Residential sound attenuation—A quest for quiet

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recently high-lighted by Berger *et al.* [*Combatting Noise in the '90s: A National Strategy for the U.S.* (ASHA, Rockville, MD, 1991)]. As a result of his participation in this conference, the first author became interested in this problem and began an informal study to collect 24-h noise exposure data on primarily nonoccupationally noise-exposed friends and co-workers living in Indianapolis, IN. Data from the subjects who were asked to "wear" dosimeters 24 h/day for week-long periods, will be presented and anecdotal findings will be reviewed. Thus far, the average 24-h L_{eq} across the available sample of 14 people, is 77 dBA with the lowest observed 24-h L_{eq} equal to 56 dBA and the highest value found to be 90 dBA.

9:40

3aNS5. Nonoccupational noise exposures and their estimated daily *L* (eqs.) for general commercial air travel and local bars, restaurants, discos, and socialization establishments. Larry H. Royster (MAE Dept., NC State University, Raleigh, NC 27695-7910) and Julia D. Royster (Environmental Noise Consultants, Inc., Raleigh, NC 27622-0698)

Over a period of several years the authors have collected noise exposure data ($N > 150$ samples) during normal commercial air travel. The data were collected utilizing noise dosimeters, and an octave-band analyzer. The resulting noise exposures for air passengers will be presented, including the distribution of the measured A-weighted sound pressure levels. In addition, as part of regular class assignments, the students of the first author's Effects Of Noise And Vibration graduate class have collected sound exposure data over several years at popular bars, restaurants, discos, and socialization establishments in the Raleigh, NC area. The noise exposures and sound level distributions from these surveys will also be presented.

10:00–10:05 Discussion

10:05–10:15 Break

Contributed Papers

10:15

3aNS6. Initial results of study of aircraft noise effects on residential sleep disturbance. S. Fidell, K. Pearsons, R. Howe, B. Tabachnick, L. Silvati, and D. Barber (BBN Systems and Technol., 21120 Vanowen St., Canoga Park, CA 91303)

More than 1800 subject-nights of observations have been completed in a large-scale, in-home study of awakenings associated with nighttime aircraft noise exposure in the vicinity of an Air Force base, a major civil airport, and several sites in urban neighborhoods with negligible nighttime aircraft noise exposure. A statistically reliable relationship was found between behaviorally confirmed awakenings and indoor sound exposure of individual noise events. This relationship is similar to one reported in another recent large-scale field study, and also with a relationship summarizing the findings of several earlier field studies of noise-induced sleep disturbance. The findings do not, however, agree well with those typically found in laboratory studies of sleep disturbance, nor with an interim dosage-response relationship adopted by the Federal Interagency Committee on Noise. [Research sponsored by U.S. Air Force Armstrong Laboratory, Wright-Patterson Air Force Base, OH.]

10:30

3aNS7. Software system for quantitative, observer-based analyses of aircraft noise. N. H. Reddingius, M. D. Sneddon, J. S. Smyth, and S. Fidell (BBN Systems and Technol., 21120 Vanowen St., Canoga Park, CA 91303)

The National Park Service's Overflight Decision Support System (NODSS) now provides a functional capability for estimating airspace volumes above points and areas on the ground that should be avoided if aircraft are to remain unnoticed. Calculations of these volumes are sensitive to aircraft noise emissions, background noise levels at observers' positions, terrain shielding, atmospheric absorption, and geometric spreading. NODSS provides a complete and consistent framework for performing acoustic detectability-based calculations as well as more conventional aircraft emission-based analyses, and produces results that can be displayed in easily understood graphic form. The initial use intended for NODSS is to perform engineering analyses of airspace restrictions associated with restoration of natural quiet in Grand Canyon National Park, pursuant to Public Law 100-91. [Effort supported in part by U.S. National Park Service.]

10:45

3aNS8. Residential sound attenuation—A quest for quiet. Deborah W. Murphy (Environmental Affairs, Sarasota Bradenton Intl. Airport, P.O. Box 13399, Sarasota, FL 34278-3399)

While aircraft noise annoyance does not cause a negative impact on public health, it does affect public welfare. Airports around the country are constantly looking for innovative ways to reduce the impact of airport operations on their neighbors. The Airport's Residential Sound Attenuation Pilot Project is one of several ways the airport has played an active role in the community, to help improve their neighbors' quality of life. The Pilot Project was an initial demonstration which introduced the concept of sound attenuation to residents of homes located between the DNL 65- and 75-dB noise contours. Implemented as part of the Airport's FAR Part 150 Noise Compatibility Program, the Project was designed to provide costing information, design guidelines, and construction methodology for a possible continuing program in which all eligible homes could be sound attenuated. The overall results of the program were extremely successful, providing four homes with a substantial reduction of interior noise levels due to aircraft overflights. The Pilot Project was successful not only as a demonstration of sound attenuation effectiveness, but also as a public relations program in that it showed evidence of the Airport's commitment to address noise as an issue of importance to the community.

11:00

3aNS9. Auto traffic noise, air traffic noise, and the environmental quality of city streets: Test of a model. William R. Meyers (Psychol. Dept., M.L. #376, Univ. of Cincinnati, Cincinnati, OH 45221), Mary Meyer, Ernest M. Weiler, Laura DeRonde, Jo Ann Sparnall, and Matthew Stroop (Univ. of Cincinnati, Cincinnati, OH 45221)

In Jan. 1991 the Greater Cincinati Airport opened a new runway whose traffic flies directly over heavily populated residential areas which had little prior exposure to aircraft noise. Our evaluative study design replicated with modifications the classic and influential Appleyard and Lintell [(1969); Appleyard, *Livable Streets* (1981)] studies of the effects of auto traffic on residential life. As did Appleyard and Lintell, three streets were chosen called High, Medium, and Low, based on observed noise levels (and dBA measures of flights; many were found to be in the 90 to 100 dBA range), and conducted, using their questionnaire, 36 structured in-depth interviews with 12 randomly sampled households