EDITORIAL

If We Care About Workers' Hearing, Then Why Are They Still Going Deaf?

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Workers in the manufacturing industries continue to list noise exposure as one of their chief complaints. That's unsurprising, given that noise exposure is not just an irritant but also a health hazard. Though no surprise, it's discouraging, because the hazards of noise are neither new nor inexplicable. Noise-induced hearing loss (NIHL) has been a major health problem in industry worldwide for more than 130 years. American industry has known that noise exposure to workers was hazardous since the mid 1940s. Many workers with NIHL also suffer from tinnitus.

Noise-induced hearing loss is insidious. The gradual loss of hearing acuity increases with exposure to noise. Usually, there is no sudden effect such as is common with crippling illnesses from exposures to chemical and biological agents, dismemberments or deaths resulting from accidents.

Since 1887, Congress has consistently passed the responsibility for employee safety to the employer, but difficulties abound, including inadequate government definitions of safe noise exposure. Compliance with the appropriate regulations would have made the company's program legal, but did it make the employees safe?

Problems

Let's consider four obstacles to protecting workers' hearing. First, as we know, allowable noise exposures vary, and the most widely accepted regulation does not fully protect workers. OSHA uses a 5-dB exchange rate (ER) for each halving or doubling of the allowable exposure time while ACGIH (American Conference of Governmental Industrial Hygienists) and EPA recommend a 3-dB ER, which is endorsed by numerous health professionals as well as the following professional organizations:

- Industrial Safety Equipment Association
- American Association of Occupational Health Nurses
- American Society of Safety Engineers
- American Industrial Health Association
- International Institute of Noise Control Engineers
- National Hearing Conservation Association

If one concludes that the likelihood of noise-induced hearing loss is related to both the noise level and the duration of noise exposure, then OSHA's values are significantly less protective than the ACGIH and EPA values. Looser regulations, by generating a false sense of security, can threaten workers, not protect them.

Second, the amount of hearing loss that's allowed before it is considered an issue is simply too great. This level of acceptable hearing loss from any cause (birth abnormalities, illness, drugs, or noise) is often referred to as the "fence," which is currently set at 25 dB by OHSA in the tested frequencies (1000, 2000, 3000, 4000, and 6000 Hz). However, 15 dB HL has been identified by researches as a more appropriate fence.

Why? Researchers evaluating the hearing of workers in very noisy plants suggested the 25-dB threshold, but one can question their findings in two ways. First, there's the problem of under-reporting: workers have an incentive to say they can still work for fear of losing their jobs. Second, questions asked in quiet rooms do not adequately represent the ability of a worker to communicate work instructions in a noisy workplace.

Third, we need to reevaluate the allowable methods of controlling exposure for noise. Much of OSHA's rules and regulations outside of noise are focused on identifying hazards and implementing solutions. Though workers wear personal protective equipment (PPE) to prevent damage when accidents occur, engineering controls serve as the mainstay solutions to serious health hazards. So, for example, hard hats and safety-toed shoes are in place for contingencies should an accident occur, but we don't ever *plan* for them to be used as the primary safeguard. Similarly, respirators serve workers only in temporary or emergency situations, not as solutions to long-term exposures. The ongoing risk of chemical and dust exposure is solved primarily by engineering controls, with PPE being used only as a backup.

What a different route we have taken with noise. PPE has become a primary – if not the primary – tool to protect workers' hearing. But using hearing protectors alone to reduce noise exposure is like issuing respirators and oxygen supply systems as the only protection from chemical exposures. And it's even worse: If your safety shoes are a bit big for your feet, they'll still protect them from a falling pipe. But if your earplugs don't quite fit your ears, then you don't have hearing protection. You have a false sense of security. If PPEs must serve a role in protecting hearing, then a comparison with another PPE is again instructive: individual fit testing has long been the established norm for respiratory devices. The same should be true for earplugs.

Making machines quieter is the best way to protect workers' hearing. Some may say such a goal is impossible, or downright utopian, but that's balderdash. Obviously, designing the noise out of the manufacturing equipment through engineering innovation is ideal, but even retrofit noise control treatments can be effective.

Fourth, if we care about workers' hearing, why aren't we telling them about the dangers? Certainly, under current OSHA regulations, employees are instructed about noise, hearing, hearing protection, and hearing loss. But it is unclear whether a worker would have sufficient information at that time to prevent any further noise-induced hearing loss. Individual fit testing, noted above, is an excellent training method, since it lets workers experience the effectiveness of a well-fitted protector. They see the results provided by the fit-test system readout, and at the same time, they can feel how the device fits in or around their ears. With some test systems (3M's E-A-Rfit dual-ear validation system, for example), the worker can also "hear" the effectiveness, since the difference in sound level between the test noise with and without the HPD (Hearing Protection Device) can also be observed.

