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R. Keith Mobley

Hands-On Maintenance for Water/Wastewater Equipment deals with equipment maintenance as individual components, not as complete machines. This allows more information about the design, application and maintenance requirements of machinery to be presented. The text covers basic operating characteristics of machinery components, making it a valuable reference source as well as a training and maintenance manual. Written in easy-to-understand language, without complex formulas or technical theories, this text provides you with basic information to help you acquire a general understanding of how components function and how to keep equipment operating properly.

"Process Plant Equipment Book is another great publication from Wiley as a reference book for final year students as well as those who will work or are working in chemical production plants and refinery..." -Associate Prof. Dr. Ramli Mat, Deputy Dean (Academic), Faculty of Chemical Engineering, Universiti Teknologi Malaysia "...give[s] readers access to both fundamental information on process plant equipment and to practical ideas, best practices and experiences of highly successful engineers from around the world... The book is illustrated throughout with numerous black & white photos and diagrams and also contains case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. An extensive list of references enables readers to explore each individual topic in greater depth..." -Stainless Steel World and Valve World, November 2012 Discover how to optimize process plant equipment, from selection to operation to troubleshooting From energy to pharmaceuticals to food, the world depends on processing plants to manufacture the products that enable people to survive and flourish. With this

book as their guide, readers have the information and practical guidelines needed to select, operate, maintain, control, and troubleshoot process plant equipment so that it is efficient, cost-effective, and reliable throughout its lifetime. Following the authors' careful explanations and instructions, readers will find that they are better able to reduce downtime and unscheduled shutdowns, streamline operations, and maximize the service life of processing equipment. Process Plant Equipment: Operation, Control, and Reliability is divided into three sections: Section One: Process Equipment Operations covers such key equipment as valves, pumps, cooling towers, conveyors, and storage tanks Section Two: Process Plant Reliability sets forth a variety of tested and proven tools and methods to assess and ensure the reliability and mechanical integrity of process equipment, including failure analysis, Fitness-for-Service assessment, engineering economics for chemical processes, and process component function and performance criteria Section Three: Process Measurement, Control, and Modeling examines flow meters, process control, and process modeling and simulation Throughout the book, numerous photos and diagrams illustrate the operation and control of key process equipment. There are also case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. At the end of each chapter, an extensive list of references enables readers to explore each individual topic in greater depth. In summary, this text offers students, process engineers, and plant managers the expertise and technical support needed to streamline and optimize the operation of process plant equipment, from its initial selection to operations to troubleshooting.

Many readers have found Operator's Guide to Centrifugal Pumps (Xlibris, 2008) to be a valuable training resource for process operators. Volume 2 provides additional training material in the form of student challenge exams and additional exposure to reliability top-

ics. Volume 2 has two goals: The first goal is to continue to build on the general theme of pump reliability in process facilities. The second goal is to provide student challenge exams for those wanting to master the material in Operator's Guide to Centrifugal Pumps. The first chapter covers how process operators can be better utilized to improve pump reliability. The importance of operating training and commissioning will be covered in the next two chapters. In the final chapter, a methodology for addressing troublesome centrifugal pumps is presented. A majority of the book is comprised of three (3) different student challenge exams are included in Volume 2. Answers to all the exam questions are provided along with where the answers can be found in the Operator's Guide. There are a total of 150 challenge questions with their answers.

This tool needs no maintenance Fully revised and updated, this convenient guide covers the latest industrial equipment as well as all the tools and machines prevalent in older plants, even those from the early 1970s and before. Your complete reference tool * Discusses machinery installation, welding, rigging, carpentry, basic electricity, and more * Features a chapter on safety issues * Covers belts, drives, transmissions, and bearings * Examines automatic sprinkler systems * Offers tips for preventive maintenance * Includes coverage of piping and pipefitting * Reviews shop mathematics, geometry, and trigonometry

