
BOOK REVIEW

Design, Construction and Monitoring of Landfills, Second Edition

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Design, Construction and Monitoring of Landfills is a book that provides a comprehensive survey of the current practice of landfill engineering. The book deals with sanitary landfill technology applicable to both hazardous and nonhazardous waste disposal including municipal waste. The author of this book has revised and updated portions of the first edition to reflect the new technological advances and current practice in the field.

I personally think that practicing engineers and hydrogeologists involved in landfill design will find this book of great technical value. The author has accumulated a great wealth of knowledge and presented it in a simple, organized manner which provides valuable information to anyone who is involved in landfill design. The book goes further to point out some of the issues that engineers and hydrogeologists should pay particular attention to in the various design, construction and monitoring phases of the project. This book is also a good introductory tool for those who may not have been exposed to the issues related to landfill design, but who are, nevertheless, well acquainted with the basic theoretical concepts of geotechnical engineering and hydrology and their applications to this field. In many respects, the book provides a checklist of important issues to be considered in landfill design which is presented in a clear concise manner without the complication of undue theoretical issues.

The book is divided into 12 chapters comprising a total of 361 pages. It is organized such that design information is first presented, followed by landfill construction and monitoring, landfill operation, and economic analyses.

Briefly, the contents of each chapter can be summarized as follows: In Chapter 1, comments on regulatory requirements are presented. Chapter 2 gives a brief discussion on site selection process including preliminary assessment of public reactions and development of a list of potential sites. Chapter 3 discusses how

leachate and gas are generated in a landfill. This includes a discussion on factors that influence leachate quality and quantity and leachate treatment methods. Chapter 4 explains how to characterize and identify nonhazardous and hazardous wastes. Chapter 5 gives a brief overview of natural attenuation processes and the design approach for natural attenuation landfills. A brief discussion of the mechanics of attenuation and the attenuation mechanisms of specific contaminants is also included. It should be noted, however, that this chapter does not contain sufficient information to form the basis for study of the state-of-the art in this field; by-in-large, the author fails to include a survey of the literature and results of research performed in the past 10 years. Chapter 6 discusses the design of containment-type landfills for both hazardous and non-hazardous wastes including single and multiple lined landfills, liner material selection criteria, and leachate apportionment models. Chapter 7 provides a discussion on the various materials used for landfill construction including clay, synthetic membrane, synthetic clay liner and amended soil and other admixtures. Chapter 8 discusses the design of landfill elements including leachate collection systems, stormwater routing, synthetic membranes, berm design, stability of waste slope, seismic design of landfills, access road design, landfill cover design, gas venting systems, and retrofitting an existing natural attenuation landfill to function as a containment-type landfill. Chapter 9 gives a summary of construction-related issues concerning landfill elements and tests usually performed for quality control purposes. Chapter 10 discusses fundamental concepts regarding performance monitoring. Chapter 11 provides information regarding operation and long-term care needed for maintaining a sanitary landfill including equipment used, covering waste, fire protection, litter control, dust control, access road maintenance, leachate collection system maintenance, final cover maintenance, and landfill mining. Finally, Chapter 12 gives a brief discussion on economic analyses for landfills such as how to estimate the costs of construction, operation, final closure, and long-term monitoring.

Overall, the book is an excellent starting point for anyone who is involved in landfill design. Information is presented clearly and serves as a valuable tool for practicing engineers and hydrogeologists working in the field of landfill engineering.