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Optimum Cooling of Data Centers Jun Dai 2013-11-20 This book describes the use of free air cooling to improve the efficiency of, and cooling of, equipment for use in telecom infrastructures. Discussed at length is the cooling of communication installation rooms such as data centers or base stations, and this is intended as a valuable tool for the people designing and manufacturing key parts of communication networks. This book provides an introduction to current cooling methods used for energy reduction, and also compares present cooling methods in use in the field. The qualification methods and standard reliability assessments are reviewed, and their inability to assess the risks of free air cooling is discussed. The method of identifying the risks associated with free air cooling on equipment performance and reliability is introduced. A novel method of assessment for free air cooling is also proposed that utilizes prognostics and health management (PHM). This book also: Describes how the implementation of free air cooling can save energy for cooling within the telecommunications infrastructure. Analyzes the potential risks and failures of mechanisms possible in the implementation of free air cooling, which benefits manufacturers and equipment designers. Presents prognostics-based assessments to identify and mitigate the risks of telecommunications equipment under free air cooling conditions, which can provide the early warning of equipment failures at operation stage without disturbing the data centers' service. Optimum Cooling for Data Centers is an ideal book for researchers and engineers interested in designing and manufacturing equipment for use in telecom infrastructures.

2021 IEEE 27th International Symposium for Design and Technology in Electronic Packaging (SIITME) IEEE Staff 2021-10-27 The Primary objective of the Conference is to provide an international forum for dissemination of information and scientific results relating to education, research and development activities It is a tradition for all participants of the seminar to present paper(s) which are published in the proceedings SIITME is a premier European forum for the exchange of information between senior and young scientists from academic communities and electronic industries on topics related to their experimental and theoretical work in the very wide field of electronics and microelectronics echnology and packaging Based on a unique combination of oral and poster presentations as well as individual meetings, researchers can come together to discuss scientific problems and organize international cooperation in a convenient atmosphere during three conference days

Reliability of Microtechnology Johan Liu 2011-02-07 Reliability of Microtechnology discusses the reliability of microtechnology products from the bottom up, beginning with devices and extending to systems. The book's focus includes but is not limited to reliability issues of interconnects, the methodology of reliability concepts and general failure mechanisms. Specific failure modes in solder and conductive adhesives are discussed at great length. Coverage of accelerated testing, component and

system level reliability, and reliability design for manufacturability are also described in detail. The book also includes exercises and detailed solutions at the end of each chapter.

Fundamentals of Electronic Systems Design Jens Lienig 2017-04-25 This textbook covers the design of electronic systems from the ground up, from drawing and CAD essentials to recycling requirements. Chapter by chapter, it deals with the challenges any modern system designer faces: The design process and its fundamentals, such as technical drawings and CAD, electronic system levels, assembly and packaging issues and appliance protection classes, reliability analysis, thermal management and cooling, electromagnetic compatibility (EMC), all the way to recycling requirements and environmental-friendly design principles. "This unique book provides fundamental, complete, and indispensable information regarding the design of electronic systems. This topic has not been addressed as complete and thorough anywhere before. Since the authors are world-renown experts, it is a foundational reference for today's design professionals, as well as for the next generation of engineering students." Dr. Patrick Groeneveld, Synopsys Inc.

Thermal Management of Electronic Systems II E. Beyne 2012-12-06 For the second time, the Eurotherm Committee has chosen Thermal Managment of Electronic Systems as the subject for its 45th Seminar, held at IMEC in Leuven, Belgium, from 20 to 22 September 1995. After the successfui first edition of this seminar in Delft, June 14-16, 1993, it was decided to repeat this event on a two year basis. This volume constitutes the edited proceedings of the Seminar. Thermal management of electronic systems is gaining importance. Whereas a few years ago papers on this subject where mainly devoted to applications in high end markets, such as mainframes and telecommunication switching equipment, we see a growing importance in the "lower" end applications. This may be understood from the growing impact of electronics on every day life, from car electronics, GSM phones, personal computers to electronic games. These applications add new requirements to the thermal design. The thermal problem and the applicable cooling strategies are quite different from those in high end products. In this seminar the latest developments in many of the different aspects of the thermal design of electronic systems were discussed. Particular attention was given to thermal modelling, experimental characterisation and the impact of thermal design on the reliability of electronic systems.