Over the last three decades the process industries have grown very rapidly, with corresponding increases in the quantities of hazardous materials in process, storage or transport. Plants have become larger and are often situated in or close to densely populated areas. Increased hazard of loss of life or property is continually highlighted with incidents such as Flixborough, Bhopal, Chernobyl, Three Mile Island, the Phillips 66 incident, and Piper Alpha to name but a few. The field of Loss Prevention is, and continues

to, be of supreme importance to countless companies, municipalities and governments around the world, because of the trend for processing plants to become larger and often be situated in or close to densely populated areas, thus increasing the hazard of loss of life or property. This book is a detailed guidebook to defending against these, and many other, hazards. It could without exaggeration be referred to as the "bible" for the process industries. This is THE standard reference work for chemical and process engineering safety professionals. For years, it has been the most complete collection of information on the theory, practice, design elements, equipment, regulations and laws covering the field of process safety. An entire library of alternative books (and cross-referencing systems) would be needed to replace or improve upon it, but everything of importance to safety professionals, engineers and managers can be found in this all-encompassing reference instead. Frank Lees' world renowned work has been fully revised and expanded by a team of leading chemical and process engineers working under the guidance of one of the world's chief experts in this field. Sam Mannan is professor of chemical engineering at Texas A&M University, and heads the Mary Kay O'Connor Process Safety Center at Texas A&M. He received his MS and Ph.D. in chemical engineering from the University of Oklahoma, and joined the chemical engineering department at Texas A&M University as a professor in 1997. He has over 20 years of experience as an engineer, working both in industry and academia. New detail is added to chapters on fire safety, engineering, explosion hazards, analysis and suppression, and new appendices feature more recent disasters. The many thousands of references have been updated along with standards and codes of practice issued by authorities in the US, UK/Europe and internationally. In addition to all this, more regulatory relevance and case studies have been included in this edition. Written in a clear and concise style, Loss Prevention in the Process Industries covers traditional areas of personal safety as well as the more technological aspects and thus provides balanced and in-depth coverage of the whole field of safety and loss prevention. * A must-have standard reference for chemical and process engineering safety professionals * The most complete collection of information on the theory, practice, design elements, equipment and laws that pertain to process safety * Only single work to provide everything; principles, practice, codes, standards, data and references needed by those practicing

in the field

Detailing the major developments of the last decade, the Handbook of Hydraulic Fluid Technology, Second Edition updates the original and remains the most comprehensive and authoritative book on the subject. With all chapters either revised (in some cases, completely) or expanded to account for new developments, this book sets itself apart by approach

The Practical Pumping Handbook is a practical account of pumping, piping and seals starting with basics and providing detailed but accessible information on all aspects of the pumping process and what can go wrong with it. Written by an acknowledged expert with years of teaching experience in the practical understanding of pumps and systems. Aids understanding of pumps to minimize failures and time-out A practical handbook covering the basics of the pumping process Written by an acknowledged expert Mechanical Engineer's Reference Book, 12th Edition is a 19-chapter text that covers the basic principles of mechanical engineering. The first chapters discuss the principles of mechanical engineering, electrical and electronics, microprocessors, instrumentation, and control. The succeeding chapters deal with the applications of computers and computer-integrated engineering systems; the design standards; and materials' properties and selection. Considerable chapters are devoted to other basic knowledge in mechanical engineering, including solid mechanics, tribology, power units and transmission, fuels and combustion, and alternative energy sources. The remaining chapters explore other engineering fields related to mechanical engineering, including nuclear, offshore, and plant engineering. These chapters also cover the topics of manufacturing methods, engineering mathematics, health and safety, and units of measurements. This book will be of great value to mechanical engineers.

