

Small and Micro Hydroelectric Plants, edited by Robert Noyes, Noyes Data Corp., Park Ridge, NJ, 1980. Price: \$42.

REVIEWED BY FRANK M. WHITE

This book is essentially a clothbound grouping of the contents of four 1979 government reports and thus at its present list price is not really a bargain, being infinitely more expensive than the original material. But the original reports were not widely distributed—the reviewer possesses none of them, for example—so their compilation into a sturdy book creates a very useful item for hydropower engineering groups and libraries.

The book is thoroughly practical throughout and could be used by a consulting engineer to design an industrial plant or by a homeowner to construct a backyard facility. It makes an excellent practical companion to the recent ASME WAM'80 Symposium Volume No. G00180, *Small Hydro-Power Fluid Machinery*, edited by D. R. Webb and D. N. Papadakis.

The term "small" hydropower means a capacity of less than 15 megawatts or a dam height of less than 20 meters, while "micro" hydropower means less than 100 kilowatts. Both aspects are very well treated in this book.

Part I, entitled Resource Potential for Small Scale Hydropower, is taken from a 1979 U.S. Army Corps of Engineers report and documents the hydropower potential for the entire United States in 24 fact-filled pages.

Part II, Feasibility of Small Scale Hydroelectric Power Generation, is a 324-page Corps of Engineers report, written by D. W. Davis and co-workers. It is a comprehensive guide to the field and should be in the library of every prospective hydropower engineer. Its six chapters treat introductory technical and planning details, economic and financial analysis, hydrologic studies, existing facility integrity, electromechanical features, and civil and sitework features. It has a nice glossary of terms and many references.

Part III, Equipment for Small Scale Hydroelectric Power Plants, is a 43-page paper by W. W. Wayne Jr. presented to a 1979 DOE symposium. It briefly describes available equipment: packaged Francis and propeller units, bulb units, cross-flow turbines, and STRAFLO axial turbines. Included in the paper are some cost estimates, plus very nice drawings and photos.

Finally, Part IV describes Micro Hydropower, from a 1979 report to DOE by Ron Alward and co-workers from the National Center for Appropriate Technology in Butte, Montana. Its 62 pages are aimed directly at domestic individual users, with clear prose and excellent drawings. Along with technical, economic, and construction details, it includes a list of microequipment manufacturers, consulting engineers, and do-it-yourself booklets, with critical annotations.

Although apparently photocopied directly from the original reports, reproduction of this book is excellent throughout. At the list price it costs 9.2¢ a page, but is probably worth it for any engineer seriously pursuing small scale hydropower.

Fluid Power With Applications, Anthony Esposito, Prentice-Hall, 1980, 452 pages, Price: \$18.95

REVIEWED BY KENNETH R. HALLIDAY

The stated purpose of this text is to provide an introduction to fluid power systems and their application in industry. Emphasis is placed on describing fluid power components and showing how they can be integrated into useful functional loops. Within that context this is a very good book.

The first five chapters discuss the physics of fluid systems. Useful equations are presented, without derivation, as required. Topics covered include fluid properties, energy methods and pipe flow.

The next three chapters describe fluid pumps, actuators and control devices. The operation of these devices is very clearly described by a well written thorough narrative and excellent illustrations. The remainder of the book, five chapters, covers hydraulic and pneumatic circuit design, fluid logic, electronic controls and safety of construction.

The major strength of this book, in comparison to other introductory texts, is the clarity with which the components and processes are described. Each device is shown in a cutaway illustration, and numerous line drawings are presented showing various aspects of its operation. The figures are discussed in detail in the narrative. Sizing, power and dynamic calculations are presented both in the narrative and in numerous examples to help the student perform the actual processes of system design and component selection. Questions and numerical problems are provided at the end of each chapter.

The chapter on fluid control is also very good. The basic fluidic logic and sensory components are presented and a number of useful circuits are described in detail. The treatment of electro-hydraulic servo systems, on the other hand, is very sparse. This is perhaps the only real weakness in this otherwise fine text.

In summary, this is a well written introduction to fluid power. It is detailed enough to stand alone as an introduction to the field while at the same time maintaining a comfortable readability.