

Before the
ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD
Washington, D.C. 20004

In the Matter of
Americans with Disabilities Act)
Accessibility Guidelines for)
Buildings and Facilities;)
State and Local Government)
Facilities)

Interim Final Rules
36 CFR Part 1191
Docket No. 92-2

COMMENTS OF
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AMERICAN SPEECH-LANGUAGE-HEARING ASSOCIATION
AUDITORY-VERBAL INTERNATIONAL INC.
NATIONAL CENTER FOR LAW AND DEAFNESS
NATIONAL CUED SPEECH ASSOCIATION
SELF HELP FOR HARD OF HEARING PEOPLE, INC.

The Alexander Graham Bell Association for the Deaf Inc., the American Speech-Language-Hearing Association (ASHA), Auditory-Verbal International Inc., the National Center for Law and Deafness, the National Cued Speech Association and Self Help for Hard of Hearing People Inc., (SHHH) submit these comments to the Architectural and Transportation Barriers Compliance Board (ATBCB) in response to its Interim Final Rule, Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; State and Local Government Facilities.

Properly designed architectural acoustics is fundamental to access to the communications process. A poor acoustical environment is an architectural barrier to people with hearing, speech, language and visual impairments every bit as much as a set of stairs might be considered to be a barrier for a person in a wheelchair. The removal of acoustical/communication barriers and/or designing acoustically accessible rooms often requires no structural changes but rather requires only the addition of acoustical sound-absorbing materials to correct the situation. Carpet, acoustical wall panels, acoustical baffles or acoustical ceilings are some of the corrective measures that easily can be employed. Frequently such measures do not involve significant financial commitment and may in fact be considered "cost effective" given the sheer numbers that such measures accommodate.

The issue of Architectural acoustics, to enhance access to communication and minimize conditions which negatively impact or limit one's ability to hear, speak, and understand speech within a building has been omitted in the proposed ADAAG guidelines and we recommend its inclusion. Those modifications make for a better listening and less stressful environment for everyone, but also can **make the difference between understanding and not understanding speech for people who are hard of hearing** performing their duties as citizens and children in school trying to learn.

In the course of daily activities the variable affecting communication most frequently is the acoustical environment. Unfortunately, there is little understanding by those most frequently involved in building design and architecture with respect to how profoundly the acoustical environment impacts the

ability to hear and the daily activities of people who are hard of hearing.

While poor room acoustics, have a negative impact especially on people who are hard of hearing and people with other types of communication impairments (speech, language) and disabilities (learning, attention deficit disorders), people who have normal hearing frequently have similar difficulties. (ASHA, 1992) (1) Poor acoustical environments have a negative and discriminatory impact on far more people of all ages than is thought to be the case.

Poor acoustics are a problem in the types of buildings covered by Title II of the ADA. Buildings that have been designed without proper attention to acoustics typically have a prevalence of sound reflective surfaces. It is not uncommon in many schools and courthouses for the floors, walls, ceilings, chairs, desks and other furniture to be made from hard sound reflective materials.

Every space in a building where communication takes place will be impacted by the acoustical environment. The two acoustic conditions present in most school classrooms, courtrooms, and civic buildings that negatively impact speech understanding, are reverberation and noise. Both significantly interfere with speech understanding for people with hearing loss, especially for those who use hearing aids. Reverberation is the persistence of reflected sound energy or the echo effect. It is exacerbated in spaces with large volumes and minimal or no sound-absorbing finish materials. This echo effect is measured as reverberation time. Technically, this is the time, in seconds, that it takes for a sound to decrease 60 decibels (dB) after it has been turned off in the room. The more reflective or reverberant the room, the longer it takes for the sound to decrease 60 dB.

Examples of Reverberation Times (at 500/1000 Hz) include:

- . Sound booth for hearing testing - 0.01 seconds
- . Living room with carpet, sofa, drapes - 0.4 seconds
- . Classroom with desks, blackboard, bare floor - 1.0 seconds

Studies have been done that show that children with hearing loss, even when wearing hearing aids, have significant difficulty hearing, and therefore learning, in an environment with a high reverberation time and perform poorer than hearing peers in this situation. (Crum, 1974; Crum & Matkin, 1976; Finitzo-Hieber, 1988; Finitzo-Hieber & Tillman, 1978; Flexer, 1989; Flexer, Millen & Brown, 1990) (2)

The second factor is background noise or any unwanted sound from outside or inside the building that interferes with the person's ability to understand speech. Outside noise can come when a building is placed in an area of high vehicular traffic or aircraft activity, or in the case of schools, from activities on playgrounds and sports fields. Extraneous noise also can come from mechanical installations inside the building. For example, air conditioning systems, heating and water installations, fluorescent lamps, copiers, machines, and printers.

Though hearing aids help individuals to hear by amplifying sound, they do not restore normal hearing. One situation that is difficult for individuals with hearing loss is the presence of background noise because hearing aids amplify both the background noise and the speech signal. The comparison of the level of the noise to the level of the speech signal is called the signal-to-noise ratio. Research with children in school shows that to create the optimal listening environment the signal-to-noise ratio should be at least +15 dB and the reverberation time no greater than 0.2 seconds.

Both reverberation and background noise are major problems in state and local government

buildings but both can be overcome or greatly reduced by the installation of sound absorbing materials on floors, walls, and ceilings. Care in the selection of the building location and orientation mitigates unwanted background noise. For example whenever possible, schools should be built on a large lot in a quiet district and classrooms should be situated away from noise sources such as sports fields and playgrounds.