The hardcover, fully updated edition of the only multi-craft trade guide Respected by generations of skilled workers, Audel Millwright's and Mechanic's Guide is the only trade manual to cover maintenance and troubleshooting for all the mechanical trades in a single volume. Now available in hardcover, it covers the newest equipment on shop floors as well as older machinery, sometimes more than 30 years old, for which little maintenance and repair information remains available. Millwrights, mechanics, machinists, carpenters, pipe fitters, electricians, engineers, and those who su-

pervise them will find this book invaluable. The only hardcover maintenance and repair manual to cover all the mechanical trades in one guide This updated guide covers new industrial machinery as well as 30-year-old equipment for which little information can be found Essential for those who repair machinery as well as machinists, carpenters, pipe fitters, electricians, millwrights, mechanics, engineers, mechanical technicians, industrial maintenance managers, and construction tradespeople This hardcover edition of Audel Millwright's and Mechanic's Guide is as valuable to today's skilled workers as previous editions were to their fathers and grandfathers.

Just published in its updated fourth edition, this highly regarded text explains in clear terms how and why the best-of-class pump users are consistently achieving superior run lengths, low maintenance expenditures, and unexcelled safety and reliability. Written by practicing engineers whose working careers were marked by involvement in all facets of pumping technology, operation, assessment, upgrading and cost management, this book endeavors to describe in detail how you, too, can accomplish optimum pump performance and low life cycle cost. A new chapter on breaking the cycle of pump repairs examines the cost of failures and the defined operating range of pumps. The authors also explore mechanical issues, deviations from best available technology, and preventing problems with oil rings and constant level lubricators. Additional topics include bearing housing protector seals, best lube application practices, lubrication and bearing distress, and paying for value.

Full coverage of manufacturing and management in mechanical engineering Mechanical Engineers' Handbook, Fourth Edition provides a quick guide to specialized areas that engineers may encounter in their work, providing access to the basics of each and pointing toward trusted resources for further reading, if needed. The book's accessible information offers discussions, examples, and analyses of the topics covered, rather than the straight data, formulas, and calculations found in other handbooks. No single engineer can be a specialist in all areas that they are called upon to work in. It's a discipline that covers a broad range of topics that are used as the building blocks for specialized areas, including aerospace, chemical, materials, nuclear, electrical, and general engineering. This third volume of Mechanical Engineers' Handbook covers Manufacturing & Management, and provides accessi-

ble and in-depth access to the topics encountered regularly in the discipline: environmentally benign manufacturing, production planning, production processes and equipment, manufacturing systems evaluation, coatings and surface engineering, physical vapor deposition, mechanical fasteners, seal technology, statistical quality control, nondestructive inspection, intelligent control of material handling systems, and much more. Presents the most comprehensive coverage of the entire discipline of Mechanical Engineering. Focuses on the explanation and analysis of the concepts presented as opposed to a straight listing of formulas and data found in other handbooks. Offers the option of being purchased as a four-book set or as single books. Comes in a subscription format through the Wiley Online Library and in electronic and other custom formats. Engineers at all levels of industry, government, or private consulting practice will find *Mechanical Engineers' Handbook, Volume 3* an "off-the-shelf" reference they'll turn to again and again.

This PDF (Mechanical maintenance-Rotating/Static equipment's) ready for day to day mechanical maintenance job and for interview purpose (refer many books and taken photos/drawings).

Root Cause Failure Analysis Provides the knowledge and failure analysis skills necessary for preventing and investigating process equipment failures. Process equipment and piping systems are essential for plant availability and performance. Regularly exposed to hazardous service conditions and damage mechanisms, these critical plant assets can result in major failures if not effectively monitored and assessed—potentially causing serious injuries and significant business losses. When used proactively, *Root Cause Failure Analysis (RCFA)* helps reliability engineers inspect the process equipment and piping system before any abnormal conditions occur. RCFA is equally important after a failure happens: it determines the impact of a failure, helps control the resultant damage, and identifies the steps for preventing future problems. *Root Cause Failure Analysis: A Guide to Improve Plant Reliability* offers readers clear understanding of degradation mechanisms of process equipment and the concepts needed to perform industrial RCFA investigations. This comprehensive resource describes the methodology of RCFA and provides multiple techniques and industry practices for identifying, predicting, and evaluating equipment failures. Divided into two parts, the text first introduces *Root Cause Analysis*, explains the failure analysis process, and discuss-