Technical Safety, Reliability and Resilience Ivo Häring 2021-03-17 This book provides basics and selected advanced insights on how to generate reliability, safety and resilience within (socio) technical system developments. The focus is on working definitions, fundamental development processes, safety development processes and analytical methods on how to support such schemes. The method families of Hazard Analyses, Failure Modes and Effects Analysis and Fault Tree Analysis are explained in detail. Further main topics include semiformal graphical system modelling, requirements types, hazard log, reliability prediction standards, techniques and measures for reliable hardware and software with respect to systematic and statistical errors, and combination options of methods. The book is based on methods as applied during numerous applied research and development projects and the support and auditing of such projects, including highly safety-critical automated and autonomous systems. Numerous questions and answers challenge students and practitioners.

Fehlerbaumanalyse in Theorie und Praxis Frank Edler 2015-10-19 Dieses Fachbuch gibt eine praxisorientierte Einführung in Grundlagen und Anwendung der Fehlerbaumanalyse (FTA). Die Autoren erläutern nicht nur die mathematische und theoretischen Grundlagen, sondern auch Modellierungsregeln für die konkrete Systemanalyse. Anhand vieler Beispiele werden diese so erläutert, dass dem Leser die Konstruktion auch von komplexen Fehlerbäumen mit der Abbildung verschiedener Abstraktionsebenen eines Systems deutlich wird. Neben der Einbindung der Analyse in Entwicklungsprojekte widmet sich das

Werk auch den Qualifikationen von Analysten sowie der optimalen sprachlichen Ausarbeitung. Das Buch erfordert keine spezifischen Vorkenntnisse, setzt jedoch voraus, technische Darstellungen erfassen zu können. Das Werk richtet sich neben angehenden und praktizierenden Analysten insbesondere auch an andere, die bei Entwicklung, in Projekten oder beispielsweise als Gutachter mit Fehlerbaumanalysen in Kontakt kommen.

Systems, Software and Services Process Improvement Jakub Stolfa 2017-08-23 This volume constitutes the refereed proceedings of the 24th EuroSPI conference, held in Ostrava, Czech Republic, in September 2017.The 56 revised full papers presented were carefully reviewed and selected from 97 submissions. They are organized in topical sections on SPI and VSEs, SPI and process models, SPI and safety, SPI and project management, SPI and implementation, SPI issues, SPI and automotive, selected key notes and workshop papers, GamifySPI, SPI in Industry 4.0, best practices in implementing traceability, good and bad practices in improvement, safety and security, experiences with agile and lean, standards and assessment models, team skills and diversity strategies.

Telcom Report 1988

Reliability Growth Panel on Reliability Growth Methods for Defense Systems 2015-03-01 A high percentage of defense systems fail to meet their reliability requirements. This is a serious problem for the U.S. Department of Defense (DOD), as well as the nation. Those systems are not only less likely to successfully carry out their intended missions, but they also could endanger the lives of the operators. Furthermore, reliability failures discovered after deployment can result in costly and strategic delays and the need for expensive redesign, which often limits the tactical situations in which the system can be used. Finally, systems that fail to meet their reliability requirements are much more likely to need additional scheduled and unscheduled maintenance and to need more spare parts and possibly replacement systems, all of which can substantially increase the life-cycle costs of a system. Beginning in 2008, DOD undertook a concerted effort to raise the priority of reliability through greater use of design for reliability techniques, reliability growth testing, and formal reliability growth modeling, by both the contractors and DOD units. To this end, handbooks, guidances, and formal memoranda were revised or newly issued to reduce the frequency of reliability deficiencies for defense systems in operational testing and the effects of those deficiencies. "Reliability Growth" evaluates these recent changes and, more generally, assesses how current DOD principles and practices could be modified to increase the likelihood that defense systems will satisfy their reliability requirements. This report examines changes to the reliability requirements for proposed systems; defines modern design and testing for reliability; discusses the contractor's role in reliability testing; and summarizes the current state of formal reliability growth modeling. The recommendations of "Reliability Growth" will improve the reliability of defense systems and protect the health of the valuable personnel who operate them.

Apple Confidential 2.0 Owen W. Linzmayer 2004 Chronicles the best and the worst of Apple Computer's remarkable story.

