

Chemical Process Industries 1st Edition

Human Factors in the Chemical and Process Industries: Making it Work in Practice is a comprehensive overview of human factors within this sector, focusing on the practical application. It has been written by acknowledged industry experts from the Keil Centre, which is a leading practice of chartered ergonomics and human factors specialists, chartered safety specialists, registered occupational psychologists, and registered clinical psychologists. The book was inspired by the international human factors training course run by the Keil Centre with the IChemE, which has reached four continents across the world. The book is written for those who want a comprehensive overview of the subject, focusing on the practical application of human factors. It has been written for safety professionals, engineers and operational disciplines within industry, and those aspiring to these disciplines, who either deal with human factors issues or any aspect of the 'human element' in their core role. The book explains what 'human factors' is about and how human factors issues are best managed from a practical perspective. It will help readers develop a greater understanding of the area and how to establish more effective solutions for human factors related issues. Provides comprehensive coverage of the most relevant human factors within this sector, with succinct overviews of each topic Uses case studies and practical examples to illustrate topics and explains the material in a fully accessible, easy to understand style Written by a single team of eleven industry practitioners, drawing on the combined expertise of different human factors specialisms which are rarely comprehensively combined in a single resource

With a focus on actual industrial processes, e.g. the production of light alkenes, synthesis gas, fine chemicals, polyethylene, it encourages the reader to think "out of the box" and invent and develop novel unit operations and processes. Reflecting today's emphasis on sustainability, this edition contains new coverage of biomass as an alternative to fossil fuels, and process intensification. The second edition includes: New chapters on Process Intensification and Processes for the Conversion of Biomass Updated and expanded chapters throughout with 35% new material overall Text boxes containing case studies and examples from various different industries, e.g. synthesis loop designs, Sasol I Plant, Kaminsky catalysts, production of Ibuprofen, click chemistry, ammonia synthesis, fluid catalytic cracking Questions throughout to stimulate debate and keep students awake! Richly illustrated chapters with improved figures and flow diagrams Chemical Process Technology, Second Edition is a comprehensive introduction, linking the fundamental theory and concepts to the applied nature of the subject. It will be invaluable to students of chemical engineering, biotechnology and industrial chemistry, as well as practising chemical engineers. From reviews of the first edition: "The authors have blended process technology, chemistry and thermodynamics in an elegant manner... Overall this is a welcome addition to books on chemical technology." – The Chemist "Impressively wide-ranging and comprehensive... an excellent textbook for students, with a combination of fundamental knowledge and technology." – Chemistry in Britain (now Chemistry World)

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Fluoropolymer Applications in Chemical Processing Industries: The Definitive User's Guide and Handbook, Second Edition, contains the most extensive collection of data and information on fluoropolymer applications in chemical processing industries. Because of their superior properties, fluoropolymers have been rapidly replacing metal alloys for corrosion inhibition in chemical processing equipment. This book is a complete compendium of information about fluoropolymer lining materials and structural piping and tubing. Fluoropolymer surfaces preserve purity of processing streams in the chemical processing, plastics, food, pharmaceutical, semiconductor, and pulp and paper industries. Updated to reflect major changes since 2004, this book contains practical, problem-solving tools for professionals in those industries. Equipment manufacturers, plant operators, and product design and manufacturing engineers all will benefit from the in-depth knowledge provided. This new edition includes new fluoropolymer grades and new examples of the fluoropolymer role in preventing corrosion. New fabrication techniques have been added, and additional emphasis has been placed on adhesion and welding techniques. New sections have been added on inspection of new linings, and in-service inspection – including inspection frequency, acceptance criteria, fitness for service evaluation, and reparability. Includes extensive guidelines for the selection of fluoropolymers for corrosion control Features a detailed 'how-to' on processes that convert fluoropolymers into shapes and parts Discusses fabrication techniques to finish the fluoropolymer components before exposure to harsh chemical environments Includes laboratory techniques to determine the cause of part failure, and a modeling methodology to predict and analyze failure of fluoropolymer parts

This title introduces the underlying theory and demonstrates practical applications in different process industries using hybrid modeling. It reviews hybrid modeling approach applicability in wide range of process industries, recommends how to increase hybrid model performance and throw Insights into cost efficient practices in modeling techniques Discusses advance process operation maximizing the benefits of available process knowledge and Includes real-life and practical case studies

Supplying nearly 350 expertly-written articles on technologies that can maximize and enhance the research and production phases of current and emerging chemical manufacturing practices and techniques, this second edition provides gold standard articles on the methods, practices, products, and standards recently influencing the chemical industries. New material includes: design of key unit operations involved with chemical processes; design, unit operation, and integration of reactors and separation systems; process system peripherals such as pumps, valves, and controllers; analytical techniques and equipment; current industry practices; and pilot plant design and scale-up criteria.