es the management of both human and latent error. The second part focuses on failure analysis of various components such as bolted joints, mechanical seals, steam traps, gearboxes, bearings, couplings, pumps, and compressors. This authoritative volume: Illustrates how failures are associated with part integrity, a complete system, or the execution of an engineering process. Describes how proper design, operation, and maintenance of the equipment help to enhance their reliability. Covers analysis techniques and industry practices including 5-Why RCFA, fault tree analysis, Pareto charts, and Ishikawa diagrams. Features a detailed case study of process plant machinery and a chapter on proactive measures for avoiding failures. Bridging the gap between engineering education and practical application, *Root Cause Failure Analysis: A Guide to Improve Plant Reliability* is an important reference and guide for industrial professionals, including process plant engineers, planning managers, operation and maintenance engineers, process designers, chemical engineers, and instrument engineers. It is also a valuable text for researchers, instructors, and students in relevant areas of engineering and science.

THE DEFINITIVE GUIDE TO SELECTING, OPERATING, AND MAINTAINING POWER PLANT EQUIPMENT Power Plant Equipment Operation and Maintenance Guide provides detailed coverage of different types of power plants such as modern co-generation, combined-cycle, and integrated gasification combined cycle (IGCC) plants. The book describes the design, selection, operation, maintenance, and economics of all these power plants. The best available power enhancement options are discussed, including duct burners, evaporative cooling, inlet-air chilling, absorption chilling, steam and water injection, and peak firing. This in-depth resource addresses the sizing, selection, calculations, operation, diagnostic testing, troubleshooting, maintenance, and refurbishment of all power plant equipment, including steam turbines, steam generators, boilers, condensers, heat exchangers, gas turbines, compressors, pumps, advanced sealing mechanisms, magnetic bearings, and advanced generators. Coverage includes: Methods for enhancing the reliability and maintainability of all power plants. Economic analysis of modern co-generation and combined-cycle plants. Selection of the best emission-reduction method for power plants. Preventive and predictive maintenance required for power plants. Gas turbine applications in power plants, protective systems, and

tests

This book is meant for students of mechanical engineering and the maintenance workforce in industries. It gives the fundamental and practical knowledge of the most commonly encountered maintenance engineering problems. Readers are advised to gain more and more knowledge by continuously reading available material, bearing in mind the saying that, "half knowledge is more dangerous than no knowledge", more so in maintenance engineering. There are five units in this book. Unit 1 has the outline of the whole maintenance subject. Unit 2 deals with the economics of inventory of spares and the preparation of estimates. Unit 3 emphasizes Predictive maintenance and Vibrations. Unit 4 discusses an important topic of maintenance i.e. lubrication. Unit 5 deals with some of the common machinery repairs and the intricacies involved, including the most common air compressor and centrifugal pump repairs. The book is prepared mainly from the exam point of view for students and as a general reference book. Industries and workshops may also find this book useful in day-to-day maintenance work of all machines.

Engineering Tribology by John Williams of Cambridge University is an ideal textbook for a first tribology course and a reference for designers and researchers. *Engineering Tribology* gives the reader interdisciplinary understanding of tribology including materials constraints. Real design problems and solutions, such as those for journal and rolling element bearings, cams and followers, and heavily loaded gear teeth, elucidate concepts and motivate understanding. This work integrates qualitative and quantitative material from a wide variety of disciplines including physics, materials science, surface and lubricant chemistry, with traditional engineering approaches.

