

building-related.) Another chapter discusses human behavior and performance in safety, where job safety analysis, risk-taking behavior, and even biorhythms (“Is this may day?”) must be considered when designing for human occupancy and continued operations. Other chapters introduce the reader to electrical safety, chemical hazards including toxicity, explosives, material handling, pressure vessels, both ionizing and non-ionizing radiation, and the need to monitor to ensure that human health and welfare (both short-term exposures and long-term chronic effects) will be within recognized “safe limits”. Industrial hygiene is an approach which requires both engineering and supervisory skills modified to the workplace or laboratory if it is to be truly effective, and achieve its objective.

Each chapter is followed by a list of questions and exercises, suitable for use in instruction. Diagrams and figures are unusually clear and specific. References are many, and in general updated. This excellent book deserves serious attention by both engineers, other specialists and management, but especially by all who wish a sensible review of the current hazard scene as seen by industry and the public.

HOWARD H. FAWCETT

Plant Design for Safety: A User-friendly Approach, by Trevor Kletz, Hemisphere Publishing Corporation, New York, NY, 1991, ISBN 1-56032-068-0, 167 pp.

Trevor Kletz has written another gem. It’s truly amazing how many useful common sense approaches he has been able to condense into such a readable form. The author discusses characteristics of “safer plants” based on experiences gained from previous case histories of disasters, as well as several of his earlier publications. The main characteristics include:

1. Intensification – reduce inventories (what you don’t have, can’t leak).
2. Substitution – replace hazardous materials/processes with safer ones.
3. Attenuation – use hazardous materials under the least hazardous conditions (i.e. lower temperatures, lower pressures, more stable states, etc.).
4. Simplification – minimize the number of processing steps and pieces of equipment; thus reducing things that can go wrong.

He states that: “The essence of the inherently safer approach to plant design is the avoidance of hazards rather than their control by added-on protective equipment.” The author draws examples from a number of commercial chemical processes to illustrate his points, such as: small well-mixed reactors replacing large stirred tank reactors in the production of nitroglycerin; adipic acid reactors with internal cooling coils rather than pumps and external cool-

ers, and the use of a Higeer rotating packed bed to replace conventional distillation columns (thereby minimizing large material inventories).

The book is a valuable addition to the design engineer's "tools of the trade". It will provide the design teacher with a number of discussion topics for class, as well as provide a good list of references for additional reading.

LESLIE E. LAHTI

Improving Chemical Engineering Practices, 2nd edn., by Trevor Kletz, Hemisphere Publishing Corporation, New York, NY, 1990, ISBN 0-89116-929-6, 153 pp.

The author has collected 60 myths or half-truths about the chemical process industries into this little book and, based on his extensive experience, he has explained the shortcomings or errors in accepting such statements. As the author explains, there are usually some elements of truth in the statements (or myths) and quite often they were more true at some time in the past than they are now. The real message that he offers to the reader, is to always doubt a blanket statement as "THE TRUTH" and to take a sceptical approach to the particular issue or statement.

It would be impractical to repeat all of the myths in this review, but hopefully the following will give some of the flavor: "Accidents are due to human failing, so we should eliminate the human element when we can"; "A pressure of 10 pounds is small and will not cause injury"; "Plants are made safer by adding protective equipment" and "Policies lead to actions". The author, in addition to suggesting why the statements might be erroneous, gives contrary examples based on his experience.

The book is interesting reading. Undoubtedly, some of the myths will enrich chemical engineering classes because they will provide good discussion material for the students. As a result it will serve as a good resource for teachers of design or process safety.

LESLIE E. LAHTI

Managing Safety and Health Programs, by Roy Boylston, Van Nostrand Reinhold, New York, NY, 1990, ISBN -0-442-31900-2, 264 pp., \$29.00.

In the first sentence of this volume, the author states: "Managing safety and health programs is one of management's most important responsibilities". While doubtlessly true, this reviewer's half-century of experience in the real world gives us pause, and makes the objective of this volume, namely manage-