

OCCUPATIONAL NOISE DILEMMA IN THE USA

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This lecture was presented by William Lang (Noise Control Foundation - Poughkeepsie, USA)

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Different Government Agencies

- ◉ Recommend sound level limits
- ◉ Set sound level limits and the hearing conservation requirements for different populations of workers
- ◉ Select exchange rate: 3, 4, or 5 dB/doubling
- ◉ Establish rules for labeling noise reduction of hearing protectors

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NIOSH recommends.

OSHA, MSHA, FRA, USCG, DOD set sound level limits, hearing conservation requirements, and doubling rate.

EPA establishes rules for labeling.

Timeline of USA Activity, 1882-1936

1882—Holt reported hearing loss among railroad engineers

1908—US Congress passed the Federal Employers' Liability Act (FELA)

1914—Thompson reported hearing loss among railway engineers

1936—US Congress passed the Walsh-Healy Public Contracts Act

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In **1882**, in the USA, Dr. Holt reported hearing loss among boilermakers and his own efforts to develop a device to "modify the effects of noise on the ear."

In **1908**, Congress passed the Federal Employers' Liability Act (FELA). Although this law does not specifically mention noise, it assures railroad employees a safe workplace with the right to recover compensation if injured in a railroad-related accident.

In **1914**, in the USA, Thompson reported that occupational "labyrinthine disease" due to excessive noise may result in permanent deafness and that 45% of railway engineers have labyrinthine deafness if they have been employed on engines for a number of years.

In **1936**, Congress passed the Walsh-Healy Public Contracts Act, which dealt with companies providing goods and services to the federal government. It prohibited "work conditions which are unsanitary or hazardous or dangerous to health and safety of employees engaged in the performance of said contract." This act empowered the Secretary of Labor to establish health and safety standards for companies that received sales of \$10,000 or more per year from the federal government.

Timeline of USA Activity, 1936-1949

1937—Bunch presents paper on hearing loss of trainmen

1947—MacLaren and Chaney reported on Lockheed noise and hearing-loss study

1949—Grove reports on hazardous noise levels, noise-induced hearing loss, and protective measures

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In **1937**, Bunch presented a paper at the annual meeting of the American Otological Society entitled "The diagnosis of occupational or traumatic deafness: A historical and audiometric study." He offered extensive evidence from the literature of hearing impairment among railroad trainmen.

In **1947**, MacLaren and Chaney reported on a noise and hearing-loss study at Lockheed, along with the hearing conservation program.

In **1949**, Grove reported on hazardous noise levels, noise-induced hearing loss, and protective measures. He stated that industry had been slow to conserve the hearing of its workers because "it is fearful of an avalanche of medicolegal claims if the subject is stirred up." But he believed that pre-employment audiograms and other hearing conservation measures would protect the employer as well as the employee. [15]

Timeline of USA Activity, 1949-1960

1949—US Air Force issued first U.S. noise exposure regulation. AF Reg. No. 160-3

1956—Air Force Reg. No. 160-3, Hazardous Noise Exposure, superseded the 1949 regulation

1960—Air Force issued revised noise exposure regulations

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In **1949**, the U.S. Air Force issued the first U.S. noise exposure regulation: AF Reg. No. 160-3 "Precautionary Measures Against Noise Hazards." [16] This regulation "establishes minimum requirements for the prevention of illness and injury of those persons exposed to noise hazards." It specified limits for noise exposure in various kinds of work environments and required the provision of hearing protection devices and audiometric testing for personnel exposed to high noise levels.

In **1956**, Air Force Regulation No. 160-3, Hazardous Noise Exposure, superseded the 1949 regulation. This regulation was very detailed, covering education, posting of areas, hearing protection, noise exposures, etc.

In **1960**, the Air Force issued revised noise exposure regulations: Air Force Regulation No. 160-3a, Dept. of Air Force, Washington, 18 May 1960. [

Timeline of USA Activity, 1960-1968

1960—DOL limits noise

1962—CHABA prepares DRCs for noise

1967—Intersociety Committee published
Guidelines for Noise Exposure Control

1968—ACGIH recommends 92 dBA for 4-
8 hours exposure

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In **1960**, the Department of Labor under the Walsh-Healey Public Contracts Act limited noise to minimize fatigue and the probability of accidents. No specific limits for noise levels were given.

