Process Innovation In Petroleum Refining

#petroleum refining innovation #oil refinery process optimization #advanced refining technologies #energy efficiency refining #hydrocarbon processing innovation

Explore the critical advancements in process innovation within petroleum refining, focusing on strategies that enhance efficiency, reduce costs, and improve environmental performance. Discover how adopting cutting-edge technologies and optimized methodologies is transforming crude oil conversion into high-value products, driving the industry towards a more sustainable and productive future.

Process Innovation in Petroleum Refining

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Process Innovation in Petroleum Refining - Primary Source Edition

Throughout the twentieth century the technology employed by the petroleum refining industry has been advancing rapidly, yet it has generally escaped study. Whatever the explanation for its scholarly neglect, the advances that have been secured over the century have enabled the producers of petroleum products to meet the ever-increasing demands for their products throughout the world. No other manufactured goods are so universally and so cheaply available. This book concentrates on the technical changes that have been secured in the second half of this century, using as its basis the main petroleum refining process, Fluid Catalytic Cracking. Both technological and economic aspects are examined over the sixty years of the process's history; and, in a novel attempt, related the one to the other: an accomplishment that reveals more about the technology and the economics rather than either engineering or economic analysis would separately. Technology and economics are connected in the real world: in this study they are connected in their exposition. As in conventional economic history, technological improvements are summarized and their sources and consequences determined. In addition, the long-term pattern of costs and profits is displayed; and regular measurements are taken throughout, so that experience can be seen as the continuous unfolding of industrial progress.

Petroleum Progress and Profits

As feedstocks to refineries change, there must be an accompanying change in refinery technology. This means a movement from conventional means of refining heavy feedstocks using (typically) coking technologies to more innovative processes that will coax the last drips of liquid fuels from the feedstock. This book presents the evolution of refinery processes during the last century and as well as the means by which refinery processes will evolve during the next three-to-five decades. Chapters contain

material relevant to (1) comparisons of current feedstocks with heavy oil and bio-feedstocks; (2) evolution of refineries since the 1950s, (3) properties and refinability of heavy oil and bio-feedstocks, (4) thermal processes vs. hydroprocesses, and (5) evolution of products to match the environmental market. Process innovations that have influenced refinery processing over the past three decades are presented, as well as the relevant patents that have the potential for incorporation into future refineries. • Comparison of current feedstocks with heavy oil and bio-feedstocks. • Evolution of refineries over the past three decades. • Properties and refinability of heavy oil and bio-feedstocks. • Thermal processes vs. Hydroprocesses. • Evolution of products to match the environmental market. Investigates the engineering and plant design challenges presented by heavy oil and bio-feedstocks Explores the legislatory and regulatory climate, including increasingly stringent environmental requirements Examines the trade-offs of thermal processes vs. hydroprocesses

Technical Progress and Profits

Taking the case of the Norwegian petroleum industry as its vantage point, the book discusses the question of industrial transformations in resource-based industries. The book presents new, empirically-based analyses of the development of the petroleum industry, with an emphasis on three ongoing transformation processes: Technological upgrading and innovation in upstream petroleum. Globalisation of the petroleum industry and suppliers' experiences of entering foreign markets. Diversification into and out of petroleum – and the potential for new growth paths after oil. Drawing together a range of key thinkers in this field, this volume addresses the ways in which the petroleum industry and its supply industry has changed since the turn of the millennium. It provides recommendations for the development of resource economies in general and petroleum economies in particular. This book will be of great interest to students and scholars of energy policy and economics, natural resource management, innovation studies and the politics of the oil and gas sector.

The Refinery of the Future

Petroleum refiners must face billion-dollar investments in equipment in order to meet ever-changing environmental requirements. Because the design and construction of new processing units entail several years' lead time, refiners are reluctant to commit these dollars for equipment that may no longer meet certain conditions when the units come on stream. Written by experts with both academic and professional experience in refinery operation, design, and evaluation, Petroleum Refining Technology and Economics, Fifth Edition is an essential textbook for students and a vital resource for engineers. This latest edition of a bestselling text provides updated data and addresses changes in refinery feedstock, product distribution, and processing requirements resulting from federal and state legislation. Providing a detailed overview of today's integrated fuels refinery, the book discusses each major refining process as they relate to topics such as feedstock preparation, operating costs, catalysts, yields, finished product properties, and economics. It also contains end-of-chapter problems and an ongoing case study.