Safety in process industries is of utmost necessity to ensure protection from hazards. The aim of this book is to elucidate the hazards and preventive measures for a few of such specific industrial processes. Starting with overview of the prevalent industrial accidents, types of hazards and safety provisions, the book contains nineteen chapters with each one of them consisting of a unique case study comprising of basic causes, results and discussion, and protective measures to be adopted to overcome such situation. Topics covered include caprolactam storage tank accident, fire explosion accident caused by static electricity, and human factors risk and management in

process safety and so forth. Aimed at researchers, professionals, graduate students in Chemical Engineering, Safety Management, Risk Assessment, Chemical Process Safety, this book: Provides exhaustive coverage of industrial case studies on their hazards and safety issues in the process industry set-up. Includes quantitative discussion on new and existing technologies and methodologies. Explores high quality descriptive and quantified data for better visualization of each chapter. Gives detailed description on various industrial accidents, their related consequences and available safety/preventive measures. Discusses preventive measures taken by world class industries in their production plants.

Human Factors in the Chemical and Process Industries Making it Work in Practice Elsevier

Domino Effects in the Process Industries discusses state-of-the-art theories, conceptual models, insights and practical issues surrounding large-scale knock-on accidents—so-called domino effects—in the chemical and process industries. The book treats such extremely low-frequency phenomena from a technological perspective, studying possible causes and introducing several approaches to assess and control the risks of these scenarios. The authors also examine these events from a managerial viewpoint, discussing single and multi-plant management insights and requirements to take proactive measures to prevent such events. Academics, regulators, and industrialists who study and analyze domino effects in order to prevent such events will find the book unique and highly valuable. Outlines available methods in analyzing these events, aiding understanding of the accidents and their causes Covers current modelling, control and management tactics of domino effects, -facilitating prevention Identifies areas where new research is needed

Methods in Chemical Process Safety, Volume Four focuses on the process of learning from experience, including elements of process safety management, human factors in the chemical process industries, and the regulation of chemical process safety, including current approaches. Users will find this book to be an informative tool and user manual for process safety for a variety of professionals with this new release focusing on Advanced Methods of Risk Assessment and Management, Logic Based Methods for Dynamic Risk Assessment, Bayesian Methods for Dynamic Risk Assessment, Data Driven Methods, Rare Event Risk Assessment, Risk Management and Multi Criteria, and much more. Helps acquaint the reader/researcher with the fundamentals of process safety Provides the most recent advancements and contributions on the topic from a practical point-of-view Presents users with the views/opinions of experts in each topic Includes a selection of authors who are leading researchers and/or practitioners for each given topic

The tragic incident at Bhopal, India made it clear that safety reviews for identification and control of accidents involving toxic chemicals must be more systematic. This guide shows how to integrate hazard identification, risk assessment, consequence analysis, and risk mitigation into a formalized program for handling hazardous chemicals. Most of the 21 contributors are senior staff members at Stone & Webster Engineering Corporation. They discuss how to perform and supervise safety studies for chemical, petrochemical, petroleum refining, and other facilities. They discuss all aspects of detection, prevention, and mitigation of risks associated with processing, handling, and production of hazardous chemicals. Special attention is given to hazard

identification and hazard assessment techniques ranging from simple screening checklists to highly structured Hazard and Operability (HAZOP) analysis. You're shown how to calculate potential consequences of identified hazards, quantify the likelihood of these events, and combine equipment failure rate data and human reliability analysis with hazard assessment. You'll also benefit from the book's rundowns of how to * apply expert systems and artificial intelligence in risk management * instill safety-oriented operating and maintenance procedures * train operators and emergency response personnel * conduct internal and external safety audits * perform chemical dispersion, explosion, and fire analyses * assess health effects from chemical releases * use insurance vehicles to deal with residual risk. Risk Assessment and Risk Management for the Chemical Process Industry is an essential source on minimizing the dangers of toxic incidents and accidents. It is essential reading for safety engineers, regulatory managers, environmental engineers, and other professionals responsible for safety in chemical plants.

