Laboratories are not inherently safe working places. Laboratory personnel face injury and even death in the laboratory from fire, explosion, asphyxiation, poisoning, infection and/or radiation. Physical hazards present are falls, burns, cuts and falling objects.

Laboratory safety begins with instruction of employees and students (beginning with new students in high school). However, as good as safety instruction may be, safety must be predicated on safe laboratory design, a topic that is one of two overlooked or slighted. To overcome this flaw, the authors note that "the construction of new laboratory buildings and the renovation of old ones require close communication between laboratory users, project engineers, architects, construction engineers, and safety and health personnel." "The purpose of this book is to provide reliable design information related to specific health and safety issues that should be considered when planning new or renovated laboratories. The objective is approached within the framework of other important factors such as efficiency, economy, energy conservation, and design flexibility. Although precise specifications are provided in some cases, the general intent is to review the relevant safety and health issues and then to recommend appropriate design action, including, where possible, a range of alternatives."

In the next paragraph, the authors' write "the book seeks to address at the design stage the many issues that have a direct bearing on the occupational health and safety of those who work in science and engineering laboratories."

The book is divided into five major sections (each with several chapters):

I. (A) Common elements of laboratory design, (B) Common elements of renovations;
II. Design guidelines for a number of commonly used laboratories;
III. Laboratory support services;
IV. Administrative procedures;
V. HVAC systems.

As one might expect, the initial chapter (Part I-A, chapters 1 and 2) contains general technical information that applies to nearly all laboratories, i.e. building layout, HVAC, safety control system, lighting, etc. "Laboratory considerations" is the title of chapter 2 (Part I-A).

Part I-B. (entitled "Common elements of renovations"), contains a most interesting table on "regulations applicable to laboratory decommissioning and decontamination." OSHA and EPA regulations pertaining to asbestos, lead, PCB's hazardous waste are listed. Even accident prevention is discussed.

The authors treat "Renovations: building considerations" in chapter 3 (Part I-B). Discussed are building layout, loss prevention, industrial hygiene and personal safety. Chapter 4 is a progression to laboratory considerations (in renovation).

Part II (chapters 5 through 21) contains information on detailed specifications, good practice procedures, and cautionary advice pertaining to 17 specific types of commonly constructed laboratories, e.g. analytical chemistry, pilot plant, high pressure, radiation, biosafety, clinical, printmaking, etc.

The next, relatively short section (Part III) has chapters dealing with laboratory support services such as photographic dark rooms, support shops, and hazardous chemicals, radioactive, and biological waste handling rooms.

Administrative procedures are covered in Part IV. This chapter begins: "although preparation an evaluation of bidding documents will ordinarily be conducted or supervised by a

knowledgeable and experienced professional architect or engineer for all but the most trivial of projects, it is important for the laboratory owners and responsible technical directors to understand the process to be sure that they have made their needs abundantly clear. When it comes to the matter of acceptance, it is essential that all the technical laboratory directors participate in a detailed examination of every aspect of the construction and furnishings that are about to become their personal work environment and that of their assistants; they leave this final task solely to a third party at their own peril."

Separate chapters discuss:

- project execution and bidding procedures;
- performance and final acceptance criteria;
- energy conservation;
- background on HVAC;
- comfort;
- fans;
- air cleaning;
- laboratory hoods and other exhaust air contaminant-capture facilities and equipment;
- exhaust air ducts and accessories;
- variable-air-volume systems.

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Environmental Biotreatment Technologies for Air, Water, Soil, and Wastes
Catherine N. Mulligan, ABS Consulting/Government Institutes, Rockville, MD, 2002, US$ 149.00, 420 pp., ISBN: 0-86587-890-0

According to the author, "the purpose of this book is to provide a complete state-of-the-art review, description, and evaluation of the technologies available for the biological treatment of air, water, soil, and solid wastes." It examines, "the various available technologies; provides process descriptions and conditions used in various case studies, performance data, scale-up issues, and site characteristics affecting performance; and weighs the advantages and disadvantages of each process and how they compare to traditional processes, such as incineration in terms of time requirements, safety issues, and other factors."

The author notes the unique aspect of the book is that it discusses treatment (albeit only biological) of air, water, soil and wastes in one book. In my opinion, she does this well, although I did take exception to some overly broad statements in passing:

- "biological processes do not product toxic by-product"—true in general, but anaerobic systems operating on chlorinated organics can produce toxic chemicals;
- "the use of microorganisms is relatively new"—not so unless you consider 100 years a short usage period;
- "waste can be degraded completely"—not normally; biological processes leave some small fraction of the organics unoxidized.