Published in final edited form as:

Acoust Aust. 2016 April ; 44(1): 51–54. doi:10.1007/s40857-015-0036-1.

BUY QUIET INITIATIVE IN THE USA

Bryan Beamer, PhD, PE, CSP, **Trudi McCleery, MPH**, and **Charles Hayden, MS, PE**

United States Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Robert A. Taft Laboratories, 1090 Tusculum Ave. MS C27, Cincinnati, OH 45226

Abstract

Noise-induced hearing loss is still considered one of the most common work-related illnesses in the United States of America. The U.S. National Institute for Occupational Safety and Health launched a national Buy Quiet campaign to raise awareness of the importance of purchasing quieter equipment. Buy Quiet encourages companies to seek out and demand quieter equipment thus driving the market to design and create quieter products. In the long run, investment in noise controls should be more prevalent as the market demands quieter products. This paradigm occurs as the market for quieter products expands both from the supply side (manufacturers) and the demand side (tool and equipment purchasers). The key to experiencing the reduced costs and increased benefits of Buy Quiet will be to develop partnerships between manufacturers and consumers. To this end, the U.S. National Institute for Occupational Safety and Health continues to work with partners to educate stakeholders about the risks and true costs of noise-induced hearing loss, as well as the economic benefits of buying quieter equipment.

Keywords

Noise; hearing loss; prevention; engineering controls; Buy Quiet

1. WHY BUY QUIET IN THE USA?

Tens of thousands of pieces of equipment and machinery that produce hazardous noise levels are used in manufacturing and construction industries in the United States of America. Managing noise hazards has frequently relied on providing hearing protection to workers, implementing hearing conservation programs, and training workers on the proper use and wear of hearing protection. To be effective, this strategy requires high levels of interaction and coordination from workers, supervisors and safety professionals. Furthermore, the worker's primary workplace responsibilities and activities may distract them from consistent and proper hearing protection use. Although engineering controls are frequently a better

Corresponding Author: Bryan Beamer, PhD, PE, CSP, ; Email: zmy4@cdc.gov, Phone: +1-513-533-8308, Fax: +1-513-533-8139

solution, the reality is that cost-conscious employers are unlikely to have a noise-control expert on staff to facilitate implementing such measures.

The lack of effective noise controls may be a reason that noise-induced hearing loss is still one of the most prevalent occupational health concerns in the United States of America, with the Agriculture, Construction and Mining Industries most consistently leading in prevalence [1, 2]. In fact, approximately 22 million workers are exposed to hazardous noise levels in the United States [3]. Noise exposures in the noisiest industries can be quite high due to equipment noise emissions. For instance, heavy equipment like piling equipment, road milling machines and drill rigs can create sound levels in excess of 110 dB(A), while other more common equipment like circular saws, loaders and leaf blowers typically have sound power levels between 100 and 110 dB(A) [4]. Despite potentially dangerous noise emissions in the workplace and the fact that, where feasible, engineering controls are the recommended method of noise mitigation, engineering controls for noise have not been universally adopted. Some of the reasons for this are: that information on the noise levels of equipment or machinery is not readily available; that reducing noise levels at their source is often seen as too expensive or not technologically feasible; or the perception that no market exists for quieter products. For these reasons, the Buy Quiet initiative is a long-term solution where increasing market demand for quieter equipment and machinery eventually drives decreasing noise-control costs and increasing technological feasibility. This period of time may be 5 years, 10 years, or even longer but the end result is a sustainably market-driven demand for quieter equipment. For an individual company, implementation of an appropriately managed Buy Quiet program objectively examines availability and cost trade-offs associated with purchasing quieter equipment, suggesting the least costly, most effective path to a quieter workplace and healthier workers.

2. WHAT DOES A BUY QUIET PROGRAM LOOK LIKE?

The U.S. National Institute for Occupational Safety and Health (NIOSH) recommends preventing hazardous noise exposures through noise controls [5]. To minimize occupational noise-induced hearing loss, NIOSH recommendations state that workers limit their noise exposure to no more than 85 dB(A) as an 8-hour time-weighted average [6]. Business owners are encouraged to create Buy Quiet programs as a first step in the effort to control noise emissions. Having information on the noise emission from tools, equipment or machinery is an important step. NIOSH developed a Power Tools Database that contains sound power levels, sound pressure levels, and vibrations data for a variety of common power tools that have been tested by researchers. This database also contains downloadable sound level recordings to help with purchasing decisions (visit http://wwwn.cdc.gov/niosh-sound-vibration/). As part of a national campaign, NIOSH launched a Buy Quiet web site to promote the initiative and educate employers and workers about Buy Quiet (visit http://www.cdc.gov/niosh/topics/buyquiet/). The website includes a video providing an overview of Buy Quiet and resources for construction company owners, employees, subcontractors, purchasers and suppliers of power tools and equipment, as well as to the general community. Similar materials are being completed focusing on the manufacturing industry.