Human Factors Methods for Improving Performance in the Process Industries provides guidance for managers and plant engineering staff on specific, practical techniques and tools for addressing forty different human factors issues impacting process safety. Human factors incidents can result in injury and death, damage to the environment, fines, and business losses due to ruined batches, off-spec products, unplanned shutdowns, and other adverse effects. Prevention of these incidents increases productivity and profits. Complete with examples, case histories, techniques, and implementation methodologies, Human Factors Methods for Improving Performance in the Process Industries helps managers and engineering staff design and execute an efficient program. Organized for topical reference, the book includes: An overview on implementing a human factors program at the corporate level or the plant level, covering the business value, developing a program to meet specific needs, improving existing systems, roles and responsibilities, measures of performance, and more Summaries of forty different human factors relating to process safety, with a description of the tools, a practical example with graphics and visual aids, and additional resources Information on addressing the OSHA Process Safety Management (PSM) requirement for conducting human factors reviews in process hazard analyses (PHAs) A CD-ROM with a color version of the book Note: CD-ROM/DVD and other supplementary materials are not included as part of eBook file.

Scaling Chemical Processes: Practical Guides in Chemical Engineering is one of a series of short texts that each provides a focused introductory view on a single subject. The full library spans the main topics in the chemical process industries for engineering professionals who require a basic grounding in various related topics. They are 'pocket publications' that the professional engineer can easily carry with them or access electronically while working. Each text is highly practical and applied, and presents first principles for engineers who need to get up to speed in a new area fast. The focused facts provided in each guide will help you converse with experts in the field, attempt your own initial troubleshooting, check calculations, and solve rudimentary problems. This book discusses scaling chemical processes from a laboratory through a pilot plant to a commercial plant. It bases scaling on similarity principles and uses dimensional analysis to derive the dimensionless parameters necessary to ensure a successful chemical process development program. This series is fully endorsed and co-branded

by the IChemE, and they help to promote the series. Offers practical, short, concise information on the basics to help you get an answer or teach yourself a new topic quickly Includes industry examples to help you solve real world problems Provides key facts for professionals in convenient single subject volumes Discusses scaling chemical processes from a laboratory through a pilot plant to a commercial plant

The purpose of this book is to provide a base of information and analysis to assist in implementation of the policy of reducing and/or minimizing hazardous waste generation in manufacturing and more specifically in the process industries. What is the significance of reducing the generation of all process wastes? This book examines the technical nature of waste reduction and the extent to which waste reduction can likely be implemented. Also explored is the extent to which technology itself, as well as information and resources, is a barrier to waste reduction. In what ways are waste reduction decisions dependent on specific circumstances? Can the amount of feasible waste reduction be estimated? Auditing of manufacturing and unit operations and processes are particularly significant and useful in the chemical process industries (food, pharmaceuticals, chemicals, fertilizer, petrochemicals, etc.) since it is estimated that these industries account for more than half of the hazardous wastes generated. This book presents a compilation of complete information on potential sources of waste loss or generation through technical inspection. Also presented are calculation methods for determining air-waste-solid wastes material balances, informational requirements and waste reduction analysis. The reader should find the book useful in the areas of auditing and waste minimization. It is replete with useful information as well as specific case histories, which should make it a practical tool for the user.

Safety in the Process Industries tackles safety issues concerning the process industry. The book covers the various hazards, policies, and safety measures in the process industry. The first part of the text presents policies and case histories. Part II discusses the various hazards present in the process industry, such as electrical, fire, explosives, corrosive chemicals, and hardware. Part III tackles hazard control in design and maintenance. Part IV deals with other related topics that concern safety, such as management, safety training, and emergency planning. The book will be of great help to individuals involved in the management, development, planning, design, construction, operation, inspection, and maintenance of a process plant.