Petroleum Industry Transformations

This work highlights contemporary approaches to resource utilization and provides comprehensive coverage of technological advances in residuum conversion. It illustrates state-of-the-art engineering methods for the refinement of heavy oils, bitumen, and other high-sulphur feedstocks.

Petroleum Refining

A comprehensive review of the theory and practice of the simulation and optimization of the petroleum refining processes Petroleum Refinery Process Modeling offers a thorough review of how to quantitatively model key refinery reaction and fractionation processes. The text introduces the basics of dealing with the thermodynamics and physical property predictions of hydrocarbon components in the context of process modeling. The authors - three experts on the topic - outline the procedures and include the key data required for building reaction and fractionation models with commercial software. The text shows how to filter through the extensive data available at the refinery and using plant data to begin calibrating available models and extend the models to include key fractionation sub-models. It provides a sound and informed basis to understand and exploit plant phenomena to improve yield, consistency, and performance. In addition, the authors offer information on applying models in an overall refinery context through refinery planning based on linear programming. This important resource: -Offers the basic information of thermodynamics and physical property predictions

of hydrocarbon components in the context of process modeling -Uses the key concepts of fractionation lumps and physical properties to develop detailed models and workflows for atmospheric (CDU) and vacuum (VDU) distillation units -Discusses modeling FCC, catalytic reforming and hydroprocessing units Written for chemical engineers, process engineers, and engineers for measurement and control, this resource explores the advanced simulation tools and techniques that are available to support experienced and aid new operators and engineers.

Petroleum Refining Processes

Leveraging Synergies Between Refining and Petrochemical Processes provides a detailed description of the interfaces and connections between crude oil refining and petrochemicals. It offers a view of global and regional markets and economic opportunities for synergies between these sectors. Features: Shows a global and regional market outlook for crude oil refining and petrochemical sectors Explores economic and market opportunities for taking advantage of the synergies between both sectors Analyzes the technical challenges and opportunities that come with these synergies Gives an outlook and prediction of what companies will be able to achieve in the mid-term future Provides introductory and explanatory material as well as in-depth insight into future technology and market developments This book serves as a reference for professionals in chemical engineering, oil and gas engineering, and industrial chemistry. It aims to help engineers and industry professionals understand the challenges and the potential benefits of developing expansion or optimization projects that may bridge the gap between refining and petrochemicals.

Petroleum Refinery Process Modeling

For the first time, an essential reference for the multi-billion dollar petrochemical industry that covers the complex topics involved in refining.

Leveraging Synergies Between Refining and Petrochemical Processes

Clearly divided into three main sections, this practical book familiarizes readers with the area of planning in petroleum refining and petrochemical industry, while introducing several planning and modeling strategies encompassing single site refinery plants, multiple refinery networks, petrochemical networks, and refinery and petrochemical planning systems. It equally provides an insight into possible research directions and recommendations for the area of refinery and petrochemical planning. Furthermore, several appendices are included to explain the general background necessary, including stochastic programming, chance constraint programming, and robust optimization. For engineers and managers working in the petroleum industry as well as academic researchers in production, logistics, and supply chain management.

Refining Processes Handbook

Describes economic evaluations for both single processes and complete refineries, and illustrates how to use yield data, properties of products, and operating and capital costs in those evaluations. Two chapters on transportation fuels and environmental concerns have been added to the second edition. Annotation copyrighted by Book News, Inc., Portland, OR.

