

## **Worship Space Acoustics**

Mendel Kleiner, David Lloyd Klepper and

Rendell R. Torres

J. Ross Publishing, Ft. Lauderdale, (2010) 311 pp,  
89.95 USD, ISBN- 13: 978-1-60427-037-2

This much needed book on the acoustics of worship spaces has been produced by three widely-experienced authors and is worthy of consideration by architects, acousticians, builders, administrators and anyone interested in the history or construction of spaces for worship.

The book has two parts. Part one gives a cursory review of the fundamentals of acoustics and its measurement, followed by properties of hearing, sound absorbing materials, planning for good acoustics in worship spaces, and means for achieving quiet. The section on "sound systems for clarity and reverberation" is excellent and should be read by every acoustician.

Part two deals with the history of Judaism, Christianity and Islam. It goes into details of the construction of synagogues, churches and mosques through the ages, but particularly as they exist today.

Important design considerations include: floor plans and sections, desirable reverberation times for music and for speech intelligibility, location of pipe organs and choirs, and means for controlling noise. The section

on sound systems deals with the various ways of achieving speech intelligibility in spaces of widely different shapes, reverberance, and seating arrangements. The different types of systems considered are: a) central, b) distributed cone, c) distributed pew back, d) distributed directional horns, e) distributed delayed columns, and f) horizontal line sources. Detailed equipment information is given on microphones, control centers, direct radiator loudspeakers, directional horns, and distributed digital-signal processing. A useful section is included on the specification of sound systems, choosing types of equipment, installation techniques, tests, and service requirements.

In dealing with worship spaces, it appears that synagogues pretty much all emphasize speech intelligibility (and so do Mosques). Spaces for Christianity cover a wide range from cathedrals, to mega-churches, to village churches. The spoken and musical characteristics for this range are translated into means for providing beautiful acoustics for organ music and uniform speech intelligibility. Loudspeakers are often everywhere and merging them into the architecture is usually a major consideration,

The book ends with an appendix that gives references and notes to the text and acknowledgments.

*Leo L. Beranek  
beranekleo@ieee.org*