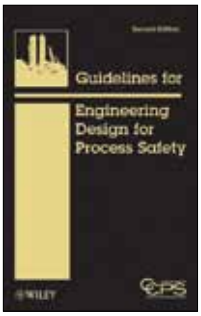
Books

Guidelines for Engineering Design for Process Safety, 2nd Edition



Center for Chemical Process Safety (CCPS), American Institute of Chemical Engineers, New York, NY, and John Wiley & Sons, Hoboken, NJ, $125, 440 pages, April 2012, ISBN: 978-0-470-76772-6

Inherently safer plants begin with their initial design — and the selection of the design basis for a process safety system is an engineering problem like any other.

This second edition, which combines and expands upon two earlier books in the Center for Chemical Process Safety's Guidelines series, provides up-to-date design guidance and comprehensive references for process equipment in a variety of categories, including vessels, reactors, heat- and mass-transfer equipment, fluid-transfer and separation equipment, fired equipment, dryers, and piping.

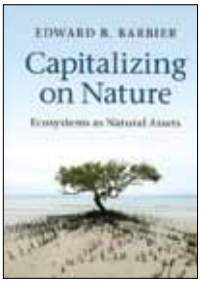
The book focuses on process safety in the design of chemical, petrochemical, and hydrocarbon processing plants, and follows a risk-based approach to the evaluation of safety system design. It emphasizes how to select appropriate designs that can prevent or mitigate the release of flammable or toxic materials, for new facilities as well as for existing facilities undergoing modification.

The safety systems discussed are categorized as inherently safer, passive, active, and procedural, in decreasing order of robustness and reliability. Engineers are instructed to adopt a risk-based approach to evaluating the organization's various objectives when deciding among potential design alternatives.

While detailed engineering designs are outside the scope of the book, the authors provide extensive references to assist designers who wish to go beyond safety design philosophy to the specifics of a particular safety system design.

This edition also includes key information on failure modes and potential design solutions.

Capitalizing on Nature: Ecosystems as Natural Assets



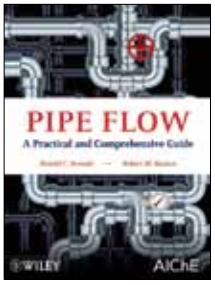
Edward B. Barbier, Cambridge Univ. Press, New York, NY, $35, 336 pages, Oct. 2011, ISBN: 978-0-52-118927-9

In this book's introduction, the author reflects on how the linking of sustainability and the environment has boosted the concept of ecosystems and the environment as natural capital. He points out that because this special form of wealth has seemingly been provided to us free, people have tended to view nature as a limitless resource, and perhaps always available for use, exploitation, and conversion. Today, he says, our economies and societies are progressively threatened by ecological scarcity, with constrained natural resources affecting fossil fuel supplies, fisheries, and arable land and water, and related degradation of many key ecosystems. He believes that if we can better understand our relationship to natural capital, then perhaps we can also find ways to manage and enhance what is left of our natural endowment.

This book combines ecology with economics to model ecosystems as natural assets and provide insight into a wide range of ecological scarcity problems, including those affecting coastal and marine systems, forests, wetlands, and watersheds. It also sheds light on landscape conversion, ecological restoration, and ecosystem resilience and collapse.

The concluding chapters address the interdisciplinary collaboration among economists, ecologists, and other environmental scientists that will be needed to guide better environmental policy, and outline the institutional changes needed to mitigate and overcome ecological scarcity.

Pipe Flow: A Practical and Comprehensive Guide



Donald C. Rennels and Hobart M. Hudson, John Wiley & Sons, Hoboken, NJ, $90, 312 pages, May 2012, ISBN: 978-0-470-90102-1

With its detailed coverage of pressure drop and other phenomena related to fluid flow in pipes, this book enables readers to design and analyze piping systems for a broad range of industrial operations, distribution systems, and power plants. The authors draw from experimental and theoretical research on fluid flow to demonstrate how to accurately predict and manage pressure loss while working with a variety of piping systems and flow configurations.

After discussing the fundamental physical properties of fluids and their flow behavior, and the basic methodology required to solve pipe flow problems, the bulk of the book presents loss coefficient data for a variety of piping components. Experimental test data and formulas are examined and integrated into broadly applicable equations. The book concludes with an examination of phenomena that affect piping-system performance, including cavitation and flow-induced vibration. Sample problems demonstrate how core concepts are applied in practice.

This book should be valuable as a text for engineering students and as a reference for engineers who design, operate, and troubleshoot piping systems.