In **1962**, the Armed Forces/National Research Council Committee on Hearing and Bioacoustics (CHABA) prepared damage-risk criteria for intermittent and steady-state noise. This group had been organized in 1953 to develop information and standards on the effects and control of noise. It included many prominent physicians and scientists and later joined with the National Academy of Sciences. Between 1953 and 1962 CHABA published numerous reports, such as those of Working Group #1, "Biological Effects of Noise," in 1954, and Working Group #19, "A Standard Method for Measuring Real-Ear Attenuation of Ear Protectors at Threshold," in 1955. The 1962 CHABA publication included curves developed by Working Group #46 predicting hearing loss as a function of various levels, frequencies, and durations of noise ranging from 1-1/2 minutes to 8 hours.

In **1967**, the Intersociety Committee published *Guidelines for Noise Exposure Control*. This committee had been formed in 1964 from representatives of five professional organizations: The American Conference of Governmental Industrial Hygienists, the American Academy of Ophthalmology and Otolaryngology, the American Academy of Occupational Medicine, the American Industrial Hygiene Association, and the Industrial Medical Association. The group published its first consensus standard for noise exposure in 1967 in several journals: the AMA's *Archives of Environmental Health*, the *Journal of Occupational Medicine*, the *American Industrial Hygiene*

Timeline of USA Activity, 1969-1971

1969—**DOL** issued the Walsh-Healey noise standard 90 dBA for 8 hrs exp.

1970—Department of Labor issues Bulletin 334

1970—Congress passes OSH Act

1971—OSHA made the Walsh-Healey noise standard an OSHA standard

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In **1969**, prior to the existence of OSHA, the Department of Labor issued the Walsh-Healey noise standard under the authority of the Walsh-Healey Public Contracts Act for all employers with federal contracts of \$10,000 or greater. This was the first federal noise standard outside the military.

In **1970**, the Department of Labor issued Bulletin 334, which interpreted the Walsh-Healey noise standard and provided guidance for the standard's requirement for a "continuing, effective hearing conservation program" by prescribing noise measurement and control, audiometric testing, and hearing protection devices. The bulletin was issued again in 1971 as an OSHA publication.

In **1970**, Congress passed the Occupational Safety and Health Act, which was enacted to assure "every working man and woman in the Nation safe and healthful working conditions."

In **1971**, OSHA made the Walsh-Healey noise standard an OSHA standard, thus making the noise standard applicable to most employers in the USA.

OSHA 1971 Regulation

- Engineering Controls
- Administrative Controls
- Hearing Conservation Program

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The OSHA 1971 regulation, often called a standard, mandated that “continuing effective hearing conservation program shall be administered” whenever engineering or administrative controls have not reduced the noise levels to the allowable limit.

Timeline of USA Activity, 1972-1973

1972, Congress passes Noise Control Act

1972—NIOSH recommends a permissible exposure limit for 8 hours of 85 dBA and presents detailed requirements for hearing conservation programs

1973—Air Force issues a revised set of noise regulations

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In **1972**, Congress passed the Noise Control Act, which was enacted “to promote an environment for all Americans free from noise that jeopardizes their health or welfare.” This act authorized the EPA to require noise labels on noise-producing or noise-reducing equipment.

In **1972**, the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education, and Welfare recommended a permissible exposure limit for 8 hours of 85 dB(A) and presented detailed requirements for hearing conservation programs. The document received widespread attention and was influential in the preparation of OSHA's 1974 proposal and its 1981 hearing conservation amendment.

In **1973**, the Air Force issued a revised set of noise regulations.

Timeline of USA Activity, 1973-1974

1973—EPA issues report detailing the risk of noise-induced hearing loss from long-term average exposures of 75, 80, 85, and 90 dBA

1974—EPA identifies an average level of 70 dB to protect the entire population from even the smallest amount of hearing loss

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In **1973**, the Environmental Protection Agency issued a report detailing the risk of noise-induced hearing loss from long-term average exposures of 75, 80, 85, and 90 dB(A). EPA estimated the risk of hearing handicap from a lifetime's exposure to 90 dB(A) to be 22%.

In **1974**, EPA identified an average level of 70 dB to protect the entire population from even the smallest amount of hearing loss. This level translated to an 8-hour (occupational) level of 75 dB(A)!

Timeline of USA Activity, 1980

1980—FRA issues final noise standards for locomotives similar to those proposed in 1979 except that the 85-dBA 16-hour limit was deleted and the 115-dBA limit now applied to continuous noise, not impulse noise

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In **1980**, the FRA issued final noise standards for locomotives similar to those proposed in 1979 except that the 85-dB(A) 16-hour limit was deleted and the 115-dB(A) limit now applied to continuous noise, not impulse noise. The standard's preamble stated: "It is now generally accepted that extended periods of exposure to high noise levels cause varying degrees of temporary and permanent hearing loss ... comparatively more crew members will be at lower risk at 85 dB(A) than 95 dB(A) ." The preamble also gave examples of feasible and inexpensive noise control measures.

