Designing Better Classrooms

Understanding and Implementing the New Classroom Acoustics Standard

Spoken language communication is essential to most classroom learning, where as much as 60 percent of the activities involve students listening to and participating in spoken communications with a teacher and other students. The school classroom facilitates and enables students to learn essential academic, social and cultural skills. As a communication channel for learning, the classroom should be free of acoustical barriers. These statements are included in the *Rationale for Acoustical Performance Criteria* in the American National Standard for Acoustical Performance, Criteria, Design Requirements and Guidelines for Schools, ANSI S12.60-2002.

The standard is best summarized in its Abstract: "This Standard provides acoustical performance criteria, design requirements, and design guidelines for new school classrooms and other learning spaces. The standard may be applied when practicable to the major renovation of existing classrooms. These criteria, requirements, and guidelines are keyed to the acoustical qualities needed to achieve a high degree of speech intelligibility in learning spaces. Design guidelines in informative annexes are intended to aid in conforming to the performance and design requirements, but do not guarantee conformance. Test procedures are provided in an annex when conformance to this standard is to be verified."

Why was a new standard needed? After all, architects have been designing schools for generations. What has changed that requires an acoustical standard on top of all of the other codes and regulations that govern school facility design and construction? Lightweight drywall construction has displaced traditional masonry for many interior partitions. Air conditioning is almost universal, whereas in former years it was far less common. Urban noise, including vehicular traffic has continuously increased. Audio/visual systems with amplified audio tracks are in many classrooms. Acoustically deficient trends such as "open classrooms," lacking sound isolation between classrooms were adopted. Most importantly, however, much has been learned through research on students' physiology, hearing, learning, speech perception and communications. Design based on precedent, it turns out, is not so much using what works, as it is just doing things because that's how they have always been done.

The use of American National Standards is voluntary. With the exception of a few institutional owners and school districts that currently impose S12.60-2002 in their facility standards, owners and designers are not yet required by law, regulation or ordinance to use or even consider the criteria, requirements and guidelines of the standard. Architects should consider, however, that this standard was initiated by a federal government agency and many representatives of the technical, trade and public-interest communities. Over time, it is inevitable that institutional owners and political jurisdictions will adopt some or all of the standard.

Architects, who design facilities for learning and are responsible for creating successful learning environments, should become familiar with the school acoustics standard, inform their clients about it, and implement it into design. Criteria and other specifications contained in the ANSI/ASA standard are consistent with long-standing recommendations for good practice in acoustical design. Failure to consider or incorporate the standard could make architects liable for poor acoustical performance of facilities, and poor academic performance of students. The new standard is more than a potential regulation; it is a long-anticipated and valuable tool for design professionals, owners and builders to create better learning facilities.

History of S12.60-2002

The Access Board, a federal government entity that enforces accessibility under the Architectural Barriers Act of 1968 (ABA) and the Americans with Disabilities Act of 1990 (ADA), was created under Section 502 of the Rehabilitation Act of 1973. Officially named the United States Architectural and Transportation Barriers Compliance Board (ATBCB), the Access Board is responsible for developing accessibility guidelines and providing technical assistance to individuals and organizations. Recognizing that poor spoken communications due to inaudible or unintelligible speech for students and teachers may create selective acoustical barriers to learning, the Board published a request for information on acoustics in schools in 1998. The Acoustical Society of America (ASA) formed a working group in 1997 with representatives of eleven national groups on "eliminating acoustical barriers to learning in classrooms." The Access Board partnered with the ASA, in association with the American National Standards Institute (ANSI), to develop a new standard. Between 1999 and 2002, this group met regularly, ultimately developing a final draft in late 2001. After review and public comment, the process was completed. The ANSI S12 Committee on Noise, which included "wide representation from the technical community (manufacturers, consumers, trade associations, general interest and government representatives," (S12.60, Forward) approved the new standard 26 June 2002. Challenges were made by the American Refrigeration Institute (ARI), Modular Building Institute (MBI) and the School Facilities Manufacturers' Association (SFMA), but all were rejected by the Board of Standards Review (BSR), which upheld the standard and the development and approval process that was followed by the S12 committee in adopting it. The Access Board submitted extracted provisions of ANSI S12.60 to the International Code Council (ICC) for inclusion in the 2003 International Building Code (IBC), including maximum background noise levels of 35 dBA and reverberation time of 0.6-0.7 seconds. Although the proposal was not adopted at the ICC hearing in September, "there was a strong consensus among interested parties to work with the ASA and ANSI S12 Committee on Noise" on resolving the issues related to compliance and associated costs.

For continuation of this article by Jack Evans, see Texas Architect, January/February 2004.