Noise-Induced Hearing Loss in Construction and Other Industries

Every year, thousands of construction workers suffer hearing loss from excessive noise exposure on the job. Hearing loss impairs quality of life and increases the risk of injury – for instance, when a worker cannot hear approaching vehicles or warning signals. In the United States, the Occupational Safety and Health Administration (OSHA) set the *permissible exposure limit* (PEL, *see* Glossary) for construction noise to 90 A-weighted decibels (dBA) over an eight-hour period.[1] However, noise-induced hearing loss (NIHL) usually results from extended exposure to sound levels at or above 85 dBA.[2] The National Institute for Occupational Safety and Health (NIOSH) *recommended exposure level* (REL, *see* Glossary) is 85 dBA for an eight-hour period,[3] but noise exposure in construction may exceed this standard (*see* page 33).

Although NIHL is a well-known risk in construction, government data among construction workers are limited. Since employers have no obligation to test workers' hearing (audiometric testing) in construction, even if employees experience noise levels at or above OSHA's PEL,[4] hearing loss in construction is rarely recognized as an occupational disease. It is not surprising, therefore, that the numbers reported to the U.S. Bureau of Labor Statistics (BLS) show a very low rate of hearing loss, and for this reason hearing loss data for construction are not comparable with data for general industry.

The BLS reports diagnosed hearing loss by industry in the Survey of Occupational Injuries and Illnesses data. From 2004 to 2010, the BLS reported only 1,400 cases of hearing loss in construction. In 2010, the rate of reported occupational hearing loss among construction workers was 0.2 per 10,000 *full-time equivalent workers* (FTEs; *see* Glossary; chart 49a). Although the reported numbers indicate an overall downward trend, the small numbers are inadequate for a solid conclusion.

Hearing data are also collected by the National Health Interview Survey (NHIS), a large household survey in the U.S. At least one in five (21.4%) construction workers self-reported some hearing trouble in 2010 (chart 49b). This is nearly one-third higher than the proportion of workers with hearing trouble for all industries combined (16.3%).

Duration of occupational exposures may further increase the risk of hearing loss. Among workers aged 50 years and older who responded to a longitudinal survey, 30% of workers whose longest job was in construction trades reported fair or poor hearing compared to just 21% of workers employed in white-collar occupations in a 10-year follow-up (chart 49c).

While self-reported data are useful in assessing hearing loss, results from audiograms are more reliable in accurately determining the true prevalence.[5] A recent study on occupational hearing loss found that 42% of the respondents who reported "good" or "excellent" hearing had hearing loss as indicated by audiometric testing.[6] Data from the Building Trades National Medical Screening Program (BTMed) show that among construction workers examined between 1996 and 2010, 58% had significant abnormal hearing loss due to noise exposures at work. The amount of hearing loss varied by occupation; almost 80% of welders experienced hearing loss compared to 47% of roofers (chart 49d).

Under most circumstances, NIHL is preventable, yet research suggests that hearing protection usage and design in construction should be improved.[7,8] The use of hearing protection devices (HPDs) is influenced by many factors, such as perceived hearing loss, education, work experience, etc.[7-9] Integrating HPD training into multi-component intervention programs in construction has proven effective, resulting in substantial improvement in use among participants.[9,10]

1. The A-weighting mimics the sensitivity of the human ear to different frequencies. Occupational Safety and Health Administration. *Safety and Health Regulations for Construction, Part 1926*. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10625 (Accessed July 2012).

2. Better Hearing Institute. http://www.betterhearing.org/ (Accessed August 2012).

3. National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. 1998. Criteria for a Recommended Standard: Occupational Noise Exposure. Cincinnati, OH: DHHS (NIOSH), Pub. 98-126.

4. Martínez LF. 2012. Can you hear me now? Occupational hearing loss, 2004-2010. *Monthly Labor Review*, 135(7):48-55.

5. Hong O, Ronis DL, & Antonakos CL. 2011. Validity of self-rated hearing compared with audiometric measurement among construction workers. *Nursing Research*, 60(5):326-332.

6. McCullagh MC, Raymond D, Kerr MJ, & Lusk SL. 2011. Prevalence of hearing loss and accuracy of self-report among factory workers. *Noise & Health.* 13(54):340-347.

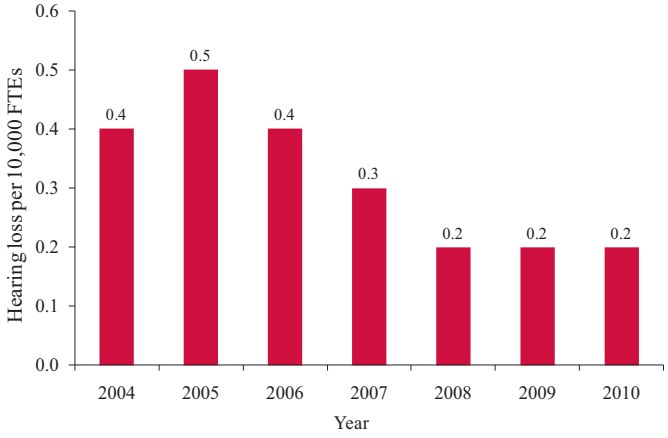
7. Edelson J, Neitzel R, Meischke H, Daniell WE, Sheppard L, Stover B, & Seixas NS. 2009. Predictors of hearing protection use in construction workers. *The Annals of Occupational Hygiene,* 53(6):605-615.