Twenty eight million Americans have hearing loss. (3) Of those, more than 10 million are the result of noise exposure. The National Institutes of Health reports that hearing damage due to noise is a growing but avoidable problem. In a study done in the state of Tennessee, 3.8% of sixth grade children had significant hearing loss. Eleven percent of ninth and twelfth grade students failed hearing screenings at frequencies above 2000 Hz; 30.2% of 2,769 incoming freshmen (age 16-21) failed frequencies above 2000 Hz. To confirm this finding, a follow-up hearing screening of incoming freshmen the next year yielded 60.7% of 1,410 students failing frequencies above 2000 Hz. (Lipscomb, 1972) Patrick Brookhouser, otolaryngologist and director of Boys Town National Research Hospital, Institute for Communication Disorders, states that U.S. military services have had to lower their hearing standards in recruits because so many adolescents applying for induction had suffered noise-induced hearing loss.

Academic lags in excess of one year have been found in children with hearing loss in the range of 15 to 26 dB in the better ear. (Quigley, 1978) While elementary school children with moderate hearing loss (from about 40-55dB) perform an average of three years behind their normally hearing counterparts on academic achievement tests. This need not be. Given effective, consistent, and continuing auditory management, proper acoustical environments and amplification systems and support services, many hard of hearing children could function in a regular classroom similar to their normally-hearing peers. (Davis, 1977)

Children who are hard of hearing may be helped enormously by the use of assistive listening devices in the classroom. (Flexer, 1992) These systems should be incorporated in all educational settings.

Another crucial form of help that is nearly always overlooked is improved acoustical modifications to classrooms such as installing wall-to-wall carpet, acoustical ceiling tile, and sound-absorbing wall treatment. Successful functioning in the regular classroom may be dependent upon the acoustic nature of the classroom in which the child is placed because significant difficulty in discriminating speech in the classroom may be the most important factor affecting performance. (Davis and Hardick, 1981) A child who is hard of hearing has difficulty with auditory comprehension of connected speech under noisy conditions and shows significant breakdown compared to normally hearing peers. Carpeting, sound-absorbing ceiling tiles, and other sound-absorbing materials, greatly overcome the barriers to maximizing speech intelligibility for children who are hard of hearing in the classroom. Architects, educators, and school administrators need a better understanding of the impact of acoustics on people and their ability to learn. School administrators have the responsibility to ensure that buildings designed by their architects meet adequately the needs for all people. The facilities must support the teacher's ability to deliver and the student to receive clear and distinguishable instruction.

Hearing aids also are sensitive to magnetic noise from sources such as transformers and some forms of lighting. This magnetic noise can cause the hearing aid to pick up a hum that interferes with speech understanding. This is particularly a problem when using a hearing aid with a telephone coil. (T-coil) A T-coil is a magnetic induction pick up coil mounted inside the hearing aid. It allows a person to use the hearing aid with the telephone without interference from environmental sounds. Particular care needs to be taken in the placement of public telephones. An evaluation of the contemplated site needs to be made to check for sources of interference and the presence of excessive background noise. If public telephones are located

close to sources of electromagnetic interference, hearing aid users will be subjected to a loud hum and be unable to hear on the phone even using the T-coil. If a telephone has to be located in a particularly noisy environment, it should be carefully oriented and at least partially enclosed to minimize distracting noise.

Our intent, through these comments, is to suggest that the Access Board includes in its ADA guidelines requirements for the design of new and altered buildings taking into consideration the acoustical and communication access environment. We would like to see ADA guidelines that set specific targets for reverberation time and noise levels. The targets we recommend are noise levels in unoccupied classrooms not exceeding 30 dB(A), and reverberation times (RT) not exceeding 0.4 seconds across frequencies. We urge that technical studies be reviewed if needed and/or authorized to provide the appropriate technical support for the inclusion of minimum architectural acoustics criteria for Title II buildings as part of 36 CFR Part 1191. Attached here for your reference are the American Speech-Language-Hearing Association (ASHA) Position Statement and Guidelines for Acoustics in Educational Settings, (1994) developed by the ASHA Subcommittee on Acoustics in Educational Settings of the Bioacoustics Standards and Noise Standards Committee, and related technical reports that document research to support acoustics criteria.

There is available the technical expertise to provide sufficient quality and quantity of acoustical materials to support and enhance the communication process. Without guidelines for architects and their clients to reference, architectural acoustics is a matter that all too frequently is overlooked.

Thank you for the opportunity to comment on the interim final rule. We hope that you will give consideration to our recommendations regarding architectural acoustics. These modifications make communication in a building more accessible for everyone and significantly impact the ability of individuals with hearing loss to understand spoken language.

Respectfully submitted,

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Deputy Executive Director, SHHH

December 16, 1994

(1) American Speech-Language-Hearing Association (ASHA) (1992). Listening and Hearing: A Supplement to Technology in the Classroom. Rockville, MD: ASHA.

(2) American Speech-Language-Hearing Association, (in press). Position Statement and Guidelines for Acoustics in Educational Settings. Rockville, MD: ASHA.

(3) National Institute on Deafness and Other Communication Disorders Advisory Board (1991). Research in Human Communication (NIH Publication No. 92-3317). Annual Report. Bethesda, MD: NIDCD.