Reliability in Electrical and Electronic Components and Systems E. Lauger 1982

자동차_기능_안전_기본_가이드 터스텐 랑엔한 2020-03-27 안전을 최우선하는 태도를 유지하라! 자동차 전장 제어기 개발자가 알아야 할 Safety Engineering의 기본 본 책은 자동차 전장 부품을 개발할 때, 반드시 고려해야 하는 ISO 26262(Automotive Functional Safety)를 다룬다. 자동차 개발에서 안전이 2000년 이후 화두가 된 배경과 이에 따라 ISO 26262가 등장하게 된 과정을 이해할 수 있다. 기업에서 안전한 제품을 만들기 위해 필요한 활동, 필요한 역할은 무엇인지를 상세히 설명한다. 여기에는 쉽게 잊어버리기 쉽지만 매우 중요한 활동이 포함된다. 안전한 제품을 위해 필요한 프로세스, 도구, 문화, 인적 자원뿐만 아니라 세부 개발 활동(설계 및 검증)에 대해서 안전 관점에서 저자의 경험을 바탕으로 설명하고 있다. 이 책에서 다루는 내용 ?자동차 전장 개발에서 안전의 의미 ?안전 관련 프로세스 ?안전 문화 ?기능 안전 관리자의 역할 ?시스템 수준의

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Zuverlässigkeit und Verfügbarkeit technischer Systeme Stefan Eberlin 2014-11-05 Diese Einführung in die Praxis für die Berechnung von Zuverlässigkeit und Verfügbarkeit von technischen Systemen legt besonderen Wert auf den technischen und wirtschaftlichen Nutzen der Ergebnisse. Ein Gerät oder System ist dann zuverlässig, wenn es über einen bestimmten Zeitraum seine definierte Funktion erbringt. Verfügbarkeit ist definiert als die Wahrscheinlichkeit, dass ein System zu einem beliebigen Zeitpunkt funktionsfähig ist bzw. - in anderer Sichtweise - zu z.B. 99,999 % zur Verfügung steht. Beide Größen werden mit Hilfe von statistischen Verfahren ermittelt. Die Verfahren werden ausführlich und, soweit sinnvoll und erforderlich, mit der zugehörigen Mathematik und mit Beispielen nachvollziehbar dargestellt. Die dafür notwendigen Daten werden definiert und die erhaltenen Ergebnisse interpretiert.

GB/T 16855.1-2008 English-translated version Codeofchina.com 2009-04-01 GB/T 16855.1-2008 Cold rolled ribbed steel wires and bars English-translated version

IC Component Sockets Weifeng Liu 2004-03-25 A broad and practical reference to IC socket technology The first and only comprehensive resource on IC (Integrated Circuit) socket technology, IC Component Sockets offers a complete overview of socket technology and design in order to provide engineers and their managers with a good understanding of these specialized technologies and the processes for evaluating them. The authors, both acknowledged experts in the field, address all relevant aspects of the subject-including materials, design, performance characteristics, failure modes and mechanisms, and qualification and reliability assessment-with emphasis on the technology's inherent advantages and challenges. Topics of interest include: * Socket design and contact technologies * Performance characteristics and material properties * Contact failure modes and mechanisms * Qualification testing conditions * Qualification sequences and setup * IEEE prediction methodology * Theoretical calculation of contact reliability Including a list of standards and specifications, this book is an important and timely resource for today's electronics engineers concerned with evaluating and perfecting socket design, manufacture, and use.

Light Scattering from Polymer Solutions and Nanoparticle Dispersions Wolfgang Schärtl 2007-08-13 Light scattering is a very powerful method for characterizing the structure of polymers and nanoparticles in solution. As part of the Springer Laboratory series, this book provides a simple-to-read and illustrative textbook probing the seemingly very complicated topic of light scattering from polymers and nanoparticles in dilute solution, and goes further to cover some of the latest technical developments in experimental light scattering.

Remaking American Security John Adams (Military officer) 2013-05-08 The United States' national security is threatened by our military's growing and dangerous reliance on foreign nations for the raw materials parts, and finished products needed to defend the American people. The health of our manufacturing sector is inextricably intertwined with our national security, and it is vital that we strengthen the sector.This reportâ€”prepared by Guardian Six Consulting LLC for the Alliance for American Manufacturingâ€”recommends 10 actions to make America less dependent on foreign nations for the vital products that enable America's soldiers, sailors, airmen, and Marines to be the most powerful and effective fighting force in the world.

