Architectural Acoustics: Principles and Practice, 2nd Edition

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Wiley, Hoboken NJ. 329 pp, 125.00 USD (hardcover), ISBN: 978-0470190524

An architect facing his or her first encounter with an acoustic challenge, a building owner or developer planning acoustically sensitive facilities, or an architecture student first exploring the realm of sound would be lucky to come across the latest edition of this book. The most recently published of many similarly titled books, this hardcover edition is a comprehensive primer on the diverse aspects of sound in commercial and institutional buildings, written by a group of the most preeminent practitioners in the field. In addition to providing a broad introduction to the basic issues involved when dealing with sound and noise in buildings, the book contains many types of acoustical data which make it a useful desk reference.

Each chapter begins with an explanation of concepts, illustrated with extensive figures and tables to make each concept clear and understandable to readers of any background. The chapters conclude with comprehensive lists of references and further reading, followed by case studies which present building problems and solutions related to the content of the chapter. The case studies, some of which are new to the second edition, highlight some of the most prominent and notable projects of recent times as well as practical solutions to common acoustic issues.

The first chapter provides a broad foundation for understanding the behavior and quantification of sound sources, paths and receivers. A full spectrum of topics, from frequency, to reverberation, to noise criteria is introduced here. Topics are summarized in plain English; the complete mathematical derivation of acoustic behavior is omitted in favor of practical, immediately applicable information accessible to students and non-engineers. The case study of the Fogg Art Museum Lecture Hall at the end of the first chapter is particularly interesting, since it is in this room that architectural acoustics as a field of study and practice began.

Most readers will be familiar with the construction materials presented in chapter two, but not necessarily their acoustical properties and applications. A thorough review of many common building materials as well as some specialized acoustical devices are presented here. The chapter concludes with many tables of absorption coefficients and isolation construction assemblies, which make the book a useful reference for practicing architects and acousticians.

Noise control using the source-path-receiver approach is presented in chapter three. The authors work from environmental noise considerations to the interior of the building and finally to specific equipment and HVAC systems. The chapter serves as an excellent roadmap of how to systematically analyze and address noise in a building from outside in.

While "home theatres" are mentioned in chapter four, which is about places for listening, this is not a how-to book for those looking to install a home studio or entertainment room. While the relevant concepts are covered, this book is geared mainly towards commercial and institutional buildings where critical listening takes place, like churches, auditoriums, concert halls, and theatres. Many types and examples of such rooms are presented here. One area that seems lacking in this chapter is discussion of spaces associated with educational facilities, like classrooms and music education rooms. Since such projects may not include an acoustical consultant, discussion here would make the book a more valuable resource for a practicing architect.

Almost everyone has experienced a public address system that was completely unintelligible. Chapter five discusses ways to configure sound reinforcement and reproduction systems to avoid this phenomena and to make music sound good as well. The chapter contains an overview of the many types of equipment and systems and examples of their use. Again, the focus is on commercial and institutional systems, not on how to make the greatest home theatre surround sound.

It is a daunting task to summarize all of the recent research in and innovations in acoustics, but chapter six covers many of the most important methods and advancements. It is also a thorough introduction to the scientific methods of inquiry in architectural acoustics, beyond practical applications. Any student considering a career in architectural acoustics, or architect wondering what the acoustical consultants are talking about would be well served by this chapter. The description of sound field parameters and the perceptual effects they quantify is an excellent summary of the many objective quantifiers of sound in a room. The case studies demonstrate how interdisciplinary research is incorporated into the design process, a cooperation that serves as an excellent model for many aspects of architectural design where research is less prevalent.

The final chapter, new to the second edition, considers the role of acoustics in the recent tidal wave of green and sustainable building practices. Organizations and regulations pertaining to green building are discussed and the unintended acoustic consequences of many green building measures are explained. The acoustic properties of typically employed green materials are discussed and examples of green design incorporating

acoustic features are presented. The book concludes with several appendices of data, a guide for selecting an acoustical consultant, and a glossary, which further add to its value as a desk reference.

These seven chapters and supplementary materials provide a concise summary of the diverse field of architectural acoustics, lots of practical advice, and good reference data for the practicing architect or architecture student. The figures and language make the material accessible to a broad audience from any background. Further reading lists and thorough references at the end of each chapter provide direction to those who may find the material too shallow. For practicing acousticians and engineers, the equations and theoretical background needed to do many calculations are missing, so a more technical reference may be more appropriate for these readers. Nonetheless, the authors have achieved their goal of providing "useful and practical treatment of this subject for architects, engineers, consultants, teachers and students as well as building owners and managers." It is particularly well suited as a textbook for architecture students, a practical reference for practicing architects, and as an introduction to the field for building owners, user groups, and anyone interested in sound as it pertains to buildings.

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