

OSHA's Noise Standard Defines Hazard, Protection

Walsh-Healey Noise Standard

Although OSHA's hearing conservation amendment (HCA) came out in a flurry of publicity about a decade ago, the noise standard to which it was amended has actually been around for quite a while. In 1969, shortly before OSHA came into being, the Department of Labor issued a noise standard under the authority of the Walsh-Healey Public Contracts Act. This meant that the standard applied to all employers having contracts with the federal government. In 1971, the standard became an OSHA standard, and along with a large number of other government and consensus standards, it became the law for all noisy workplaces in the U.S.

Still nicknamed the "Walsh-Healey noise standard," it calls for a maximum noise exposure level of 90 dB(A) as an 8-hour, time-weighted average level (TWA). Higher levels are permitted for shorter durations, with a 5-dB relationship between noise level and duration (see Table 3). Thus, 95 dB(A) is permissible for 4 hours, 100 dB(A) for 2 hours, and so forth, up to a maximum exposure for continuous noise of 15 minutes at 115 dB(A). Continuous noise is defined as noise whose maxima (highest levels) occur more often than once per second. Thus, impulsive noise is assumed to have peaks occurring less often than once a second, and is limited to peak sound pressure levels of 140 dB.

Employers must use feasible engineering or administrative controls to reduce exposures whenever the levels in Table 3 are exceeded. Employers must also issue hearing protectors and employees must wear them when overexposed. Until the standard was amended in 1981, it also required a "continuing, effective hearing conservation

Table 3
OSHA's "Table G-16" Showing
Permissible Noise Exposures

Duration per day (hours)	Sound level, dB(A) slow response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

program" whenever employees were exposed to levels exceeding those in Table 3, but this section has now been replaced by the HCA.

The Process of Revision

Shortly after the noise standard was adopted by OSHA, controversy arose as to the definition of a "continuing, effective hearing conservation program." The standard itself offered little clarification and OSHA's guidelines on the subject were challenged as not having the weight of a regulation. The process of revising the standard, which would seem simple enough, lasted more than a decade. NIOSH sent OSHA a criteria document in 1972, recommending a reduction of the permissible exposure limit (PEL) to 85 dB(A), and giving detailed specifications for hearing conservation programs. OSHA called together an advisory committee, invited public comment,

drafted economic impact statements, issued a proposed revised standard and held public hearings. The major issues revolved around: (1) the PEL, whether it should be 90 or 85 dB(A); and (2) the method of control, whether to keep the primacy of engineering and administrative controls, or to allow hearing protectors to have equal weight. Finally, after years of deliberation, OSHA decided to leave the PEL at 90 dB(A) and to affirm engineering and administrative controls as the primary means of compliance, but to amend the standard with detailed requirements for hearing conservation programs.

OSHA published the HCA on January 16, 1981. Under most circumstances the regulation would have become effective (enforceable) in April of that year. On January 20, however, there was a change of administration and OSHA's top management was completely reshuffled. The new administration delayed the amendment's effective date, releasing part of the standard in August of 1981, and making revisions to other parts. The revised version was finally issued in 1983 and has not been altered since then. The requirements for hearing protectors remained essentially unchanged between 1981 and 1983.

Professionals with the responsibility for hearing conservation programs should become thoroughly familiar with the revised version of the HCA. It may be found as CFR 1910.95 in the Code of Federal Regulations, which is available from the Government Printing Office at (202) 512-0000. Anyone who has access to the Federal Register can also find it in the March 8, 1983 issue of the Federal Register, pages 9738-9784. The actual standard appears on pages 9776-9784, which is, of course, the most important section. Much of the (continued on next page)

OSHA's Noise Standard

continued from page G19

standard is explained in the preamble of the 1981 version, found in the January 16, 1981 issue of the Federal Register, pages 4078-4179. The Code of Federal Regulations and the Federal Register are available in many libraries.

Summary of the Hearing Conservation Amendment

To summarize the current HCA's major provisions, hearing conservation programs must be available to all employees whose TWAs equal or exceed 85 dB(A). Employers must monitor, at least once, the noise exposures of workers whose TWAs are 85 dB(A) or greater. Remonitoring is necessary with a change in equipment or work process that causes a significant increase in exposure level. All continuous, intermittent, and impulsive noise between the levels of 80 and 130 dB(A) must be included in the exposure assessment. Area monitoring is permitted, but employers must use personal exposure monitoring when there is considerable variation of noise level over time. Workers must be allowed to observe the monitoring procedures and must be told about their exposures.

Employers must provide baseline audiograms within the first six months of an employee's exposure to 85 dB(A) or above (or one year if the company uses mobile test services), and annual audiograms must be provided thereafter. The test must be conducted by trained and competent personnel and supervised by an audiologist or physician. Tests must be carried out in rooms that meet or exceed the 1969 ANSI criteria for background sound levels, and equipment must be calibrated

according to specific schedules. Workers who experience "standard" threshold shifts must be notified in writing, counselled as to the fitting and use of hearing protection, and referred to a specialist if necessary. A standard threshold shift is defined as an average shift from baseline hearing levels of 10 dB or more at the audiometric frequencies 2000, 3000, and 4000 Hz.