The key elements of a model Buy Quiet program are:

A. **An inventory of existing machinery and equipment with corresponding noise levels.** This inventory is updated as the quieter pieces of equipment are purchased to replace worn out, louder equipment. The inventory can also be used for facilitating, documenting, tracking, and promoting a company's Buy Quiet purchases.

   U.S. manufacturers of equipment and machinery are required to provide noise level information for the products they market and sell [7]. An equipment purchaser uses the manufacturer's information to compare noise emission levels of differing models prior to purchase. How manufacturers make this information readily available to their customers is still being discussed, but one option includes an online database populated in a collaborative fashion by manufacturers. The motivation for manufacturers to include their products' noise level information would be to increase product visibility and competitive advantages as more and more purchasers demand easily accessible noise level information.

B. **A Buy Quiet company policy or procedure.** Company policy can be an easy and effective way for employers to show commitment to using the best available technology to protect the hearing and well-being of their employees. Three levels of increasing commitment are suggested so that any company can initiate a Buy Quiet Program that realistically reflects their time and monetary resources. These levels of commitment include:

   - Low-Level: Commitment to purchasing replacement machinery that produces no greater noise levels than the original machinery.
   - Mid-Level: Commitment to purchasing the most cost-beneficial piece of machinery available that produces less noise than the original machinery.
   - High-Level: Commitment to purchasing the quietest piece of machinery available, regardless of price.

C. **Educational materials and promotional tools.** Employees, management, customers, and the community can be informed about the importance and benefits of Buy Quiet. NIOSH developed a series of posters for construction companies to communicate their organization's efforts and commitment to reducing noise levels in and around construction worksites (see Figure 1). These posters are available online for download and printing (visit http://www.cdc.gov/niosh/topics/buyquiet/posters.html).

D. **Analysis of the Cost-Benefit of Buying Quiet.** Calculation methods can be used to conduct a cost-benefit analysis comparing one piece of equipment to another. Factors that can influence this analysis may include initial costs, long-term maintenance and depreciation, as well as the cost of noise-induced hearing loss to the worker, company and society. In many cases, the quieter piece of equipment is the most inexpensive alternative when a thorough cost-benefit analysis is completed that considers:

   - all life cycle costs of the machinery;

- possible worker's compensation claims;
- costs associated with a company's hearing conservation program;
- costs of healthcare (such as hearings aids); and
- possible lost productivity.

Conservative estimates suggest savings of $100 per decibel when purchasing quieter products [8]. The savings are applicable across a wide variety of machinery and equipment.

3. ENHANCING THE EQUIPMENT DESIGNER-MANUFACTURER-user relationship

Most companies do not have the financial resources or technical expertise to design, implement and retrofit engineering noise controls on the tools, equipment and machinery they purchase. Therefore noise control consideration during the design and fabrication phases is more effective and economically efficient than implementing noise controls after the fact. As such, the Buy Quiet process moves the responsibility away from purchasers and end users, who do not necessarily have experience in design and engineering noise control to equipment designers and manufacturers who are best suited to implement engineering noise controls appropriate for their products.

Ultimately, equipment end users and their employers are responsible for following safe work practices and providing a safe workplace; Buy Quiet simply helps them accomplish that more efficiently and effectively by involving equipment design experts in the design and manufacturing phases of noise control efforts.

4. PARTNERSHIPS AND FUTURE DIRECTIONS

Many challenges exist to the successful implementation of a long-term Buy Quiet initiative in the United States of America. Perhaps chief among these is the lack of consistent, stringent standards for communicating existing noise levels of equipment and machinery in the USA. Ideally test methods would take into account noise levels both in the lab and in the field and could be applied equally by manufacturers, users, researchers and others. Another obstacle to gaining buy-in from stakeholders is that U.S. regulations pertaining to noise control standards are inconsistently enforced, a situation partially stemming from the fact that regulating noise laws is left to state and local governments [9]. Perhaps, however, the greatest challenge to convincing companies to implement a Buy Quiet program is the perceived cost of buying quieter equipment, a point of view that is entrenched in poor understanding of the true costs of noise-induced hearing loss and the potential cost savings of buying quieter, safer tools and equipment.

NIOSH and its partners are working to overcome these challenges. For instance, NIOSH representatives from the Hearing Loss Prevention Research Program are participating in and leading efforts to improve national test methods and noise rating standards. One example is the development and approval of the SAE International Standard AS6228, "Safety Requirements for Procurement, Maintenance and Use of Hand-held Powered Tools" (visit

