

## Book reviews

**Waste Management Practices: Municipal, Hazardous, and Industrial, J. Pichtel. CRC Press/Taylor & Francis Group, Boca Raton, FL (2005). 687 pp., Price: US\$ 119.95, ISBN: 0-8493-3525-6**

The publisher describes this book as: “A practical guide for the identification and management of a range of hazardous wastes.” But, it is far more than that—much, much more. In my opinion, this is the best book on the topic I have seen and is one of the most comprehensive pollution control books I have reviewed recently as it clearly, objectively, and comprehensively discusses the generation and management of all types of wastes. In this book, the author describes the sources of solid wastes, their composition, management, disposal, and US laws applicable to all the foregoing topics.

The book has 22 chapters divided into 4 major sections.

“Part 1 provides the reader with a framework within which to establish a context for the management of many types of wastes. Following the Introduction is a history of waste management and then a discussion of regulatory development in waste management.”

The author entitles this section “Historical Regulatory Development.” Following the initial “overview” chapter is a chapter entitled “A Brief History of Waste Management” that includes, much to my delight, some interesting archival photographs of early waste management practices. The next chapter in this section is less interesting; it is entitled “Regulatory Development.” Significant US laws are very briefly discussed.

The longest section of the handbook is Part 2 which deals with “Municipal Solid Wastes” including their chemical, physical, and biological characterization. This section deals with recycling, composting, incineration, and landfilling. Both conventional and innovative technologies are discussed in chapters entitled: “Characterization of Solid Waste,” “Municipal Solid Waste Collection,” “Recycling Solid Wastes,” “Municipal Solid Waste Processing; Materials Recovery Facilities,” “Composting MSW,” “Incineration of MSW,” and “The Sanitary Landfill.”

I was tempted to delve into the extensive detailed information provided by Pichtel. I resisted somewhat. Suffice it to say, I was impressed by his excellent discussion of recycling solid wastes as well as their disposal by incineration. In the latter chapter, the author provides a comprehensive review of “the dioxin problem” which is so often cited by opponents to this technology. He discusses the benefits and problems with recycling among other topics.

As a chemical engineer who has consulted for hazardous waste facilities (both generators and disposal), I was particularly interested in Part 3 entitled “Hazardous Waste Management.” Initially, Pichtel reviews the law governing hazardous waste in the United States (Resource Conservation and Recovery Act). He then follows this topic with well-written chapters entitled: “Identification of Hazardous Waste,” “Hazardous Waste Generator Requirements,” “Hazardous Waste Transportation,” “Treatment, Storage and Disposal Facility Requirements,” “Incineration of Hazardous Wastes,” “Hazardous waste Treatment,” and “Land Disposal of Hazardous Waste.”

The final section of the book discusses the management of those wastes that do not fall conveniently under the prior two categories. These wastes include used motor oil, medical waste, construction and demolition debris, and electronic wastes.

Each chapter ends with a list of references as well as a section on suggested reading. Given also are relevant review questions. Included in this category are mathematical problems, some of which are based on computer models. Certain problems are based on field data and compiled on Microsoft Excel files (available on the Web).

I have nothing but admiration and praise for this book. It is comprehensive and well written. I recommend it enthusiastically to faculty for adoption as a text or to engineers needing a background in solid waste management.

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**Hazardous Industrial Waste Treatment, K. Lawrence Wang, Y.-T. Hung, H. Howard Lo, C. Yapijakis (Eds.). CRC/Taylor & Francis, Boca Raton, FL (2006). 525 pp., USD 129.95, ISBN: 0-8493-7574-6**

This book is one of a series being produced by one or more editors of this volume and their colleagues. The group’s website (<http://HandbookofEnvironmentalEngineering.com>) lists their books published and those planned. To date, six books have been

published while four are under publication, eight are in preparation and four more are proposed. I have published reviews of several of the published books. All were informative, well written and well referenced. This book is no exception.

In this book, the authors discuss in depth "... waste characteristics, control technologies, management strategies, facility innovations, process alternatives, costs, case histories, effluent standards, and future trends for the major hazardous industrial operations, and in-depth presentation of methodologies, technologies, alternatives, regional effects, and global effects of important pollution control practice that may be applied to the industrial operations."