Planning and Integration of Refinery and Petrochemical Operations

"This book examines the technology advancements in the field of refining and petrochemical industries. It also demonstrates how to integrate the refining products within the petrochemical industries"--

Economic Impact Analysis of Effluent Limitations and Standards for the Petroleum Refining Industry

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Petroleum Refinery Process Economics

"This book focusses on the various solvent processes that are used in crude oil refineries. It presents the differences between each type of process and discusses the types of feedstock that can be used for the processes. This accessible guide is written for managers, professionals, and technicians as well as graduate students transitioning into the refining industry"--

Petroleum Refining Industry

Includes topics not found together in books on petroleum processing: economics, automation, process modeling, online optimization, safety, environmental protection Combines overviews of petroleum composition, refinery processes, process automation, and environmental protection with comprehensive chapters on recent advances in hydroprocessing, FCC, lubricants, hydrogen management Gives diverse perspectives, both geographic and topical, because contributors include experts from eight different countries in North America, Europe and Asia, representing oil companies, universities, catalyst vendors, process licensors, consultants and engineering contractors

Advanced Catalysis Processes in Petrochemicals and Petroleum Refining

Safety in Petroleum Industries covers pertinent safety aspects and precautions to be taken for design, operation, maintenance, inspection and project constructions for petroleum industries, with an emphasis on petroleum refineries. Relevant practical knowledge and experience contributing to safe and sustained operation of the industry has been compiled with all necessary references. Identified areas where theoretical inputs are required have also been incorporated. Learning objectives for the petroleum industries have been identified and discussed in an organized manner based on author’s more than thirty-five years of experience in petroleum and chemical industries. Aimed at practicing engineers in upstream and downstream petroleum industries, this book: Covers safety tips for operation of petroleum industries Documents design codes, tools and practices including safe operating practices of different equipment and safety procedures in a single source Includes detailed safety procedures like HAZOP, Safety Audit, management safety review, and process safety management Contains dedicated chapters on Fire Fighting, and Industrial Hygiene and Ergonomics Discusses first-hand experienced examples and burning issues in the petroleum industry

Petroleum Progress and Profits; a History of Process Innovation

"One of the few petroleum refining textbooks for academic use, this updated edition provides broad and rigorous coverage of all the process technologies of the industry along with discussions of crude oil properties, product specifications, capital cost curves, environmental regulation, and process operations. The book contains a review and edit of the solution manual with new homework problems and relevant interface material that adds to its relevancy and broadens its audience without distracting from the technical aspects"--

Solvent Processes in Refining Technology

"This book presents a thorough understanding of petroleum refining processes by discussing some of the significant topics in the field like the extraction procedures, design and maintenance of petroleum refineries, distillation of petroleum and petrochemicals, etc. The various studies that are constantly contributing towards advancing technologies and evolution of this field are examined in detail."--Back cover.

Practical Advances in Petroleum Processing

A pioneering and comprehensive introduction to the complex subject of integrated refinery process simulation, using many of the tools and techniques currently employed in modern refineries. Adopting a systematic and practical approach, the authors include the theory, case studies and hands-on workshops, explaining how to work with real data. As a result, senior-level undergraduate and graduate students, as well as industrial engineers learn how to develop and use the latest computer models for the predictive modeling and optimization of integrated refinery processes. Additional material is available online providing relevant spreadsheets and simulation files for all the models and examples presented in the book.

Safety in Petroleum Industries

* Offers detailed description of process chemistry and thermodynamics and product by-product specifications of plants * Contributors are drawn from the largest petroleum producers in the world, including Chevron, Mobil, Shell, Exxon, UOP, and Texaco * Covers the very latest technologies in the field of petroleum refining processes * Completely updated 3rd Edition features 50% all new material

Petroleum Refining

Uncertainties in the social, economic, and natural environment are changing workplace behaviors and are setting new demands, especially laws that govern business and society in general. Chapter One discusses this trend in relation to the oil and gas industry. Chapter Two provides a review on the mechanisms and interactions leading to loss of cement integrity, and presents approaches that have tested successfully under the reservoir condition to enhance the resistance of cements when it is exposed to supercritical CO2. Chapter Three deals with the pollution of surface and groundwater by oil products, i.e., prevention of their spreading, integrated approach to modeling of wastewater treatment plants (WWTP) in an oil refinery, impact assessment of effluent discharge on receiving water and removal of selected oil substances by ozonation and O3/UV processes. Chapter Four gives an overview of the emerging technologies for biomass conversion, hydrocarbon chemistry and sugar and sugar-derivative chemistry. Herein, bio-crude production and characterization; model catalytic cracking, the hydrocracking of ketal-compounds and new results concerning the fluidized catalytic cracking of model ketal-compounds are also described.