We work in an industry where economic success is heavily dependent on the collective performance of our processing equipment and their operators. Without highly trained and confident operators we can never hope to realize the full potential of our complex processes. Formal and informal training must be provided regularly if continuous process and reliability gains are to be expected. There are no shortcuts to operational excellence. One training topic essential to every operators education is that of centrifugal pumping technology. The ever-present centrifugal pump is one of the workhorses of the process world, tirelessly moving fluids, ranging from the innocuous to the toxic and flammable, from one

stage of the process to the next. We would be hard pressed to find a processing unit inside our complexes without a few of these in service. Their shear numbers and variety can make their mastery a challenge. This book was specifically written for process operators who regularly deal with centrifugal pumps, addressing principally those variables and factors under their control, while limiting design theory and mathematics to a minimum. The following topics and content are covered: 1. Importance of equipment reliability and what role operators play in this mission. 2. Centrifugal pump operating characteristics 3. Mechanical seals and their related seal flush plans 4. What operators should know about electric motors 5. Lubrication basics 6. Troubleshooting basics 7. How to start a pump reliability program By the end of the book, the reader should possess a clear understanding of how to operate and monitor their pumps. Three handy references are also contained in the book to answer questions as they arise in the field: 1) Operators Guide to API Flush Plans, 2) Illustrated Glossary of Centrifugal Pump Terms, 3) Glossary of Electric Motor Terms, and 4) Useful Centrifugal Pump Formulas. This book can be used as a self-paced, self-taught short course or as a companion to a live prepared short course for both inexperienced and seasoned operators. It can also serve as a handy field guide after completion of the course. The ultimate mission of this book is to provide the latest generation of operators a body of knowledge that is relevant, complete, and practical in an industrial setting for years to come. Wherever machinery operates there will be seals of some kind en-

suring that the machine remains lubricated, the fluid being pumped does not leak, or the gas does not enter the atmosphere. Seals are ubiquitous, in industry, the home, transport and many other places. This 5th edition of a long-established title covers all types of seal by application: static, rotary, reciprocating etc. The book bears little resemblance to its predecessors, and Robert Flitney has re-planned and re-written every aspect of the subject. No engineer, designer or manufacturer of seals can afford to be without this unique resource. Wide engineering market Bang up to date! Only one near competitor, now outdated

This last, the education of pump users, is precisely what this book was intended to do. To what extent we must have achieved our purpose, our readers must decide. My good friend and associate, J. T. (Terry) McGuire, and I have been working very closely together for a long time. Our view of engineering problems and of their solutions coincide to an astonishing degree. When I was asked to prepare a second edition of my book Centrifugal Pumps, it was logical that I turned to Terry and suggested that he be my coauthor on this project. He agreed to do so, and his cooperation has been most valuable, both in improving the resultant work and in easing my burden. It would be presumptuous on my part to pretend that nothing has changed in the technology of centrifugal pumps during the 30 years since I prepared the manuscript for the first edition of this book. Let me, then, speak of some of these changes.

Rules of Thumb for Maintenance and Reliability Engineers will

give the engineer the "have to have" information. It will help instill knowledge on a daily basis, to do his or her job and to maintain and assure reliable equipment to help reduce costs. This book will be an easy reference for engineers and managers needing immediate solutions to everyday problems. Most civil, mechanical, and electrical engineers will face issues relating to maintenance and reliability, at some point in their jobs. This will become their "go to" book. Not an oversized handbook or a theoretical treatise, but a handy collection of graphs, charts, calculations, tables, curves, and explanations, basic "rules of thumb" that any engineer working with equipment will need for basic maintenance and reliability of that equipment. • Access to quick information which will help in day to day and long term engineering solutions in reliability and maintenance • Listing of short articles to help assist engineers in resolving problems they face • Written by two of the top experts in the country

Recent research has led to a deeper understanding of the nature and consequences of interactions between materials on an atomic scale. The results have resonated throughout the field of tribology. For example, new applications require detailed understanding of the tribological process on macro- and microscales and new knowledge guides the rational

Fluids -- Heat transfer -- Thermodynamics -- Mechanical seals -- Pumps and compressors -- Drivers -- Gears -- Bearings -- Piping and pressure vessels -- Tribology -- Vibration -- Materials -- Stress and strain -- Fatigue -- Instrumentation -- Engineering economics.