A sample quote from one worker: "*So that's what it is supposed to sound like; I've been wearing them wrong all these years.*"

Solutions

What should we do? Let's consider three solutions. First, regulations should be revised, incorporating the now undeniable fact that hearing loss can occur at sound levels lower than the current regulations (OSHA, MSHA, FRA, etc.) permit. We should:

- Use the 85-dBA level for eight hours of exposure and a 3-dB exchange rate.
- Require that all *new* construction not exceed 85 dBA in areas where workers are present.
- Require that all *existing* facilities be retrofitted with noise control to a practical level as determined by an experienced and preferably certified noise control engineer or some comparable qualification. If the noise level cannot be reduced to less than 95 dBA, facilities must receive a statement by a certified professional offering the reasons for such a determination.
- Make hearing protection mandatory for exposure above 80 dBA and double hearing protection above 95 dBA, independent of the length of exposure.
- Require fit testing and training so that the

employee knows how quiet it should be with hearing protection.

Notice how this approach takes into account both the ethical requirements of the profession and the cost concerns of industry.

Second, let's recognize that it takes time (as well as money, ingenuity, and hard work) to solve substantial noise problems. In the last 45 years, companies have tried to design new plants to meet noise limits; some by requiring new equipment to meet an 80-dBA noise emission level. Others have been able to do serious retrofitting of their facilities with lower noise exposure as a result.

It's been 45 years since the OSHA regulation on noise was passed, with one amendment 34 years ago. A revised regulation is extremely unlikely. However, there is some movement on the part of major corporations toward using 85 dBA for an acceptable eight-hour shift and for using a 3-dB energy ratio. Further, many of these corporations are joining the 85-3 Coalition, demonstrating that companies can provide guidance for better health and safety practices for the health and safety profession.

Industry should be encouraged to build safer and quieter plants, and some have been more successful than others. And some plants now require double hearing protection when sound levels are above 95 dBA; this is an improvement over earlier years when single hearing protection was allowed up to 110 dBA.

Finally, advisors to companies – especially advisors with qualifications from professional organizations with a public commitment to worker health – should focus not simply on engineering efficiency and elegance, but also on the well-being of those men and women who operate the machinery of production.

If you have a hearing protection program for your workers, you should have a noise control plan for your facility. These plans need to be prepared not just by someone knowledgeable about the plant, refinery, facility or station, but also by someone who is knowledgeable about industrial noise control. The plans should be signed by a certified professional, such as:

- Certified industrial hygienist with industrial noise control experience.
- Board-certified noise control engineer with industrial noise control experience.
- Certified safety professional with industrial noise control experience or a registered professional engineer with industrial noise control experience.

Just as industrial audiometric exams are performed by a person certified as an occupational hearing conservationist and their work is supervised by a professional supervisor who is a physician or audiologist, noise control plans should be approved by noise control professionals.

Retrofitting some facilities may be cost prohibitive or downright impossible. In those instances, professionals publicly committed to best practices for worker safety can and should fulfill a critical role.

Conclusion

Fighting for the health of workers' hearing cannot be an unwelcome addition to our professional lives; we should already be their advocates. After all, many U.S. professional organizations recognize the moral responsibility that their members have to protect the quality of life for all people, including the risk of noise-induced hearing loss. Such organizations include:

- American Academy of Audiology
- American Association of Occupational Health Nurses
- American Academy of Otolaryngology-Head and Neck Surgery
- American College of Occupational and Environmental Medicine
- American Industrial Hygiene Association (AIHA)
- American Society of Safety Engineers
- American Speech-Language-Hearing Association
- Board of Certified Safety Professionals
- Institute of Noise Control Engineering (INCE)
- National Council of Acoustical Consultants

Four things are clear: First, these organizations need to prepare an approved approach for communicating with workers and the public about this crisis. Second, members, and especially certified members, of these professional organizations are obligated to inform clients about how to best protect workers. Third, many members, especially certified members, have known – or should have known – that protecting workers requires more stringent noise exposure criteria and less reliance on PPEs.

And fourth, though equipped with a clear moral obligation and sufficient knowledge to act, many professionals may not have done so. Perhaps taking comfort with the false belief that a legal environment must therefore be a safe environment, professionals and their professional organizations may have failed to provide knowledge to protect workers from harm and companies from liability. This needs to change. S&V

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