Energy Conservation in the Process Industries provides insight into ways of identifying more important energy efficiency improvements. This book demonstrates how the principles can be employed to practical advantage. Organized into 12 chapters, this book begins with an overview of the energy situation and a background in thermodynamics. This text then describes a staged method to improved energy use to understand where the energy goes and how to calculate the value of losses. Other chapters consider improving facilities based on an understanding of the overall site energy system. This book discusses as well the fundamental process and equipment improvements. The final chapter deals with systematic and sophisticated design methods as well as provides some guidelines and checklists for energy conservation items. This book is a valuable resource for mechanical, lead process, and plant engineers involved in energy conservation. Process designers, plant managers, process researchers, and accountants will also find this book extremely useful. Here is a new and analytical approach to chemical plant safety-encompassing design,

construction, and operation to reduce the likelihood of hazardous incidents as well as actions to mitigate their consequences should they still occur. The most significant safety issues are addressed both from the viewpoint of the fundamental phenomena and the perspective of plant design. Many of the phenomena covered are outside the scope of the normal chemical engineering curriculae; examples include compressible multiphase flow, deflagrations and detonations, turbulent dispersion, thermochemical characterization methods for material decomposition and reactions. In the plant design area, topics of importance include built in redundancy of equipment, and minimization of inventory of hazardous materials. The combination of the fundamental and applied aspects makes this book a unique and useful one for both the academic and industrial sectors.

Designed to clarify the interpretations of specifications in the chemical and process industries, this valuable reference can be used to negotiate, operate, and establish specifications. An actual process for setting specifications is outlined that will help alleviate conflicts that occur during the negotiation of specifications. This manual is especially beneficial for all quality, engineering, and manufacturing personnel who need to establish specifications for the chemical and process industries and their suppliers. "The most complete, up-to-date, problem-solving toolkit for chemical engineers and process designers. Industrial Chemical Process Design, Second Edition provides a step-by-step methodology and 25 downloadable, customizable, needs-specific software applications that offer quick, accurate solutions to complex process design problems. These applications uniquely fill the gaps left by large, very expensive commercial process simulation software packages used to select, size, and design industrial chemical process equipment. Written by a hands-on industry consultant and featuring more than 200 illustrations, this book thoroughly details: Sizing and cost estimating of process unit operation equipment Design and rating of fractionation equipment and three-phase separation equipment Chemical optimization Commercial distillation Packaged plant cost analysis Estimating cost for modular packages Performing operations such as liquid-liquid extraction and gas liquid separation vessel sizing and rating Green engineering New to the Second Edition: Added focus on sustainability with new green engineering coverage: crude oil database; vegetable oils and plant greenhouse production for use in automobile fuels; gasoline and diesel fuel database; greenhouse fuels; water removal treatment in three-phase vessel design New focus on engineering economics Simplified shell/tube design method and improved shell/tube exchanger software improvements Fluid flow coverage includes both single- and two-phase flow and the very desirable addition of complete process engineering of NO_x removal and catalytic SCR reactor processes necessary in all electric generator power plants and refinery furnace systems (per mandatory EPA regulations) Coverage of the Fischer-Tropsch process converting natural methane gas to crude oil products, liquids, gasoline, diesel, and jet fuel - all sulfur-free! Includes a plan to decrease reliance on crude oil imports Contains a packaged cost analysis natural gas-to-liquids plant turn-key software program "--

This textbook presents a thorough overview of chemical and process industries. It describes the standard technologies and the state of the industries and the manufacturing processes of specific chemical and allied products. It includes examples of industries in Ghana, highlighting the real-world applications of these technologies.

The book introduces new developments in the processes in chemical industry, focuses on the technology and methodology of the processes and the chemistry underlying them. It offers guidance on operating of processing units. Furthermore, it includes sections on safety and environmental pollution control in industry. With a pedagogical and comprehensive approach, utilizing illustrations and tables, this book provides students in chemical engineering and industrial chemistry with a concise and up-to-date overview of this diverse subject.