Reliability Prediction from Burn-In Data Fit to Reliability Models Joseph Bernstein 2014-03-06 This work will educate chip and system designers on a method for accurately predicting circuit and system reliability in order to estimate failures that will occur in the field as a function of operating conditions at

the chip level. This book will combine the knowledge taught in many reliability publications and illustrate how to use the knowledge presented by the semiconductor manufacturing companies in combination with the HTOL end-of-life testing that is currently performed by the chip suppliers as part of their standard qualification procedure and make accurate reliability predictions. This book will allow chip designers to predict FIT and DPPM values as a function of operating conditions and chip temperature so that users ultimately will have control of reliability in their design so the reliability and performance will be considered concurrently with their design. The ability to include reliability calculations and test results in their product design The ability to use reliability data provided to them by their suppliers to make meaningful reliability predictions Have accurate failure rate calculations for calculating warrantee period replacement costs

Neo-Colonialism Kwame Nkrumah 1974 Kwame Nkrumah NEO-COLONIALISM THE LAST STAGE OF IMPERIALISM This is the book which, when first published in 1965, caused such an uproar in the US State Department that a sharp note of protest was sent to Kwame Nkrumah and the $25million of American "aid" to Ghana was promptly cancelled.

Light Metals and Alloys United States. Bureau of Standards 1927

Functional safety of machine controls Hauke, M. 2019-08-20 The EN ISO 13849-1 standard, “Safety of machinery – Safety-related parts of control systems”, contains provisions governing the design of such parts. This report is an update of BGIA Report 2/2008e of the same name. It describes the essential subject-matter of the standard in its third, revised 2015 edition, and explains its application with reference to numerous examples from the fields of electromechanics, fluidics, electronics and programmable electronics, including control systems employing mixed technologies. The standard is placed in its context of the essential safety requirements of the Machinery Directive, and possible methods for risk assessment are presented. Based upon this information, the report can be used to select the required Performance Level PLr for safety functions in control systems. The Performance Level PL which is actually attained is explained in detail. The requirements for attainment of the relevant Performance Level and its associated Categories, component reliability, levels of diagnostic coverage, software safety and measures for the prevention of systematic and common-cause failures are all discussed comprehensively. Background information is also provided on implementation of the requirements in real-case control systems. Numerous example circuits show, down to component level, how Performance Levels a to e can be engineered in the selected technologies with Categories B to 4. The examples provide information on the safety principles employed and on components with well-tried safety functionality. Numerous literature references permit closer study of the examples provided. The report shows how the requirements of EN ISO 13849-1 can be implemented in engineering practice, and thus makes a contribution to consistent application and interpretation of the standard at national and international level.

Practical and Theoretical Aspects of Geological Interpretation of Gravitational, Magnetic and Electric Fields Danis Nurgaliev 2019-02-01 This volume offers an overview of the state-of-the-art theoretical and practical approaches currently used for geophysical data interpretation. It includes new methods and techniques for solving data processing problems, and an analysis of geopotential fields by international researchers. It discusses topics such as: 1. Theoretical issues of interpretation of gravitational, magnetic and electric fields, including general methods of interpreting potential fields and other geophysical data. 2. Modern algorithms and computer technologies for interpretating geophysical fields. 3. The study of Earth deep structure using terrestrial and satellite potential field anomalies. 4. Geological interpretation of gravitational, magnetic and electric fields. This proceedings book is of

interest to all geophysical researchers.

Fault Tree Handbook W. E. Vesely 1981 Developed to serve as a text for the System Safety and Reliability Analysis course presented to Nuclear Regulatory Commission personnel and contractors. Codifies and systematizes the fault tree approach, a deductive failure analysis which focuses on one particular undesired event and provides a method for determining the causes of that event.

Into Space Thais Russomano 2018-05-30 Our anatomy and physiology have been completely shaped by Earth's gravity. All body systems function in synergy with this unseen force. Yet, as we journey further and longer into space, our bodies must conform to a new reality, wherein gravity is absent or reduced, cosmic radiation threatens and our social and familial connections become distant. Into Space: A Journey of How Humans Adapt and Live in Microgravity gives an overview of some of the physiological, anatomical and cellular changes that occur in space and their effects on different body systems, such as the cardiovascular and musculoskeletal, and touches on cultural and psychosocial aspects of leaving behind family and the safety of Earth. It further addresses the complexity of manned space flights, showing how interdisciplinary this subject is and discussing the challenges that space physiologists, physicians and scientists must face as humans seek to conquer the final frontier.