Hearing protection must be provided at no cost to employees and must be worn by all workers exposed to a TWA of 90 dB(A) and above. Hearing protection is also mandatory for those exposed to 85 dB(A) and above if they have not yet had a baseline audiogram and for all employees who have experienced a standard threshold shift. Employers must offer hearing protectors to workers exposed above 85 dB(A), and all must be given a variety of suitable protectors from which to choose. Employees must be trained in the use and care of the protectors. Employers must ensure proper initial fitting of protectors and need to supervise their correct use. Hearing protectors must attenuate to a TWA of 90 dB(A) or less and to 85 dB(A) when employees have experienced a standard shift. Attenuation must be re-evaluated when necessary and protectors must be replaced when they are worn out.

Employers must provide hearing protectors that are suitable for the specific noise environments in which they are to be worn. OSHA allows employers to use any of three methods for assessing the adequacy of hearing protector attenuation. These methods are spelled out in the HCA's Appendix B. The standard recommends using the Noise Reduction Rating (NRR), which should appear on the protector package. To estimate the noise level under the protector, the employer subtracts the NRR from the worker's C-weighted exposure level. If C-

weighted levels are not available, 7 dB must be subtracted from the NRR to obtain the A-weighted sound level at the ear.

Training and education sessions must be given at least annually to workers exposed above 85 dB(A). These sessions must include information on the effects of noise on hearing, the purposes and procedures of audiometric tests, and the proper selection, fitting, use, and care of hearing protectors. Finally, employers need to keep records of noise measurements, audiograms, audiometer calibrations, and background levels in audiometric test rooms. These records must be given to employees or their representatives on request.

Interpretations

The preamble to the 1981 and 1983 versions of the HCA describe and interpret most of the provisions relating to hearing protectors that appear in the 1983 regulation. Some of these interpretations may be of interest to Job Health Highlights readers.

- **Who must wear hearing protectors?** Workers whose TWAs exceed 90 dB(A), those exposed above 85 dB(A) who have incurred standard threshold shifts, and those who have waited six months or more for a baseline audiogram.
- **Why is the use of hearing protectors between 85 and 90 dB(A) non-mandatory for most workers?** Hearing protectors may interfere with speech communication at these moderate noise levels, especially if the noise is intermittent and if wearers have noise-induced hearing losses. Employers who choose to make hearing protection above 85 dB(A) a company policy are free to do so.
- **What constitutes "a variety of suitable protectors?"** OSHA interprets this as a choice of at

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Hearing Protection

7170

least one plug and one muff, preferably more. Differing environmental conditions as well as individual differences in ear canal and head shapes and sizes may cause certain protectors to be much more comfortable than others.

- **What are employers' responsibilities to replace hearing protectors?** Hearing protectors do wear out, some more quickly than others. Earmuff seals can become inflexible, and acoustical leaks will result, or the headband can lose its tension. Malleable and premolded plugs can lose their elasticity. Some protectors will need to be replaced daily. OSHA does not hold employers responsible for damage due to worker misuse or loss due to worker negligence. However, OSHA does recommend that employers encourage workers to take their hearing protectors home if they engage in noisy hobbies or other noisy non-occupational pursuits.
- **Is the 7-dB adjustment to the NRR a form of "derating"?** No. OSHA acknowledged that hearing protector attenuation in the field is not nearly as good as it is in the laboratory. However, the agency chose not to tackle the issue of derating at the time the amendment was issued. The 7-dB adjustment is for uncertainty in the spectrum of the noise environment. Because of the importance of low-frequency noise in the assessment of hearing protector attenuation, the NRR is designed to be used with C-weighted environmental noise levels. When only A-weighted levels are available, the 7-dB penalty must be subtracted to allow for this spectral uncertainty.

OSHA's Enforcement Directive

Soon after the revised HCA was promulgated in 1983, OSHA issued a



directive to its regional and area offices stating certain enforcement principles. The result is that in most circumstances, Federal OSHA inspectors are not to issue citations for lack of feasible engineering or administrative controls until workers' TWAs are 100 dB(A) or above.* Inspectors may issue citations if they decide that engineering or administrative controls are less costly than hearing conservation programs, or if the hearing conservation programs are "ineffective." Little guidance is given on the definitions of "effective" or "ineffective," except that "the results of audiometric testing [must] indicate that any existing controls and hearing protectors are adequately protecting employees." In assessing the adequacy of hearing protector attenuation for purposes of this directive, the inspector must apply a safety factor of 50% to the laboratory-based attenuation; in other words, divide the NRR by 2. If C-weighted noise measurements are not

available and the 7-dB correction must be used, the 7 dB should be subtracted from the NRR before the 50% safety factor is applied (NRR-7dB/2).

Because this directive constitutes OSHA policy, not regulation, it can be revoked at any time. Readers wishing to obtain a copy of it may call OSHA's Office of Information at (202) 219-8148 and ask for OSHA Instruction CPL 2-2.35 dated November 9, 1983.

For Further Reading

U.S. Dept. of Labor (1981). Occupational Safety and Health Administration. Occupational Noise Exposure; Hearing Conservation Amendment. Fed. Reg. 46, pp. 4078-4179 (especially pp. 4151-4155).

U.S. Dept. of Labor (1983). Occupational Safety and Health Administration. Occupational Noise Exposure; Hearing Conservation Amendment; Final Rule. Fed. Reg. 48, pp. 9738-9784 (especially pp. 9776-9784).

U.S. Code of Federal Regulations, 29 CFR 1910.95.

* Certain states that have their own state OSHA plans have not subscribed to this directive.