Technology for a Quieter America
The National Academy of Engineering, The National Academies Press, Washington, DC, 2010 192 pp., ISBN 978-0-309-15632-5 (pbk) ISBN 978-0-309-15633-2 (pdf)

The National Academy of Engineering (NAE) is to be commended for taking on the timely and important study *Technology for a Quieter America* and publishing the committee's excellent well-reasoned roadmap for a national noise policy. The study committee (chaired by George C. Maling) included ten members representing consulting, academia, and government. The committee took input from representatives of the public, industry, and non-profits. They also received support from five panels of experts, four consultants, and eight reviewers. The names of the study contributors read like a Who's Who in U.S. Noise Control Engineering. The NAE and committee held six workshops from 2005 to 2008 and INCE sponsored Noise-Con conferences in 2007 and 2008 included two well-attended supplementary workshops.

Key areas addressed in the report include community noise, consumer product noise, workplace noise, noise-control engineering technology, noise control education, competitiveness of U.S. manufacturers, cost-benefit analysis, roles for government agencies, and information for the general public. A wide range of findings are identified along with many recommendations that when implemented will lead to quieter environments for Americans.

Chapter 1 introduces the topics later treated in the book and discusses some of the issues with noise. Selected examples of community noise from transportation sources, construction activities, industrial facilities, wind turbines, and consumer products as well as noise in buildings, cities, and parks are summarized briefly in Chapter 2. Additional details are reserved for later sections of the report.

Chapter 3 summarizes the evolution of currently popular metrics used to assess environmental noise in the U.S. and in Europe. Supplementary metrics are discussed to quantify loudness, annoyance, sleep disturbance, speech interference, and sounds in national parks. The role for supplementary metrics when communicating with the general public is also considered. Recommendations include adopting as a goal a Day-Night Level (DNL) of 55 dB to protect public health and welfare. Also recommended is international cooperation in the development of better metrics and a more holistic annoyance model for assessing noise impacts.

The important subject of hearing loss caused by excessive exposure to hazardous noise in workplaces, and when using particularly noisy consumer products, is addressed in Chapter 4. While the main focus of this chapter is on occupational noise exposures, noisy toys, recreational activities, and personal listening devices are also mentioned. Methods and treatments that have proven to be successful to reduce noise at the source are identified along with common and advanced personal hearing protection devices. The use of engineering controls is emphasized as the first and best means to reduce excessive noise in nearly all situations. Recommendations aimed at better protecting Americans from noise-induced hearing loss in workplace settings include adopting a time-weighted-average exposure limit of 85 dBA together with a 3 dB exchange rate, additional research on damage-risk criteria, the use of engineering controls, development and distribution of informational materials and guidelines on industrial noise control, and an increased emphasis on buy-quiet programs.

Assembled in Chapter 5 are both specific and overview examples of current and advancing engineering noise control technologies in the U.S., Canada, and Europe. The chapter covers transportation systems including commercial aircraft, road traffic and pavements, and urban to inter-city passenger and freight rail; consumer products and sound quality; and buildings including healthcare facilities, school classrooms, and multifamily dwellings. State-of-the-art modeling, simulation, measurement, and data management computer-based systems used for noise control engineering are also presented in this chapter.

National and international standards and regulations, as well as laboratory accreditation, certification, and labeling for noise emissions from a wide range of products are addressed in Chapter 6. Because governments and product manufacturers within the EU have taken on leadership roles in setting international noise emission standards, the chapter reflects concern that overseas manufacturers now have a competitive advantage compared to U.S. firms in the global market for quiet products and low-noise machinery. Several recommendations are provided to assist American manufacturers in the area of international noise standards as related to selling products and machinery into the global market place.

Chapter 7 and Appendix F address environmental economics as applied to evaluating the costs and benefits of outcomes expected from alternative noise abatement options. Cost-benefit analysis (CBA) methods being developed by the Federal Aviation Administration for aircraft noise (now in use in Europe for aircraft, road, and rail noise) are described. Documented costs for the more than 2,200 miles of highway noise barriers built in the U.S. are provided along with preliminary estimates of the costs associated with quieter pavements. It is noted that highway noise barriers are most effective for

homes near the highway and require minimal maintenance while quiet pavements can be expected to provide benefits at greater distances with a higher associated maintenance requirement. The authors recommend that a formal CBA be performed to compare and evaluate the outcomes of installing quiet pavements vs. noise barriers along U.S. highways.

Many current activities related to noise by government agencies and organizations, and their roles, are identified and described in Chapter 8. However, it is pointed out that in most cases activities and approaches to noise control are not adequately coordinated at federal, state, and local levels. A better organizational structure is required to coordinate and implement a comprehensive long range noise control policy for America. The structure must enable productive interaction and cooperation among the various government agencies, industry, research groups, and standards organizations. The writers recommend that the U.S. Environmental Protection Agency (EPA) be assigned the responsibility and funded to serve as the lead agency.

In Chapter 9 the study committee provides observations on the state of noise control engineering education in the U.S. and the increasing demand by industry for specialists well educated in the principles and applications of noise control engineering. Available undergraduate, graduate, and professional continuing education programs are described. Recommendations are provided to both improve the comprehensiveness of education programs and increase the supply of engineers and educators in the noise control field.

The purpose of a national noise policy and the objective of the report are one and the same: to improve the quality of life for Americans. Thus Chapter 10 suggests ways to "improve public access to authoritative, accurate, and timely information that can support and inform a strong public presence in future efforts to reduce noise." Past, current, and suggested future ways to disseminate useful information on noise to the public are described. The study recommends the EPA and engineering professional societies make information more available to the public to educate them on the adverse effects of noise and means for its control.

Chapter 11 collects together and summarizes the findings and the 27 recommendations from the study committee as documented in the report.

As might be expected, each chapter identifies many dozens of important references. Taken together the references represent a sizable library of noise control engineering documents.

Eleven appendices are included in the report with information ranging from basic concepts in acoustics and noise, to standards and regulations. The many experts who contributed to the study and report are also identified in the appendices.

Appendix E describes modern instrumentation available to measure and analyze sound. However, the examples and illustrations presented in the report are all from only one manufacturer. It is this reviewer's opinion, based on decades of field experience, that state-of-the-art reliable sound measurement and analysis systems are available from many other reputable companies such as Norsonic, Rion, and Larson Davis.

This landmark report should form the basis for the much needed American National Noise Policy.

This important report *Technology for a Quieter America* will become a popular often-quoted best seller from the prestigious National Academies Press. I recommend that you contact NAE or the INCE Foundation to obtain your copy.

Eric W. Wood
Acentech Incorporated,
33 Moulton Street
Cambridge, Massachusetts 03138, USA
ewood@acentech.com