

Book reviews

Practical Handbook of Material Flow Analysis

Paul H. Brunner, Helmut Rechberger; Lewis Publishers, Boca Raton, FL, 2003, 332 pages, US\$ 119.95, ISBN 1-5667-0604-1

Upon reading the title of this book, one would not expect it would be of interest to environmental engineers. That is a mistake as the authors outline how resources can be conserved and the environment protected with complex systems.

Perhaps the best way to start the review is to quote from the authors' answer to the question "What is MFA?" They write:

"Material Flow Analysis (MFA) is a systematic assessment of the flows and stocks of materials within a system defined in space and time. It connects the sources, the pathways, and the intermediate and final sinks of a material. Because of the law of the conservation of matter, the results of an MFA can be controlled by a simple material balance comparing all inputs, stocks, and outputs of a process. It is this distinct characteristic of MFA that makes the method attractive as a decision-support tool in resource management, waste management, and environmental management."

"An MFA delivers a complete and consistent set of information about all flows and stocks of a particular material within a system. Through balancing inputs and outputs, the flows of wastes and environmental loadings become visible, and their sources can be identified. The depletion or accumulation of material stocks is identified early enough either to take countermeasures or to promote further buildup and future utilization. Moreover, minor changes that are too small to be measured in short time scales but that could slowly lead to long-term damage also become evident."

In defining the purpose of the book, the authors go on to say: "The methods presented will enable the reader to design processes and systems that facilitate careful resource management. The term resources in this context stands for materials, energy, the environment, and wastes. Emphasis is placed on the linkage between sources, pathways, and sinks of materials, always observing the law of conservation of matter. This book is a practical handbook directed toward the practitioner. Hence, many case studies, examples, and problems are included."

This concept and methods proposed by the authors are detailed in a very long Chapter 2 entitled, "Methodology of

MFA". Discussed are analytical procedures, data uncertainties, and MFA software (such as Microsoft Excel, Quickstart with Umberto, and GaBi).

MFA, it is noted, appears to be easy if these steps are followed: define the system, collect the data, calculate the results, and draw conclusions. "In practice, one starts not with the result, but quite often with a poorly defined, highly complex problem that first must be simplified and structured. After the goals of an MFA have been clearly defined, the real art consists of skillfully designing a system of boundaries, processes, flows, and stocks that facilitate solution of a given problem at the least cost."

Presented in Chapter 3 are 14 case studies demonstrating the use of MFA in the fields of environmental management, resource management, and waste management. The first two case studies involve regional lead pollution and regional phosphorous management. These are topics of real environmental concern. These examples are followed by studies of nutrient pollution in large watersheds and a study of the use of MFA for environmental impact assessment.

Other case studies include: (1) resource conservation: nutrient management, copper management, construction wastes management, and plastic wastes management; (2) waste management: use of MFA for waste analysis, MFA to support decisions in waste management; and (3) regional materials management.

Problems for student assignment are found throughout the book.

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Ignition Handbook

Vytenis Babrauskas; Fire Science Publishers, Issaquah, WA 98027, 2003, 1124 pages (8.5 in. × 11 in., format), ISBN: 0-9728111-3-3, US\$ 198.00

Subtitled "Principles and applications to fire safety engineering, fire investigation, risk management and forensic science," the author's goal in writing this book was to "... attempt to cover the entire subject of ignition of unwanted fire." In the forward, a colleague writes, "This book is written for a broad audience, ranging from beginners who are new to the scientific study of ignition to experts who have a well-developed scientific background. The author presents fundamental science relating to combustion,