http://standards.sae.org/as6228/). This standard promotes the selection of quieter and lower vibration hand-held powered tools for the prevention of Hand-Arm Vibration Syndrome (HAVS), hearing loss and other repetitive motion injuries. Furthermore, the standard suggests the use of noise and vibration data provided by vendors to users of their products. Another way to promote the purchase of quieter tools is through collaboration with groups like the Institute of Noise Control Engineering (INCE) Product Noise Emissions Committee, which concerns itself with methods for disseminating information on product noise emissions, such as product noise declarations and labels [10]. Also, through the Safe-in-Sound Excellence in Hearing Loss Prevention Award™, created in partnership with the National Hearing Conservation Association (NHCA), NIOSH has obtained information on real-world successful noise control interventions, both in the construction and manufacturing sectors that include Buy Quiet strategies (see winners and archives at www.safeinsound.us). Links to other Buy Quiet partners can be accessed on the Buy Quiet website [11]. These partners include the National Aeronautics and Space Administration (NASA) who implemented a Buy Quiet program which developed the NASA Buy-Quiet Roadmap web tool; the U.S. National Academy of Engineering who espouse Buy Quiet principles as part of their Technology for a Quieter America report; the Center for Construction Research and Training; the American Tinnitus Association; the Great Plains Center for Agricultural Health; and the Laborers Health and Safety Fund of North America.

The most important way to overcome the challenges to implementing Buy Quiet may be through marketing and education efforts. To this end, NIOSH continues to work with partners to educate stakeholders about the prevalence and true costs of noise-induced hearing loss, as well as the economic benefits of buying quieter equipment. Ideally as consumers become more educated about noise levels, economics and the benefits of quieter machinery and equipment they will actively purchase quieter tools and machinery. In this way, market forces may ultimately be the key to future success of the Buy Quiet initiative.

5. CONCLUSIONS

In summary, the Buy Quiet initiative addresses the vision of eliminating noise hazards early in the design and manufacture of power tools and equipment, thus reducing the risk of occupational hearing loss. Buy Quiet encourages companies to seek out and demand quieter equipment effectively driving the market to design and create quieter products. Buy Quiet encourages the use of existing noise control technology and the development of new noise control technologies while demonstrating the cost benefits of doing so. In the long run, investment in noise controls should be more commonplace as the market demands quieter products. This paradigm occurs as the market for quieter products expands both from the supply side (manufacturers) and the demand side (tool and equipment purchasers). The key to experiencing the reduced costs and increased benefits of Buy Quiet will be to develop partnerships between manufacturers and consumers.

Acknowledgments

The contributions of NIOSH contractors David Nelson of Nelson Acoustics, Inc. and Rod Ford at Tier1 Performance Solutions, Inc. was instrumental in the development of Buy Quiet logistics, concepts, architecture, and promotional and educational materials.

References

1. Occupational Safety and Health Administration. Occupational Noise Exposure. [Online]. Available: https://www.osha.gov/SLTC/noisehearingconservation/. [Accessed 1 July 2015]
2. Masterson EA, Deddens JA, Themann CL, Calvert S, Bertke GM. Trends in Worker Hearing Loss by Industry Sector, 1981–2010. American Journal of Industrial Medicine. 2015; 58:392–401. [PubMed: 25690583]
3. Tak S, Davis RR, Calvert GM. Exposure to Hazardous Workplace Noise and Use of Hearing Protection Devices Among US Workers – NHANES, 1999–2004. American Journal of Industrial Medicine. 2009; 52(5):358–371. [PubMed: 19267354]
4. Roo, Fd; Gerretsen, E.; Borst, J. Environmental impact of noise from mobile outdoor equipment. 7th European Conference on Noise Control, EURONOISE 2008 and Acoustics '08; Paris, France. 2008.
5. National Institute for Occupational Safety and Health. Criteria for a Recommended Standard. U.S. Department of Health and Human Services; Cincinnati, OH: 1998.
6. National Institute for Occupational Safety and Health. Noise and Hearing Loss Prevention. Aug 15. 2013 [Online]. Available: http://www.cdc.gov/niosh/topics/noise/about.html. [Accessed 9 July 2015]
7. U.S. Environmental Protection Agency. Summary of the Noise Control Act. Jun 1. 2015 [Online]. Available: http://www2.epa.gov/laws-regulations/summary-noise-control-act. [Accessed 31 August 2015]
8. Nelson, D. Adaptation of NASA buy-quiet process roadmap for construction firms. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health; Cincinnati, OH: 2011.
9. US Environmental Protection Agency. [Online]. Available: http://www2.epa.gov/aboutepa/epa-history-noise-and-noise-control-act. [Accessed 30 July 2015]
10. The Institute of Noise Control Engineering of the USA. Technical Activities. [Online]. Available: http://www.inceusa.org/about/technical. [Accessed 30 July 2015]
11. National Institute for Occupational Safety and Health. Buy Quiet Partners and Promoters. [Online]. Available: http://www.cdc.gov/niosh/topics/buyquiet/partners.html. [Accessed 4 August 2015]
12. National Institute for Occupational Safety and Health. [Online]. Available: http://www.cdc.gov/niosh/topics/buyquiet/posters.html. [Accessed 1 July 2015]

Figure 1.

Buy Quiet promotional and educational posters. Printable format available on NIOSH website (visit http://www.cdc.gov/niosh/topics/buyquiet/posters.html).