Handbook of Biomass Downdraft Gasifier Engine Systems Thomas B. Reed 1988

Intelligent Manufacturing and Energy Sustainability A.N.R. Reddy 2020-02-14 This book includes selected, high-quality papers presented at the International Conference on Intelligent Manufacturing and Energy Sustainability (ICIMES 2019) held at the Department of Mechanical Engineering, Malla Reddy College of Engineering & Technology (MRCET), Maisammaguda, Hyderabad, India, from 21 to 22 June 2019. It covers topics in the areas of automation, manufacturing technology and energy sustainability.

Beitrag zur Integration und Analyse sicherheitstechnischer Maßnahmen bei der Entwicklung eines kompletten Rechners auf FPGA-Basis Emil Gracić 2020-01-01 A frequent market demand for functional safety managers reflected the grade of the importance the functional safety won in last few years. Analyzing the past two decades we could see that this science was reserved for aviation and process industry. Today, it is present in mostly industrial sectors. It did not lose its systematical and rigorous character despite significant modifications and changes. The capability of universal use becomes the manifest in generic concept of the world wide established safety standard IEC 61508. It derivates the instances for various branches as automotive, medicine, railway etc. In parallel to FPGA a similar progress path can be recognized - specialized applications at the beginning, then frequent use for testing purposes and prototyping, while today it is an integral part of daily life. As a design platform, FPGA provides very efficient and timing pragmatic development capabilities. But these aspects cannot be trivially transferred in a domain of the safety relevant applications. The presented study focusses on this relation and provides a detailed analysis of the novel design flows of the leading FPGA manufacturers with the intention to evaluate whether the current FPGA structures are appropriate for the functional safety field. The primary scope is related to the implementation and evaluation of the On-Chip-Redundancy concept by implementing a SIL2 conform system The initial phase of this study was the development of complete computer architecture on the FPGA-based softcore 32-bit microcontroller. After successful system implementation, various internal and external safety measures that implicated a reduction of the common cause failures on an acceptable level, as well as an increase of the diagnostic coverage, have been integrated. In order to evaluate the safety of the system, the failure rate of each system component will be calculated using two different methods - gate equivalency and Xilinx reliability calculator. Validation of this concept is done by calculating the mean value of these two methods. In the

context of the safety evaluation, we carried out an intense thermodynamic analysis in the form of a complex and reliable simulation whose results significantly correlate with practical results.

Preprints 1982

Standard Handbook of Petroleum and Natural Gas Engineering: William C. Lyons 1996-10-16 Petroleum engineering now has its own true classic handbook that reflects the profession's status as a mature major engineering discipline. Formerly titled the Practical Petroleum Engineer's Handbook, by Joseph Zaba and W.T. Doherty (editors), this new, completely updated two-volume set is expanded and revised to give petroleum engineers a comprehensive source of industry standards and engineering practices. It is packed with the key, practical information and data that petroleum engineers rely upon daily. The result of a fifteen-year effort, this handbook covers the gamut of oil and gas engineering topics to provide a reliable source of engineering and reference information for analyzing and solving problems. It also reflects the growing role of natural gas in industrial development by integrating natural gas topics throughout both volumes. More than a dozen leading industry experts-academia and industry-contributed to this two-volume set to provide the best , most comprehensive source of petroleum engineering information available.

Wärtsilä Encyclopedia of Ship Technology 2015

Basics of Engineering Economy Leland Blank 2013-03-01 This text covers the basic techniques and applications of engineering economy for all disciplines in the engineering profession. The writing style emphasizes brief, crisp coverage of the principle or technique discussed in order to reduce the time taken to present and grasp the essentials. The objective of the text is to explain and demonstrate the principles and techniques of engineering economic analysis as applied in different fields of engineering. This brief text includes coverage of multiple attribute evaluation for instructors who want to include non-economic dimensions in alternative evaluation and the discussion of risk considerations in the appendix, compared to Blank's comprehensive text, where these topics are discussed in two unique chapters.