This book represents the systematic coverage of mass and energy balancing in the process industries. The classical treatment of balances in the available literature is complemented in the following areas: - systematic analysis of large systems by Graph theory - comprehensive thermodynamic analysis (entropy and availability) - balancing on the basis of measured plant data (data reconciliation) - measurement design and optimisation - dynamic balancing - plant-wide regular mass and energy balancing as a part of company's information system. The major areas addressed are: - single- and multi-component balancing - energy balance - entropy and exergy (availability) balances - solvability of balancing problems - balancing with data reconciliation - dynamic balancing - measurement design and optimisation - regular balancing of large industrial systems. The book is directed to chemical engineers, plant designers, technologists, information technology managers, control engineers and instrumentation engineers in process industries. Major areas of applications are process industries and energy production, such as oil refining, natural gas processing, petrochemistry, chemical industries, mineral processing and utility production and distribution systems. University students and teachers of chemical engineering and control will also find the book invaluable.

The latest advances in process monitoring, data analysis, and control systems are increasingly useful for maintaining the safety, flexibility, and environmental compliance of industrial manufacturing operations. Focusing on continuous, multivariate processes, Chemical Process Performance Evaluation introduces statistical methods and modeling techniques for process monitoring, performance evaluation, and fault diagnosis. This book introduces practical multivariate statistical methods and empirical modeling development techniques, such as principal components regression, partial least squares regression, input-output modeling, state-space modeling, and modeling process signals for trend analysis. Then the authors examine fault diagnosis techniques based on episodes, hidden Markov models, contribution plots, discriminant analysis, and support vector machines. They address controller process evaluation and sensor failure detection, including methods for differentiating between sensor failures and process upset. The book concludes with an extensive discussion on the use of data analysis techniques for the special case of web and sheet processes. Case studies illustrate the implementation of methods presented throughout the book. Emphasizing the balance between practice and theory, Chemical Process Performance Evaluation is an excellent tool for comparing alternative techniques for process monitoring, signal modeling, and process diagnosis. The unique integration of process and controller monitoring and fault diagnosis facilitates the practical implementation of unified and automated monitoring and diagnosis technologies.

"Covers global and domestic competition, marketing strategies, operating expenses, and environmental and safety regulations for chemical professionals at all levels.

Contains up-to-date mergers and acquisitions of chemical companies."

"Analyzes health and hazard risk assessment in commercial, industrial, and refining industries. Emphasizes legal requirements, emergency planning and response, safety equipment, process implementation, and occupational and environmental protection exposure guidelines. Presents applications and calculations for risk analysis of real systems, as well

?The book is written with a balanced and comprehensive approach towards chemical process safety, involving hazards, both of materials and processes. It includes analysis of hazards in plants in order to further explain the preventive and protective measures along with management involvement and safety audits to the readers. The text can be used as a textbook by under graduate students as well as a reference by industry professionals, consulting organizations, marketing personnel and others involved in safety aspects in process industry. Part I: Process design -- Introduction to design -- Process flowsheet development -- Utilities and energy efficient design -- Process simulation -- Instrumentation and process control -- Materials of construction -- Capital cost estimating -- Estimating revenues and production costs -- Economic evaluation of projects -- Safety and loss prevention -- General site considerations -- Optimization in design -- Part II: Plant design -- Equipment selection, specification and design -- Design of pressure vessels -- Design of reactors and mixers -- Separation of fluids -- Separation columns (distillation, absorption and extraction) -- Specification and design of solids-handling equipment -- Heat transfer equipment -- Transport and storage of fluids.

Written by more than 40 world renowned authorities in the field, this reference presents information on plant design, significant chemical reactions, and processing operations in industrial use - offering shortcut calculation methods wherever possible.

This practical text serves as a guide to elaborating and determining the principles, assumptions, strengths, limitations and areas of application for multiple-plant chemical safety and security management. It offers guidelines, procedures, frameworks and technology for actually setting up a safety and security culture in a cluster of chemical companies, thus allowing forward planning. The presentation is conceptually rather than mathematically oriented so as to maximize its utilization within the chemical industry.