Petroleum Refining Processes

"Petroleum refining and the petrochemical industry play an important role in the current world economy. They provide the platform to convert basic raw materials into many essential products, ranging from transportation fuels (such as gasoline, jet fuel, diesel, and gas oil) to basic and intermediate materials for petrochemical industries and many other valuable chemical products. Advanced Catalysis Processes in Petrochemicals and Petroleum Refining: Emerging Research and Opportunities is an essential comprehensive research publication that provides knowledge on refining processes that could be integrated by the petrochemical industry and discusses how to integrate refining products with petrochemical industries through the use of new technologies. Featuring a range of topics such as biofuel production, environmental sustainability, and biorefineries, this book is ideal for engineers, chemists, industry professionals, policymakers, researchers, academicians, and petrochemical companies."--Provided by publisher.

Studies on Science and the Innovation Process

This book covers petroleum refining and gas purification processes, including refinery configurations comprising of relevant units with special emphasis on processing of heavy crudes with high acid number. It includes a short review of distillation principles, distillation column auxiliaries, critical column pressure control strategies, critical issues of crude and vacuum distillation units particularly for heavy crude processing. Different corrosion mechanisms and their prevention with regards to heavy high TAN crude processing are also included. Fundamentals are explained with support of steady-state simulation and presented with simulation flowsheets and outputs, supported by examples of calculations and troubleshooting case studies. Features: • Deals with principles and practices in the hydrocarbon industry and petroleum refinery with emphasis on heavy crude processing • Focuses on operation and practices of the major process units with simulation examples and aimed at the professional engineer • Covers acid gas treatment in view of increased emphasis on carbon capture and storage, and introduction of residue gasification processes • Elucidates methodologies for safety relief load computation for distillation columns • Explains real-life problems in reboilers, column internals, column

pressure controls and corrosion in crude, and vacuum distillation and secondary units with several case studies This book is aimed at professionals in petroleum engineering and graduate students in chemical engineering.

Environmental Considerations of Selected Energy Conserving Manufacturing Process Options: Petroleum refining industry report

Thoroughly revised and expanded, by 50%, the new edition of this handbook is a comprehensive guide to all aspects of petroleum refining processes. The author defines the technology, pollution control and economic aspects of 60 processes.

Refinery Engineering

In the new chapters they deal with the international dimensions of technological change including underdevelopment, technology transfer, international trade, and globalization. They have also strengthened the historical account of the rise of new technologies, a main feature of earlier editions.

Handbook of Petroleum Refining Processes

A very detailed, workable approach to improving energy efficiency and cost effectiveness in petroleum processing, dealing with the role of management and refinery operators in achieving the best technological parameters, the most rational utilization of energy, as well as the greatest possible economic success. The author provides a detailed and well-founded approach to the methodology, information and criteria necessary for analyzing energy use, economics and the environmental impact, as well as solutions for fulfilling the requirements of the Kyoto agreement. In addition, he describes in sufficient detail the energy streams within a refinery. A practical guide for refinery engineers, managers, and consultants, as well as all engineers involved in the design of process technologies, in developed as well as developing countries.

Petroleum Refining and Oil Well Drilling

This book provides a survey of the theory and of the empirical knowledge about the links between market structure and technological change.