Influence of Temperature on Microelectronics and System Reliability Pradeep Lall 1997-04-24 This book raises the level of understanding of thermal design criteria. It provides the design team with sufficient knowledge to help them evaluate device architecture trade-offs and the effects of operating temperatures. The author provides readers a sound scientific basis for system operation at realistic steady state temperatures without reliability penalties. Higher temperature performance than is commonly recommended is shown to be cost effective in production for life cycle costs. The microelectronic package considered in the book is assumed to consist of a semiconductor device with first-level interconnects that may be wirebonds, flip-chip, or tape automated bonds; die attach; substrate; substrate attach; case; lid; lid seal; and lead seal. The temperature effects on electrical parameters of both bipolar and MOSFET devices are discussed, and models quantifying the temperature effects on package elements are identified. Temperature-related models have been used to derive derating criteria for determining the maximum and minimum allowable temperature stresses for a given microelectronic package architecture. The first chapter outlines problems with some of the current modeling strategies. The next two chapters present microelectronic device failure mechanisms in terms of their dependence on steady state temperature, temperature cycle, temperature gradient, and rate of change of temperature at the chip and package level. Physics-of-failure based models used to characterize these failure mechanisms are identified and the variabilities in temperature dependence of each of the failure mechanisms are characterized. Chapters 4 and 5 describe the effects of temperature on the performance characteristics of MOS and bipolar devices. Chapter 6 discusses using high-temperature stress screens,

including burn-in, for high-reliability applications. The burn-in conditions used by some manufacturers are examined and a physics-of-failure approach is described. The final chapter overviews existing guidelines for thermal derating of microelectronic devices, which presently involve lowering the junction temperature. The reader then learns how to use physics-of-failure models presented in the previous chapters for various failure processes, to evaluate the sensitivity of device life to variations in manufacturing defects, device architecture, temperature, and non-temperature stresses.

Funktionale Sicherheit von Maschinensteuerungen Hauke, M. 2017-04-30 Die Norm DIN EN ISO 13849-1 "Sicherheit von Maschinen - Sicherheitsbezogene Teile von Steuerungen" macht Vorgaben für die Gestaltung von sicherheitsbezogenen Teilen von Steuerungen. Dieser Report ist eine Aktualisierung des gleichnamigen BGIA-Reports 2/2008. Er stellt die wesentlichen Inhalte der Norm in ihrer dritten Ausgabe von 2016 vor und erläutert deren Anwendung an zahlreichen Beispielen aus den Bereichen Elektromechanik, Fluidtechnik, Elektronik und programmierbarer Elektronik, darunter auch Steuerungen gemischter Technologie. Der Zusammenhang der Norm mit den grundlegenden Sicherheitsanforderungen der Maschinenrichtlinie wird aufgezeigt und mögliche Verfahren zur Risikoabschätzung werden vorgestellt. Auf der Basis dieser Informationen erlaubt der Report die Auswahl des erforderlichen Performance Level PLr für steuerungstechnische Sicherheitsfunktionen. Die Bestimmung des tatsächlich erreichten Performance Level PL wird detailliert erläutert. Auf die Anforderungen zum Erreichen des jeweiligen Performance Level und seine zugehörigen Kategorien, auf die Bauteilzuverlässigkeit, Diagnosedeckungsgrade, Softwaresicherheit und Maßnahmen gegen systematische Ausfälle sowie Fehler gemeinsamer Ursache wird im Detail eingegangen. Hintergrundinformationen zur Umsetzung der Anforderungen in die steuerungstechnische Praxis ergänzen das Angebot. Zahlreiche Schaltungsbeispiele zeigen bis auf die Ebene der Bauteile hinunter, wie die Performance Level a bis e mit den Kategorien B bis 4 in den jeweiligen Technologien technisch umgesetzt werden können. Sie geben dabei Hinweise auf die verwendeten Sicherheitsprinzipien und sicherheitstechnisch bewährte Bauteile. Zahlreiche Literaturhinweise dienen einem tieferen Verständnis der jeweiligen Beispiele. Der Report zeigt, wie die Anforderungen der DIN EN ISO 13849-1 in die technische Praxis umgesetzt werden können, und leistet damit einen Beitrag zur einheitlichen Anwendung und Interpretation der Norm auf nationaler und internationaler Ebene.