8. Griffin SC, Neitzel R, Daniell WE, & Seixas NS. 2009. Indicators of hearing protection use: Self-report and researcher observation. *Journal of Occupational and Environmental Hygiene,* 6(10):639-647.

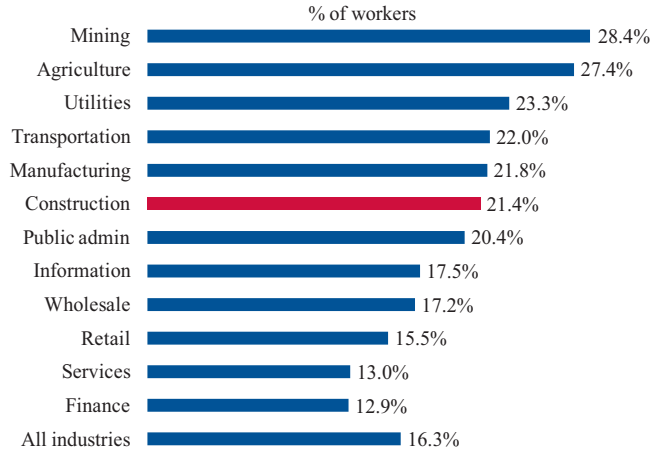
9. Neitzel R, Meischke H, Daniell WE, Trabeau M, Somers S, & Seixas NS. 2008. Development and pilot test of hearing conservation training for construction workers. *American Journal of Industrial Medicine,* 51:120-129.

10. Seixas NS, Neitzel R, Stover B, Sheppard L, Daniell WE, Edelson J, & Meischke H. 2011. A multi-component intervention to promote hearing protector use among construction workers. *International Journal of Audiology*, 50(Suppl 1):S46-S56.

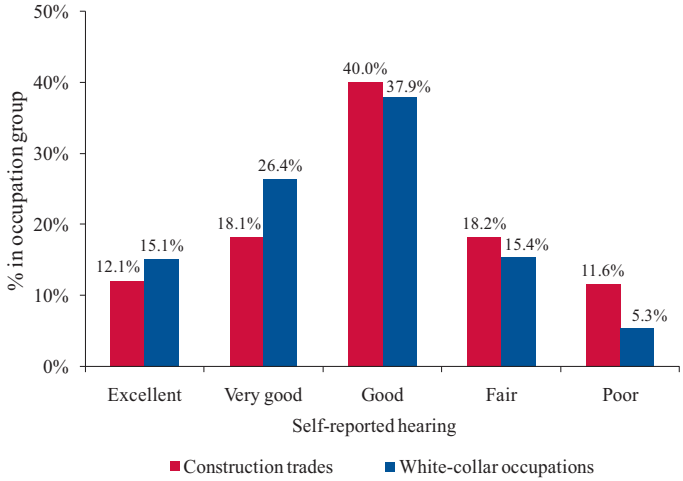
49a. Rate of hearing loss in construction, 2004-2010 (Private wage-and-salary workers)



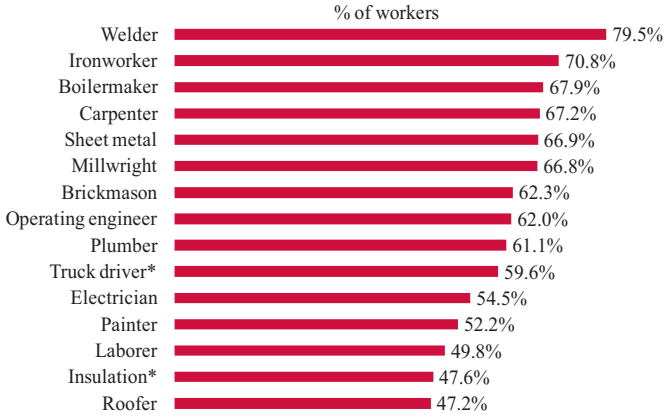
49b. Percentage of workers with self-reported hearing trouble, by industry, 2010 (All employment)



49c. Self-reported hearing status among older workers, construction trades vs. white-collar occupations, 2008 (All employment)



49d. Prevalence of noise-induced hearing loss, selected construction trades at U.S. Department of Energy sites, 1996-2010



Note: Chart 49b - Hearing trouble refers to workers who reported a little trouble, moderate trouble, or a lot of trouble hearing, or were deaf without a hearing aid or other listening device.
Chart 49d - Asterisk (*) represents a change in occupation title from the original data: Insulation (Asbestos worker and Insulator); Truck driver (Teamster).

Source: Chart 49a - U.S. Bureau of Labor Statistics. 2004-2010 Survey of Occupational Injuries and Illnesses. http://www.bls.gov/data/#injuries (Accessed October 2012).
Chart 49b - National Center for Health Statistics. 2010 National Health Interview Survey. Calculations by CPWR Data Center.
Chart 49c - National Institute on Aging. 1998-2008 Health and Retirement Study. Calculations by CPWR Data Center.
Chart 49d - BTMed disease prevalence: Exams completed through 2010. Contact: John Dement, Duke University Medical Center.