Imagine if your process manufacturing plants were running so well that your production, safety, environmental, and profitability targets were being met so that your subject matter experts could focus on data-driven business improvements. Through proper use and analysis of your existing operations data, your company can become an industry leader and reward your stakeholders. Written in an engaging and easily understandable manner, this book demonstrates a step-by-step process of how an organization can effectively utilize technology and make the necessary culture changes to achieve operational excellence. You will see how several industry-leading companies have used an effective real-time data

infrastructure for mission-critical business use cases. The book also addresses challenges involved, such as effectively integrating operational (OT) data with business (IT) systems to enable a more proactive, predictive management model for a fleet of process plants. Some of the things you will take away: Learn how a real-time data infrastructure enables transformation of raw sensor data into contextualized information for operational insights and business process improvement. Understand how reusing the same operational data for multiple use cases significantly impacts fleet management, profitability, and asset stewardship. See how a simple digital unit template representing production flows can be repeatedly used to identify critical inefficiencies in plant operations. Discover best practices of deploying real-time situational awareness alerts and predictive analytics. Realize how to transform your organization into a data-driven culture for continuous sustainable improvement. Find out how leading companies integrate operations data with business intelligence and predictive analytics tools in a corporate on-premises or cloud-enabled environment. Learn how industry-leading companies have imaginatively used a real-time data infrastructure to improve yields, reduce cycle times, and slash operating costs. This book is targeted for process industries production and operations leadership, senior engineers, IT management, CIOs, and service providers to those industries. Academics will benefit from latest data analysis strategies. This book guides readers to use the best, results-proven approaches to ensure operational excellence.

This book is a manual for designing and operating a basic quality management program; a practical discussion of what is needed and how to fulfill those needs on a practical basis. It will be helpful to chemical engineers, plant laboratory managers and those interested in quality management.

This volume is a valuable reference work for the student and the practising engineer in the chemical, pharmaceutical, minerals, food, plastics, paper and metallurgical industries. The second edition of this successful text has been thoroughly rewritten and updated. Based on the long running post-experience course produced by the University of Bradford, in association with the Institution of Chemical Engineers, it covers all aspects of mixing, from fundamentals through to design procedures in single and multi-phase systems. Experts from both industry and academia have contributed to this work giving both a theoretical practical approach. It covers dry and wet powders, single and two-phase liquids, solid/liquid and gas/liquid systems. The range of mixers available for such diverse duties is dealt with, including tumbler mixers for powders, mechanically agitated vessels, in-line continuous mixers and jet mixers. Coverage is given of the range of mixing objectives, varying from achieving product uniformity to obtaining optimum conditions for mass transfer and chemical reactions. This volume is a valuable reference work for the student and the practising engineer in the chemical, pharmaceutical, minerals, food, plastics, paper and metallurgical industries. The second edition of this successful text has

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Human Behavior in Hazardous Situations introduces a new generation within safety management, fully developed with neuropsychological insights, developed in collaboration with, and put to test by, the chemical and process industries. Until now, there has been little theoretical framework on how, and especially why, people behave the way they do in hazardous situations. Human Behavior in Hazardous Situations presents new theories, based on a human behavioral approach, to offer a fresh perspective on safety management. By way of case studies, practical tips and exercises, Dr Jan Daalmans demonstrates how this neuropsychological approach can be applied for those safety managers working in the Chemical, Process and Pharmaceutical industries. Presents new brain-based approaches to safety, with a historical perspective on the evolution of the safety management. Practical tips and guidance for those working in the chemical and process industries. Including exercises and case studies to demonstrate the practical application of techniques.

Industrial Chemical Process Analysis and Design uses chemical engineering principles to explain the transformation of basic raw materials into major chemical products. The book discusses traditional processes to create products like nitric acid, sulphuric acid, ammonia, and methanol, as well as more novel products like bioethanol and biodiesel. Historical perspectives show how current chemical processes have developed over years or even decades to improve their yields, from the discovery of the chemical reaction or physico-chemical principle to the industrial process needed to yield commercial quantities. Starting with an introduction to process design, optimization, and safety, Martin then provides stand-alone chapters—in a case study fashion—for commercially important chemical production processes. Computational software tools like MATLAB®, Excel, and Chemcad are used throughout to aid process analysis. Integrates principles of chemical engineering, unit operations, and chemical reactor engineering to understand process synthesis and analysis Combines traditional computation and modern software tools to compare different solutions for the same problem Includes historical perspectives and traces the improving efficiencies of commercially important chemical production processes Features

worked examples and end-of-chapter problems with solutions to show the application of concepts discussed in the text