The editors note that the book can serve both as a college textbook as well as a reference for hazardous waste managers. Perhaps personally, I am not sure of its utility as an engineering course textbook. The text is mainly descriptive and contains very little mathematical analysis usually found in engineering texts. Moreover, there are no problems or student exercises provided.

Surprisingly, incineration which is commonly used in hazardous waste disposal is discussed very briefly. A chapter devoted to this technology would have been useful.

The foregoing is a relatively minor criticism of the book. The book does contain a great deal of useful information.

There are many positive features to note in this book. A few of them are discussed below.

- (1) A review of hazardous waste generator status and regulatory requirements that industry is required to follow for storage, manifests, shipping and emergency preparation, and response. As examples of waste handling, the authors cover the management of hazardous wastes from medical offices and photography wastes from graphic arts companies. The chapter ends with a short review of recycling hazardous waste as refuse-derived fuel.
- (2) Pollution prevention is the topic of Chapter 5. Its benefits, laws governing, technologies involved therein and feasibility analysis are the subjects of this chapter.
- (3) The sins of the past are returning the haunt future plant operations. This is the topic of Chapter 7 which is entitled "Site Remediation and Groundwater Decontamination." This reasonably short (35 page) chapter covers the topic adequately. However, I found the inclusion of the 8-page glossary odd.

To finalize this review, I will simply list the titles of the chapters in this book. The reader will note that the first seven chapters are general methods of addressing hazardous waste problems while the last five chapters deal with wastes of specific industries:

- (1) Implementation of industrial ecology for industrial hazardous waste management.
- (2) Bioassay of industrial waste pollutants.
- (3) In-plant management and disposal of industrial hazardous substances.
- (4) On-site monitoring and analysis of industrial pollutants.
- (5) Pollution prevention.
- (6) Stormwater management and treatment.

- (7) Site remediation and groundwater decontamination.
- (8) Treatment of metal finishing wastes.
- (9) Treatment of photographic processing wastes.
- (10) Treatment of timber industry wastes.
- (11) Explosive waste treatment.
- (12) Treatment of landfill leachate.

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**Advanced Physicochemical Treatment Processes, L.K. Wang, Y.-T. Hung, N.K. Shammam (Eds.), Handbook of Environmental Engineering, vol. 4 Humana Press, Totowa, NJ (2006). 710 pp., US\$ 165.00, ISBN: 1-588-29-361-0**

In this book, the authors clearly and concisely discuss strategies for abating water pollution. Each of the 18 chapters is devoted to a single technology, wherein the authors review in detail a variety of process combinations along with technical and economic evaluations.

I was impressed by the uniformity of approach adopted for all the chapters, indicating to me, strong involvement and control of the writing process by the editors. Although each chapter is unique, they all (or at least most) share common topic headings/information such as: (1) background, (2) equipment descriptions, (3) theory as needed, (4) design process, (5) descriptive flow diagrams, (6) worked design examples and (7) cost data. Finally, I note there were an appropriate (but not exhaustive) number of references at the end of each chapter, many of which refer to publications of the senior editor.

To say the least, the list of chapter topics is impressive. Discussion of each topic, though not exhaustive, is comprehensive and well done. The chapter titles are as follows: (1) Potable water aeration, (2) Air stripping, (3) Adsorptive bubble separation and dispersed air flotation, (4) Powdered activated carbon adsorption, (5) Diatomaceous earth precoat filtration, (6) Tertiary microscreening, (7) Membrane filtration, (8) Ion exchange, (9) Fluoridation and defluoridation, (10) Ultraviolet radiation for disinfection, (11) Water chlorination and chloramination, (12) Waste chlorination and stabilization, (13) Dechlorination, (14) Advanced oxidation processes, (15) Chemical reduction/oxidation, (16) Oil water separation, (17) Evaporation processes, and (18) Solvent extraction, leaching, and supercritical extraction.

The authors note in the preface that this book is a companion volume to "*Physicochemical Treatment Processes*" (vol. 3 in their series) which covers a large group of other treatment processes such as screening, comminution, equalization, neutralization,