BOOKS

Fundamentals of Heat Transfer for Process Engineering

By D. Azbel, Noyes Publications, 1984, 377 pp., $36.00.

The title raised some hope that this book might be directed towards the particular needs and interests of the chemical or process engineer, as distinguished from the power engineer or the aerospace engineer. But this book turns out to be very conventional in its coverage—actually more constricted in some important areas than Holman's or Lienhard's, for example. There is the usual 25% devoted to conduction, including the customary foray into solving intermediate differental equations—inadequate if one wants to learn mathematics, excessive if one wants solutions for cooling an extruded polymer rod. The material on convection (35% of the book) is more nearly to the point, but with curious twists; e.g., somehow the problem of heat transfer in a fixed bed gets confounded with transient cooling of a solid body.

In the phase change chapter (17%), the boiling material is almost entirely pool boiling; condensation is treated better, including correlations on convective effects. Both areas would benefit from some preliminary discussion of two-phase flow phenomena. Multicomponent effects and combined heat and mass transfer processes are almost totally omitted.

The radiation chapter (15%) is conventional. The section on combined heat transfer is essentially the development of the overall heat transfer coefficient equation. The design integral, the mean temperature difference and NTU effectiveness concepts, and any description of heat exchangers are totally absent.

Rarely does the book live up to the statement in the preface that "principles . . . are presented in a manner that will make them useful in chemical engineering design." SI, U.S., and old metric units are used indiscriminately and incorrectly. The book is legibly reproduced from typed copy and well constructed, but there are numerous typographical errors as well as statements that this reviewer would take issue with on both technical and pedagogical grounds.

In summary, this book seems to fit no special niche and compares poorly with existing works in its topic area.

KENNETH J. BELL
School of Chemical Engineering
Oklahoma State University
Stillwater, OK 74078

Pneumatic and Hydraulic Conveying of Solids

By O. A. Williams, Marcel Dekker, Inc., 1983, 336 pp., $45.00

This monograph describes a variety of basic and applied aspects of pneumatic and hydraulic conveying of particulate materials, with heavy emphasis on application. In spite of the fact that it has been produced by offset printing, its readability is good; diagrams, sketches and tables are reproduced clearly and are well organized.

The mongraph opens with a short introductory chapter on pneumatic conveying. This is followed by three chapters dealing with three major pneumatic conveying systems—the negative pressure, positive pressure, and negative-positive pressure systems. The next chapter describes in detail common components of pneumatic conveying systems, including elbows, pipes, hoppers, storage tanks and silos, unloaders, and spouts. Air gravity conveyors are said to be effective and simple systems for transferring fluidizable solids; such systems are treated in Chapter 6. Chapter 7 on design calculations for pneumatic conveying systems presents basic principles, definitions, and concepts as they relate to potential applications of these systems in pneumatic handling of solids.

The remaining 11 chapters of the book are concerned with hydraulic conveying systems for solids, i.e., sluice systems, and ancillary facilities and equipment for the systems. The sluice systems are introduced in Chapter 8. This is followed by a chapter dealing with the three major sluice systems, namely, jet pumps, material handling pumps and combined systems. The main focuses of Chapters 10 through 14 and 16 are on ancillary facilities and equipment for hydraulic transport of solids. System design calculations and water balance calculations are described in Chapters 15 and 18, respectively. A problem of environmental concern, material disposal, is discussed in Chapter 17.

Inclusion of the chapters on systems design calculations is highly commendable. It is regretable, however, that no procedures are presented for cost estimation and economic optimization. Furthermore, omission of the reliability and safety aspects of solids conveying leaves much to be desired.

The mongraph does not treat rigorously the theoretical foundation of pneumatic and hydraulic transport of solids; it is also totally void of reference citation. The mongraph, therefore, is suitable neither as a classroom text nor as a reference book for researchers. However, in the light of a rapid increase in the application of pneumatic and hydraulic conveying of solids in the mining, chemical, utility and related industries, the mongraph should be conspicuous in the book shelves of the majority of practicing engineers in these industries.

L. T. FAN and F. S. LAI
Dept. of Chemical Engineering
Durland Hall
Kansas State University
Manhattan, KS 66506