Prognostics and Health Management of Electronics Michael G. Pecht 2008-09-11 The first book on Prognostics and Health Management of Electronics Recently, the field of prognostics for electronic products has received increased attention due to the potential to provide early warning of system failures, forecast maintenance as needed, and reduce life cycle costs. In response to the subject's growing interest among industry, government, and academic professionals, this book provides a road map to the current challenges and opportunities for research and development in Prognostics and Health Management (PHM). The book begins with a review of PHM and the techniques being developed to enable a prognostics approach for electronic products and systems. building on this foundation, the book then presents the state of the art in sensor systems for in-situ health and usage monitoring. Next, it discusses the various models and algorithms that can be utilized in PHM. Finally, it concludes with a discussion of the opportunities in future research. Readers can use the information in this book to: Detect and isolate faults Reduce the occurrence of No Fault Found (NFF) Provide advanced warning of system failures Enable condition-based (predictive) maintenance Obtain knowledge of load history for future design, qualification, and root cause analysis Increase system availability through an extension of maintenance cycles and/or timely repair actions Subtract life cycle costs of equipment from reduction in inspection costs, down time, and inventory Prognostics and Health Management of Electronics is an indispensable reference for electrical engineers in manufacturing, systems maintenance, and management, as well as design engineers in all areas of electronics.

Functional Safety for Road Vehicles Hans-Leo Ross 2016-07-25 This book highlights the current challenges for engineers involved in product development and the associated changes in procedure they make necessary. Methods for systematically analyzing the requirements for safety and security mechanisms are described using examples of how they are implemented in software and hardware, and how their effectiveness can be demonstrated in terms of functional and design safety are discussed. Given today's new E-mobility and automated driving approaches, new challenges are arising and further issues concerning "Road Vehicle Safety" and "Road Traffic Safety" have to be resolved. To address the growing complexity of vehicle functions, as well as the increasing need to accommodate interdisciplinary project teams, previous development approaches now have to be reconsidered, and system engineering approaches and proven management systems need to be supplemented or wholly redefined. The book presents a continuous system development process, starting with the basic requirements of quality management and continuing until the release of a vehicle and its components for road use. Attention is paid to the necessary definition of the respective development item, the threat-, hazard- and risk analysis, safety concepts and their relation to architecture development, while the book also addresses the aspects of product realization in mechanics, electronics and software as well as for subsequent testing, verification, integration and validation phases. In November 2011, requirements for the Functional Safety (FuSa) of road vehicles were first published in ISO 26262. The processes and methods described here are intended to show developers how vehicle systems can be implemented according to ISO 26262, so that their compliance with the relevant standards can be demonstrated as part of a safety case, including audits, reviews and assessments.

Zuverlässigkeitsvorhersage für elektronische Komponenten unter mechanischer Belastung Daniel Glose 2014-04-11 Inhaltsangabe:Einleitung: Elektronische Geräte sind in unserem Leben allgegenwärtig. Dass diese Systeme eine Erleichterung darstellen, fällt besonders dann auf, wenn sie nicht mehr funktionieren. Meist ist solch ein Ausfall aber nicht dem gesamten Gerät zuzuschreiben, sondern er beschränkt sich auf ein Element, welches seine Funktion nicht mehr erfüllt; sei es ein durchgeschlagener Kondensator oder eine Bus-Verbindung, die keine elektrische Leitfähigkeit mehr besitzt. Die Ursachen für solche Ausfälle sind vielseitig: Mangelnde Qualitätskontrollen bei der Fertigung, Fehlbedienung durch den Benutzer, Überbelastung, hohe Luftfeuchte oder mechanische Belastung können die Lebensdauer einer Komponente beeinflussen. Die vorliegende Arbeit befasst sich mit der Zuverlässigkeitsvorhersage elektronischer Komponenten. Es sollen Verfahren vorgestellt werden, die beanspruchen, eine Vielzahl von möglichen Umweltbedingungen und deren Einfluss auf die Komponenten- und Systemzuverlässigkeit zu quantifizieren. Besondere Aufmerksamkeit gilt der Berücksichtigung mechanischer Belastungen, die z.B. beim Start einer Rakete auftreten. Als wichtige Grundlage gehen Zuverlässigkeitsvorhersagen in die in Kapitel 2 beschriebenen technischen Risikoanalysen ein, die Gefährdungen und Risiken minimieren sollen. Hier dienen Ausfallwahrscheinlichkeiten zur Quantifizierung der Sicherheit und Zuverlässigkeit von Hardware. Die mathematische Definition der in Kapitel 2 erwähnten Ausfallwahrscheinlichkeit und der Ausfallrate wird neben anderen, für das Verständnis notwendigen Grundlagen, in Kapitel 3 erläutert. Dazu werden für die Beschreibung der Ausfallrate typische Verteilungen aufgezeigt. In Kapitel 4 wird die Exponentialverteilung, eine in Kapitel 3 vorgestellte Verteilung, als vereinfachende Modellannahme eingeführt. Sie wird von allen Standards zur Beschreibung der Ausfallrate angenommen. Zudem soll geklärt werden, wie die Ausfallrate und diverse Einflussfaktoren aus einer Sammlung von Feld- oder Testdaten gewonnen werden können. Die in Kapitel 3 und Kapitel 4 beschriebenen Grundlagen sind nötig, um die in Kapitel 5 beschriebenen klassischen Standards deuten und interpretieren zu können. Hier sollen multiplikative Standards wie MIL-HDBK-217, SAE (PREL), Telcordia (SR-332), CNET (RDF2000), BT (HRD5) und Italtel (IRPH) vorgestellt und deren Aufbau detailliert dargelegt werden. Insbesondere wird beschrieben, wie mechanische Belastung in multiplikativen Standards und diskreten […]

