

papers involving over 1500 references, drawings, photographs, tables and equations, this book is an extensive review of the literature much as would be found (in topics covered) in a special topics issue of this journal (although a special issue of JHM would contain only a fraction of the number of paper found here).

The book is divided into four sections, roughly of the same length. The first section presents general engineering issues and discusses the regulation, ethical and technical framework with which these processes are managed. There are 10 papers in the section, beginning with one authored by two US EPA employees on "International Perspectives on Contaminated Land." Other papers in this section include ones on: (1) design considerations for hazardous waste landfills; (2) electrokinetic remediation, a topic of a special issue of the Journal of Hazardous Materials, some time ago; and (3) evaluation of the adequacy of hazardous chemical site remediation by landfilling.

The second (11 papers) section contains papers under the title of "Case Studies in Hydrocarbon Remediation." Most of the papers involve microbial treatment, and easily as a group could have been included in the bioremediation text noted above. The third, and longest (13 papers; almost 300 pages), section deals with "Traditional Soil-Specific Technologies" such as air-stripping, soil-vapor extraction, photolysis, ion-exchange and solvent extraction.

The final section contains several papers describing developing technologies: (1) use of CO₂; (2) novel (TORBED) process reaction; and (3) natural attenuation of explosives. Inexplicably, there were two seemingly out-of-place papers here in processing of vegetable raw material to produce fodder and municipal solid waste generation and management in Caracas, Venezuela.

Finally, a personal observation from an editor who is always seeking reviewers. Given the limited information supplied for each paper, it would present problems for me (as editor or someone who wanted to pursue the topic of the paper) in seeking out the author of the paper. At least for the United States, those authors at universities (the name of the university being given) could probably be contacted (it would be easier if the department names were given) but for those at companies or research institutions, it would be harder (but not impossible with internal resources) to get the addresses.

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Biofilms: Investigative Methods & Applications

Hand-Curt Flemming, Ulrich Szewzyk, Thomas Griebe (Eds.), Technomic Publishing Co., Inc., Lancaster, PA, 2000, 264 pp., US\$ 119.95, ISBN 1-56676-869-1

In the preface, the editors write, "During the last 10 years biofilms have become an important object of microbiological inquiry as a critical element in the preservation of quality within water systems as well as a key component of biological reactions in wastewater treatment. An understanding of biofilm development, structure and dynamics is one condition for improving water supplies and for addressing technical problems such as biofouling, corrosion and bioweathering."

This topic is of personal interest to me because I conducted biofilm research over 30 years ago, directing a master's student. That student realized the potential of the field; I did not. He went on to obtain much notoriety for his work in the field and subsequently published a book on the topic [Biofilms, W.G. Characklis, K.C. Marshall (Eds.), Wiley, New York, 1990]. Characklis' work on determining biofilm thickness is described in Chapter 14 of this book and is referred elsewhere.

My focus on biofilms was in their use in wastewater treatment systems, trickling filters and rotary biological contactors. The book goes well beyond that narrow topic to consider corrosion control and biofouling among other topics.

In the 14 chapters in this book, the contributors focus on laboratory research methods of examination of the composition and function of attached cells. It is discussed how sensors, microscopy, lasers and calorimetry can be used to obtain data on the morphology and metabolism of biofilms.

Selected chapter titles are:

- Rotating Annular Reactors for Controlled Growth of Biofilms.
- Extraction and Quantification of Extracellular Polymeric Substances from Wastewater.
- Quantitative Microscopy in Biofilm Studies.
- Microelectrodes and Tube Reactors in Biofilm Research.

Given the importance of biofilms, it is my opinion this book is a major contribution to the environmental literature.

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