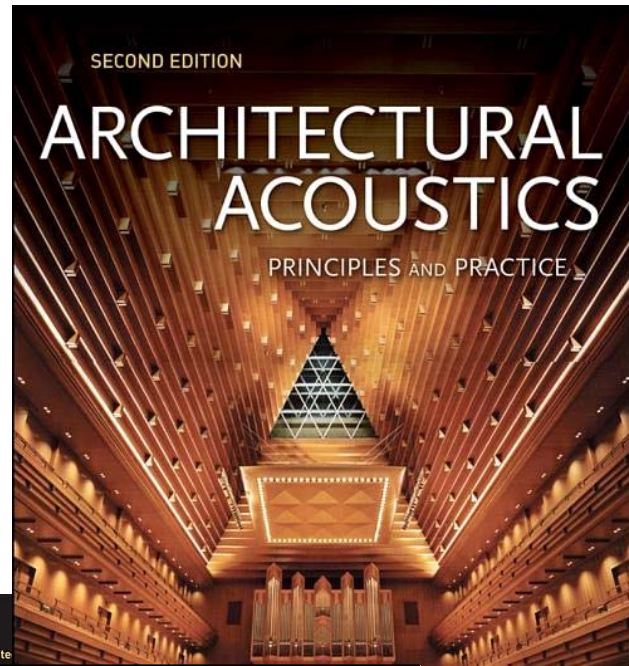


William Cavanaugh's 2009 edition of *Architectural Acoustics : Principles and Practice* is released

December, 2009

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Gary W. Siebein and Bertram Y. Kinzey (UF, Professor Emeritus) submitted Chapter 6: Recent Innovations in Architectural Acoustical Design and Research. The chapter focuses on the most recent progress in the field of acoustics in developing methods of evaluating, modeling, and predicting the acoustical qualities of buildings and environments. The chapter also reviews new developments in soundscape design, modeling and aural simulation, research in new materials for sound diffusion, noise control devices for mechanical systems, impact sounds, the noises in air distribution systems, and advances in other building systems. Seven case studies including Segerstrom Hall, McDermott Concert Hall, Evangeline Atwood Concert Hall, Bass Performance Hall, Esplanade Concert Hall, and Tokyo Opera City Concert Hall were presented.



Architecture/Engineering/Interiors

The leading guide to acoustics for architects, engineers, and interior designers.

A widely recognized, comprehensive guide to architectural acoustics, this book covers the latest in acoustical materials, and technologies. Written by a team of international acoustical experts, this book covers acoustical principles, design, building types, including educational facilities, particular attention is given to recording and broadcast studios.

With fundamental conceptual information, building designers can now design acoustically sound spaces without the need for costly, if not impossible, retrofits.

WILLIAM J. CAVANAUGH, FASA, an acoustical consultant to the world's leading architectural firms for more than four decades, has been named a Fellow of the Acoustical Society of America's highest honor in acoustics.

GREGORY C. TODD, FASA, INCE, executive director of Cavanaugh Todd Associates, Inc., brings important insights to acoustical design as president of the Institute of Acoustics and a co-chair of American National Standards Institute's Acoustics Committee.

JOSEPH A. WILKES, FAIA, is a professional architect. He has taught at the schools of architecture at the University of California, Berkeley, and the University of Texas at Austin.

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chapter 6

Recent Innovations in Acoustical Design and Research

GARY W. SIEBEIN AND BERTRAM Y. KINZEY, JR.

6.1 INTRODUCTION

The purpose of much of the current research in the field of architectural acoustics is to develop methods to evaluate, model, predict, and aurally simulate acoustical qualities of buildings and environments. This research allows qualities of sound to be consciously designed as important elements contributing to the multi-sensory experience of architecture. In a few years, an integrated system will likely be developed to evaluate, design, predict, and simulate the subtleties of the sonic environment of interior and exterior dynamic soundscapes as they change over time. This system will be designed to reflect the perceptions of the sonic qualities that people who use the rooms find important. It should be able to be used as an integral part of the design process of all buildings, and allow sound to be a fundamental phenomenological entity to be used to form perceptual space; in addition, it may serve as a basis for establishing form and concept for architectural, urban, and environmental design.

The research activities are interdisciplinary by necessity. Architects, researchers, and consultants from architecture, neuroscience, psychology, music, theater, engineering, speech, and other areas have all been actively engaged in this work. An outline of the major areas of research is presented in the three major categories described here.

Understanding and Measuring Room Acoustic Qualities

- The perceived aural qualities of existing buildings are being studied to define the components of acoustical quality. This occurs both through qualitative evaluations by researchers, consultants, and musicians listening to many performances in many rooms, and through laboratory studies of sound quality evaluated by human listeners, using techniques borrowed from psychology and neuroscience.
- Acoustical measurement systems for studies in full-size rooms and in scale models of rooms are being developed and tested. These systems are based on impulse response testing and digital signal processing from electrical engineering.
- The physical acoustical qualities of existing buildings are being studied to determine how sound interacts

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Joseph A. Wilkes