Advanced Catalysis Processes in Petrochemicals and Petroleum Refining

This book will take the reader through a systematic examination of the factors involved in process innovation, starting with considerations to be initiated in the boardroom and at group management level and developing into a hands-on guide for middle management and professional engineers directly involved in the innovation of process technology. The book initially puts process innovation in a corporate perspective, providing a framework for the development of a corporate process innovation strategy. Some new methodological tools are also introduced which support targeting and proper roadmapping of improved process capabilities and the progression of customer and end-user product demands into raw-material specifications in a well-managed supply and demand chain. Various aspects of the design of a process innovation organisation are reviewed in a later section. In the context of development of process technology, this book advocates the importance of delineating and clarifying corporate work processes for process innovation. Various environments for development work are discussed, from initial test work to pilot-plant testing and the use of demonstration facilities to achieve lean process innovation. The importance of an open collaborative approach is stressed; this includes involving external equipment manufacturers at an early stage as well as collaborative development of customers' use of the products in their production processes, with a view to excellence in future application development. Process innovation will not, however, generate profit or reduce operating costs until the new or improved process technology is operating well in the plant. Best practice for start-up of new process technology and process plants is then examined, starting with a fresh outlook on technology transfer in general. This often-neglected area of management of process innovation is, in fact, of an importance equivalent to that of a product launch in the development of new products. The final part of the book closes the circle, discussing how to implement and measure the strategic intent of process innovation. Improving the general performance of corporate process innovation is then covered by going through success factors and key performance indicators, and their aggregation on a corporate level.

Gains in Oil and Gas Production Refining and Utilization Technology

Now in its seventh edition, Managing Innovation: Integrating Technological, Market and Organizational Change enables graduate and undergraduate students to develop the unique skill set and the foundational knowledge required to successfully manage innovation, technology, and new product development. This bestselling text has been fully updated with new data, new methods, and new concepts while still retaining its holistic approach the subject. The text provides an integrated, evidence-based methodology to innovation management that is supported by the latest academic research and the authors' extensive experience in real-world management practice. Students are provided with an impressive range of learning tools—including numerous case studies, illustrative examples, discussions questions, and key information boxes—to help them explore the innovation process and its relation to the markets, technology, and the organization. "Research Notes" examine the latest evidence and topics in the field, while "Views from the Front Line" offer insights from practicing innovation managers and connect the covered material to actual experiences and challenges. Throughout the text, students are encouraged to apply their knowledge and critical thinking skills to business model innovation, creativity, entrepreneurship, service innovation, and many more current and emerging approaches and practices.

Hydrocarbon Processing and Refining

Based on evidence from Asia and Latin America, this book explores the role of innovative firms in emerging markets, and their contributor to growth, development, and knowledge transfer.

Handbook of Petroleum Refining Processes

Uses a practical day-to-day approach regarding the operations of the petroleum industry. Organized to allow ease of reference and data searching, it simplifies the complex subject of crude oil and its composition with easy-to-understand diagrams. Covers vacuum and atmospheric distillation, the recovery of propane and butanes along with in-depth descriptions of catalytic treating and reforming units. Each chapter details various calculation techniques used to define the aspects of every process and includes rules of thumb employed in plant operation and design.

The Economics of Industrial Innovation

Reflecting the many changes in the technology of the oil and gas industry since its last publication in 1984, this new edition of Modern Petroleum Technology is the most authoritative and thoroughly up-to-date review of technical expertise employed across the whole of the international oil and gas industry. Written by leading international experts from industry and academia, all entries have been updated and many new entries have been added for this 6th edition. The work is divided into two volumes: Upstream and Downstream. Upstream examines the different stages of the exploration and production processes involved in the location and extraction of raw materials, including the latest applications employed in modern seismic technology and the production of heavy oils. Downstream covers the process of refining the raw material, and producing and supplying the end product, from refineries to service stations. Both volumes deal with all aspects of their area of petroleum technology, from the innovations in technology to the environmental issues surrounding its practical application. Modern Petroleum Technology considers the current challenges and opportunities presented by new technology, enabling everyone in the industry, from the busy chief executive to the petroleum engineer, to stay in touch with developments outside their own area of expertise. Modern Petroleum Technology's concise and comprehensive overview will also be of special value to analysts, strategists, lecturers and students, oil and gas consultants, and legal and financial service providers.

Oil Refineries in the 21st Century

Market Structure and Technological Change