

hazardous waste sites. The detailed breakdown of line item costs includes the crew, the hourly output, adjustment factors, the labor cost, the equipment cost, and the material cost organized in a work breakdown structure designed for environmental remediation work.”

Details are voluminous. For example, costs are given for 21 different size (5–200) KW of a high intensity ultraviolet oxidation system. The smallest unit costs \$51 000 and the largest one is priced at \$358 000. The Modification section for geography is given by Zip Codes with Toledo (Zip 43606 and home of the reviewer) being 0.87. New York (Zip 11300) is 1.30.

The third book, *Environmental Remediation Cost Data—Assemblies*, “provides a systematic menu of costs for each type of remediation technology. Each assembly cost is broken out into five additional cost levels that have decreasing productivities to compensate for increasing safety levels established by OSHA. Containing over 4,000 assembly cost items organized by treatment train, this publication is a cost source book for environmental restoration activities beginning with initial site investigation and continuing through studies, design, remediation, and long term monitoring and operation.”

Each technology topic begins with a diagram of the process considered and a general discussion of the process. For example, under solidification/stabilization operations, the cost of a Bobcat with a Backhoe is given (at \$1500/month). On the same page one finds the cost of a dump truck rental. Each cost is also given by safety level.

Finally comes Echo’s Softbook User Guide that gives details step by step information on how to install and use the cost estimating programs (six floppy disks). In addition to cost data, treatment/process descriptives, treatment train consideration, common cost elements and other cost considerations are given.

Reviewing the package was a challenge. First, the data are voluminous. Second, the information is much different from the technical books I normally review.

I am far from a cost estimation engineer, but I am well aware of the importance of project cost, especially in the hazardous waste site remediation area where costs often get ‘carried away.’ Personally, I cannot believe someone in the field could do without this or a similar package. I believe it is invaluable.

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*Air Quality Control Handbook*, E. Robert Alley & Associates, Inc., McGraw-Hill, New York, 1998, 845 pp., ISBN: 0-07-001411-6

Alley and coworkers at his consulting firm have authored this handbook to give industrial, governmental and consulting engineers a quick reference to the major areas of pollution control-theory, characterization, regulation, management, and implementation. That they accomplish in 26 chapters followed by 17 appendices.

The main body of the book has five parts (if one does not count the introductory section on the history of air pollution and background of air quality regulations).

Part 1 has seven chapters dealing with the theory and quantification of air pollution. Discussion, as one would expect, is based on air quality theory and atmospheric dispersion models (but missing is information about the newer computer-based models). I was particularly impressed by the thoroughness of the chapter on stack sampling. If I had to guess, It would be that Alley's firm has much business in that area. Other chapters in this section dealt with fugitive emissions and air quality management policy.

The latter topic is a good lead-in to Part 2: Air Quality Management, in which Alley et al., discuss audits and air management programs. I thought his advice on how to prepare for and conduct a regulatory audit was excellent (although I must admit I have never been through an air audit myself).

The difficult (and voluminous) area of regulation comprises the discussion in Part 3. Discussed in turn are air quality, mobile sources, hazardous air pollutants, acid rain (I prefer the term acid precipitation), operating permits, stratosphere ozone protection and enforcement/administration.

Finally, we come to Control Systems (Part 4). Appropriately, I believe, the book starts with ventilation followed by control of particles and gasses. Here's where I begin to fault this book. These chapters are generally too short and lacking in detail, especially the fundamental theory (equations) underlying the control techniques. Virtually no theory is given on particulate emissions control other than settling velocity; the same comment can be made for absorption—but not for adsorption which is well covered in both theory and practice by Alley himself (leading me to believe he has considerable experience in this area).

Other control-oriented sections deal with incineration, biofiltration and condensation. Biofiltration has 31 pages devoted to it; inordinately long in my opinion. Nor was the discussion of the fundamentals of biological growth (and growth curves) discussed in this chapter relevant. A growth curve really has no applicability in fixed film systems (in contrast to dispersed growth). Also I would have liked some performance data.

The main body of the text ends with two sections on the control of NO<sub>x</sub> and SO<sub>x</sub> emissions.

Unfortunately, the editor has chosen to have extensive appendices: 17 sections totalling 258 pages (approximately 30% of the book). Most of the material was not needed (in my opinion).

Much of the appendices is government regulations—nice to have, but long to print—and very dated. If I had been the editor, I would have referred to the regulations and used the 268 pages (more or less) for increased coverage of pollution control systems.

One final note; the field of air pollution control, especially regulatory, is changing so quickly, I was ready to say the author missed the new EPA regulations on PM<sub>2.5</sub> microns. Not so. These regulations were being developed at the time of writing and were so noted (and discussed) by the author of the appropriate chapter.

My overall assessment—not a bad book but it would be even better by increasing the space devoted to control systems.

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