Timeline of USA Activity, 1981-1983

1981—OSHA amends its noise standard with detailed requirements for hearing conservation programs

1982—Donovan v. Castle Foods

1983—OSHA revises the hearing conservation portion of the standard

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In **1981**, OSHA amended its noise standard with detailed requirements for hearing conservation programs that were similar to those proposed in 1974. Workers exposed to a time-weighted average (TWA) of 85 dB(A) or greater must be given noise exposure monitoring, audiometric testing, hearing protection devices, and training and education, and employers must keep records of their actions in this regard. A lengthy preamble explained the effects of noise on hearing, showing that the risk of hearing loss from occupational noise exposure was not insignificant until TWAs were as low as 80 dB(A). The majority of the provisions of the hearing conservation amendment became effective in August.

In **1982**, a federal US Court ruled that engineering controls can't be required without comparing costs and effectiveness of abatement methods with personal protective equipment.

In **1983**, OSHA revised the hearing conservation portion of the standard. Those portions of the amendment that had been held back in 1981 were revised; and the entire amendment was reissued in March to become effective in April. It is still in effect today.

1983 Hearing Conservation

- Defines the “continuous, effective hearing conservation program” of 1971
- Includes
 - Periodic audiograms
 - Training
 - Recordkeeping
 - Variety of HP devices
 - Certification of OHC
 - Professional Supervisor

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The key to good hearing conservation is good audiograms and good training.

The Council for the Accreditation of Occupational Hearing Conservationists (OHC) was founded in 1971 and offers certification of the OHC. CAOHC now offers a certification for the Professional Supervisor of a hearing conservation program.

Timeline of USA Activity, 1983

1983—OSHA develops an enforcement guideline by which the engineering-control requirements would not be enforced unless the noise exposures exceeded 100 dBA

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President Reagan issued an executive order limited OSHA to the above action, and OSHA then developed an enforcement guideline to match the order. This is still in effect.

Timeline of USA Activity, 1998-2006

1998—NIOSH issues recommendation

1999—MSHA issues final rule

2006—FRA issues final rule

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NIOSH recommended 85 dBA for 8 hrs of exposure, 3dB doubling

MSHA does require feasible engineering and administrative controls to reduce TWAs above 90 dBA. Even if they do not reduce levels to 90 dBA, they have to be installed if they provide 3 dBA NR.

FRA treats hearing protection the same as noise operation controls.

What About Lawsuits?

- Suits against employers
- Suits against third-party manufacturers

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Lawsuits continue to have an impact on industry. Companies are encouraged to buy quieter equipment rather than to pay legal fees and settlements.

Similarly, equipment manufacturers face a similar threat from lawsuits under third-party lawsuits.

New Approach By Industry

- Spend \$ before people lose hearing
- Buy quiet equipment
- 3 major corporations have new limits on the noise for new purchases
- These companies purchase in excess of \$15 billion of equipment and facilities

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Industrial companies have realized that the hearing conservation programs have not provided sufficient protection to keep their employees from incurring hearing loss. One company indicates that, across the board, their employees get about 10 dBA of protection. Three major companies are now buying equipment to meet an 80 dBA at 1 meter limit.

Why Buy Quiet?

- To prevent hearing loss in workers!
 - Their current and extensive HCP hasn't been enough to prevent HL due to noise
 - OSHA's focus on 90 dBA for engineering controls and 85 dBA hasn't solved the problem

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After market engineering controls and worker-mandated hearing protection have not solved this problem. Though we have known for some time that noise causes heavy loss, government regulations have not met the problem. To protect workers' hearing, we must attack the problem not at their ears or at their environments but at the source of the noise itself: the machinery. Noise is a legal problem, an economic problem, and a psychological problem. Primarily it is an engineering problem that can be solved.

Future Expected Actions

- NRR revision
- F-MIRE
- 8,000 Hz
- National Academy of Engineering
- New US Regulations

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The Noise Reduction Rating will be revised later this year by the EPA.

F-MIRE stands for Field Microphone In Real Ear. Using special earplugs fitted with small microphones, the actual attenuation that a worker receives from inserting his ear plug can be measured. This should become a major teaching tool for instructing workers on how to wear hearing protectors.

8,000 Hz will likely be added to the frequencies tested for hearing. Currently OSHA requires testing at 500, 1000, 2000, 3000, 4000, and 6000 Hz.

NAE is studying “Technology for a Quieter America.”

New US Regulations may be forthcoming as industries and government agencies realize that the current level of protection is insufficient.

Ladies and Gentlemen

The hearing of workers is in your hands.
Let's make it a safer and quieter world!

Thank you for listening.

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