Offering a modern, process-oriented approach emphasizing process control scheme development instead of extended coverage of Laplace space descriptions of process dynamics, this text focuses on aspects that are most important for process engineering in the 21st century. Instead of starting with the controller, the book starts with the process and moves on to how basic regulatory control schemes can be designed to achieve the process' objectives while maintaining stable operations. In addition to continuous control concepts, process and control system dynamics are embedded into the text with each new concept presented. The book also includes sections on batch and semi-batch processes and safety automation within each concept area. It discusses the four most common process control loops—feedback, feedforward, ratio, and cascade—and discusses application of these techniques for process control schemes for the most common types of unit operations. It also discusses more advanced and less commonly used regulatory control options such as override, allocation, and split range controllers, includes an introduction to higher level automation functions, and provides guidance for ways to increase the overall safety, stability, and efficiency for many process applications. It introduces the theory behind the most common types of controllers used in the process industries and also provides various additional plant automation-related subjects.

Physical Security in the Process Industry: Theory with Applications deals with physical security in the field of critical infrastructures where hazardous materials are a factor, along with the state-of-the-art thinking and modeling methods for enhancing physical security. The book offers approaches based on scientific insights, mainly addressing terrorist attacks. Moreover, the use of innovative techniques is explained, including Bayesian networks, game-theory and petri-networks. Dealing with economic parameters and constraints and calculating the costs and benefits of security measures are also included. The book will be of interest to security (and safety) scientists, security managers and the public at large. Discusses how to achieve inherent physical security using a scientific approach Explores how to take adequate add-on physical security measures Covers risk assessment tools and applications for practical use in the industry Demonstrates how to optimize security decisions using security models and approaches Considers economic aspects of security decisions

While Lean practices have been successfully implemented into the process industry with excellent results for over 20 years (including the author's own award winning example at Exxon Chemical), that industry has been especially slow in adopting Lean. Part of the problem is that the process industry needs its own version of Lean. The larger part of t

This textbook covers the essential aspects of process safety engineering in a practical and comprehensive manner. It provides readers with an understanding of process safety hazards in the refining and petrochemical industries and how to

manage them in a reliable and professional manner. It covers the most important concepts: static electricity, intensity of thermal radiation, thermodynamics of fluid phase equilibria, boiling liquid expanding vapor explosion (BLEVE), emission source models, hazard identification methods, risk control and methods for achieving manufacturing excellence while also focusing on safety. Extensive case studies are included. Aimed at senior undergraduate and graduate chemical engineering students and practicing engineers, this book covers process safety principles and engineering practice authoritatively, with comprehensive examples:

- Fundamentals, methods, and procedures for the industrial practice of process safety engineering.
- The thermodynamic fundamentals and computational methods for release rates from ruptures in pipelines, vessels, and relief valves.
- Fundamentals of static electricity hazards and their mitigation.
- Quantitative assessment of fires and explosions.
- Principles of dispersion calculations for toxic or flammable gases and vapors.
- Methods of qualitative and quantitative risk assessment and control.

Lees' is industry's first stop for process safety information. Lees' 4e is the comprehensive and scalable source of professional industrial process safety and loss prevention information. Available in print and electronic formats, and online with additional new tools and an annual update schedule, Lees' provides users with the information they require to ensure process safety. Volume 1 covers legislation, engineering and design: Key topics include law; major hazard control; economics and insurance; reliability engineering; hazard identification; hazard assessment; process design; pressure system design; control system design; emission and dispersion; and fire. Volume 2 covers operation and practical safety: Key topics include explosion, toxic release, plant operation, storage, transport, emergency planning, personal safety, accident research, reactive chemicals, safety instrumented systems, and chemical security. Volume 3 contains the case histories and data, including ACMH model license conditions; HSE guidelines' public planning inquiries; standards and codes; process safety management (PSM) regulations in the United States; risk management program regulations * THE process safety encyclopedia, trusted worldwide for over 30 years * Now available in print and online, to aid searchability and portability * Over 3600 print pages cover the full scope of process safety and loss prevention, compiling theory, practice, standards, legislation, case studies and lessons learned, in one resource as opposed to multiple sources.

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