Lead-free Electronics Sanka Ganesan 2006-03-31 Lead-free Electronics provides guidance on the design and use of lead-free electronics as well as technical and legislative perspectives. All the complex challenges confronting the elec-tronics industry are skillfully addressed: * Complying with state legislation * Implementing the transition to lead-free electronics, including anticipating associated costs and potential supply chain issues * Understanding intellectual property issues in lead-free alloys and their applications, including licensing and infringement * Implementing cost effective manufacturing and testing * Reducing risks due to tin whiskers * Finding lead-free solutions in harsh environments such as in the automotive and telecommunications industries * Understanding the capabilities and limitations of conductive adhesives in lead-free interconnects * Devising solutions for lead-free, flip-chip interconnects in high-performance integrated circuit products Each chapter is written by leading experts in the field and carefully edited to ensure a consistent approach. Readers will find all the latest information, including the most recent data on cyclic thermomechanical deformation properties of lead-free SnAgCu alloys and a comparison of the properties of standard Sn-Pb versus lead-free alloys, using the energy partitioning approach. With legislative and market pressure to eliminate the use of lead in electronics manufacturing, this timely publication is essential reading for all engineers and professionals in the electronics industry.

Photovoltaic Module Reliability John H. Wohlgemuth 2020-01-08 Provides practical guidance on the latest quality assurance and accelerated stress test methods for improved long-term performance prediction of PV modules This book has been written from a historical perspective to guide readers through how the PV industry learned what the failure and degradation modes of PV modules were, how accelerated tests were developed to cause the same failures and degradations in the laboratory, and then how these tests were used as tools to guide the design and fabrication of reliable and long-life modules. Photovoltaic Module Reliability starts with a brief history of photovoltaics, discussing some of the different types of materials and devices used for commercial solar cells. It then goes on to offer chapters on: Module Failure Modes; Development of Accelerated Stress Tests; Qualification Testing; and Failure Analysis Tools. Next, it examines the use of quality management systems to manufacture PV modules. Subsequent chapters cover the PVQAT Effort; the Conformity Assessment and IECRE; and Predicting PV Module Service Life. The book finishes with a look at what the future holds for PV. A comprehensive treatment of current photovoltaic (PV) technology reliability and necessary improvement to become a significant part of the electric utility supply system Well documented with experimental and practical cases throughout, enhancing relevance to both scientific community and industry Timely contribution to the harmonization of methodological aspects of PV reliability evaluation with test procedures implemented to certify PV module quality Written by a leading international authority in PV module reliability Photovoltaic Module Reliability is an excellent book for anyone interested in PV module reliability, including those working directly on PV module and system reliability and preparing to purchase modules for deployment.

End-Of-life Management International Renewable Energy Agency 2016-06 Solar photovoltaic (PV) deployment has grown at unprecedented rates since the early 2000s. As the global PV market increases, so will the volume of decommissioned PV panels, and large amounts of annual waste are anticipated by the early 2030s. Growing PV panel waste presents a new environmental challenge, but also unprecedented opportunities to create value and pursue new economic avenues.This report, prepared jointly by the International Renewable Energy Agency (IRENA) and the International Energy Agency Photovoltaic Power Systems Programme (IEA-PVPS), is the first-ever projection of PV panel waste volumes to 2050. It highlights that recycling or repurposing solar PV panels at the end of their roughly 30-year lifetime can unlock an estimated stock of 78 million tonnes of raw materials and other valuable components globally by 2050. If fully injected back into the economy, the value of the recovered material could exceed USD 15 billion by 2050.