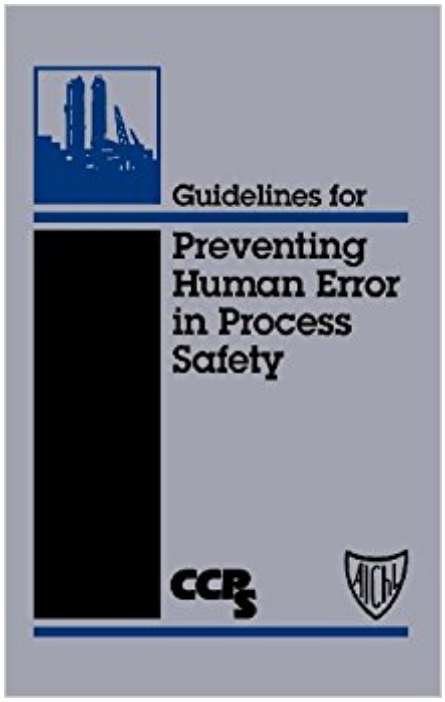
Guidelines For Preventing Human Error In Process Safety



Synopsis

Almost all the major accident investigations--Texas City, Piper Alpha, the Phillips 66 explosion, Feyzin, Mexico City--show human error as the principal cause, either in design, operations, maintenance, or the management of safety. This book provides practical advice that can substantially reduce human error at all levels. In eight chapters--packed with case studies and examples of simple and advanced techniques for new and existing systems--the book challenges the assumption that human error is "unavoidable." Instead, it suggests a systems perspective. This view sees error as a consequence of a mismatch between human capabilities and demands and inappropriate organizational culture. This makes error a manageable factor and, therefore, avoidable.

Book Information

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Customer Reviews

The CENTER FOR CHEMICAL PROCESS SAFETY (CCPS), an industry technology alliance of the American Institute of Chemical Engineers (AIChE), has been a world leader in developing and disseminatinginformation on process safety management and technology since 1985. CCPS has published over 80 books in its process safety guidelines and process safety concepts series. For more information, visit www.ccpsonline.org.

The Center for Chemical Process Safety (CCPS) has produced numerous excellent books for the Chemical Processing Industry (CPI), and this is one of the best of the bunch. I have worked as a

Production Manager in a chemical manufacturing facility, have spent much of my life researching and teaching in aviation safety programs, and believe that not only do the majority of case studies, concepts, and conclusions drawn in this book apply to the CPI, but in many other technically oriented tightly-coupled industries as well.The book commences with an excellent brief glossary and acronym list (pp. xvii-xxi). Most of the terms were familiar, but one that was new to me was "encystment", which is a characteristic of a human under stress, whereby the individual focuses on minor problems or details, while ignoring more important issues. This is similar to "target fixation" in military aviation, but perfectly encompasses a characteristic that has been a problem throughout technological systems, and has caused major accidents in the CPI, aviation, and elsewhere. In this discussion of human error, I took particular delight in a typo on p. 5, which introduced the topic: "Human rror [sic] is probably the major contributor to loss of life, injury to personnel and property damage in the CPI." While unintentional, this minor detail demonstrates that even in an extremely carefully prepared document, mistakes happen.The book uses numerous excellent case studies throughout to illustrate principles, and spotlights organizational factors (p. 22ff) that are critical to safety, particularly emphasizing the importance of having a blame-free culture which encourages the flow of information, and an explicit policy that safety considerations are always primary. Chapter two "Understanding Human Performance and Error" is one of the strongest, and I especially found the discussion (p. 40ff) of types of errors and engineering approaches to them to be valuable; the table (p. 45) comparing the various perspectives on human error is an excellent reference. While discussing the sociotechnical perspective to human error (p. 86), the book boiled down the essence of an accident as succinctly as I have ever seen anywhere: "Studies of major accidents have shown that they almost always arise from a combination of active errors, latent failures and inappropriate culture."Chapter three, "Factors Affecting Human Performance in the Chemical Industry", is also a gem. The discussion (p.103) of Performance-Influencing Factors (PIFs; a similar concept in the nuclear industry is that of Performance-Shaping Factors, PSFs) is an excellent introduction to factors that lead to error causation. Exploring the PIFs applicable to a job can go a long way toward defining the plans to reduce error. Characteristics of a good training program are detailed later in the chapter (p. 132), as are more intangible qualities of operator characteristics, including personality factors and suitability, risk-taking behavior, Locus of Control, and Risk Homeostasis Theory (RHT). The discussion of these personality traits (p. 135ff) is of great benefit to managers hiring, matching personnel to jobs, and to training managers in tailoring their programs to their employee group. Of particular note is the table on p. 151 detailing individual and cognitive phenomena under stress, which ties all the personality issues (encystment, thematic vagabonding, tunnel vision, stereotype

takeover, etc.) together in an easy to use reference.Chapter four, "Analytical Methods for Predicting and Reducing Human Error", is also useful, and requires slow, deliberate reading. Numerous predictive and reactive methodologies are explored, but one of the most useful discussions begins on p. 187 where Task Analysis (TA) methods are evaluated, and criteria for employing TA methods are listed. Chapter five deals with both qualitative and quantitative predictions of human error in risk assessment, and while packed with information, is not as universally applicable as chapter four. The Technique for Human Error Rate Prediction (THERP, discussed on p. 226ff) was developed for military and nuclear power users, and has wide-ranging applicability both within the CPI and in other industries, notably aerospace. Although I had seen similar methodologies elsewhere, I found THERP to be lucidly explained and easy to understand and employ.Chapter six, "Data Collection and Incident Analysis Methods", is another excellent resource for the safety professional. I like the Accident Causation Model and diagram presented (p. 258), and agreed with their discussion of the cultural aspects of data collection system design (p. 259), which emphasize a blame-free safety culture, and freedom from fear of reprisals. Their use of the Space Shuttle "Challenger" disaster as an example of the disadvantages of a culture of blame was spot on. This segues into chapter seven, "Case Studies" nicely. The case studies presented here are all well-selected and nicely explained. I particularly commend the discussion of the Piper Alpha disaster (pp. 292-306), and recommend interested parties to read the unabridged findings of the Cullen commission in the two volume report (available from HMSO in the UK). I was especially enthusiastic about the STEP diagram of the hydrocarbon leak on pp. 300-303. While less newsworthy than Piper Alpha, the case study about Human Factors in resin processing, was also packed with excellent insight. I especially appreciated the discussion of SOP and checklist design on pp. 320-325. This closely paralleled my knowledge from aviation, and again serves to demonstrate the applicability of this work across multiple technically-oriented industries."Guidelines for Preventing Human Error in Process Safety" is a fascinating, detailed, and immensely useful book for safety professionals both in the CPI and in other industries with tightly-coupled complex processes (e.g. nuclear power, aerospace, etc.). I recommend this book highly and will keep it on my bookshelf within easy reach.

Kids Ages 9-14 (Kidpower Safety Comics) Fullpower Safety Comics: People Safety Skills for Teens and Adults (Kidpower Safety Comics) IEC 61511-1 Ed. 1.0 b:2003, Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and software requirements Practical Guide to Industrial Safety: Methods for Process Safety Professionals Error Reduction in Health Care: A Systems Approach to Improving Patient Safety Mudras for a Strong Heart: 21 Simple Hand Gestures for Preventing, Curing & Reversing Heart Disease: [A Holistic Approach to Preventing & Curing Heart Disease] (Mudra Healing Book 8) The Field Guide to Understanding 'Human Error' Set Phasers on Stun: And Other True Tales of Design, Technology, and Human Error The Atomic Chef: And Other True Tales of Design, Technology, and Human Error Descartes' Error: Emotion, Reason, and the Human Brain Graphic Artist's Guild Handbook of Pricing and Ethical Guidelines (Graphic Artists Guild Handbook: Pricing & Ethical Guidelines) GUIDELINES 2013-2016 STEWARDSHIP (Guidelines Leading Congregation) Guidelines for Perinatal Care (Guidelines for Perinatal Care (Aap/Acog))