

Noise Measurement and Control

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Purpose

To describe (1) The essential considerations for noise measurement and control and; (2) Their relationship to the hearing conservation program

Chapter Topics

- Purpose of Noise Measurement
- Identifying and Quantifying Noise Exposures
- Instruments for Measuring Noise
- Calibration
- Regulatory Requirements and Terminology
- Noise Control

The **Occupational Hearing Conservationist** (OHC) is not expected to become an expert on noise measurement and control. In fact, most OHCs don't make any noise measurements or decisions about controlling noise. Noise-control engineers and industrial hygienists usually measure noise, although a variety of personnel may perform this function if they have been trained (eg, engineers, audiologists, safety specialists). However, it is always good for the OHC to understand noise measurement and control. Because the OHC is a key person in the **hearing conservation program** (HCP), he or she needs to ensure that regulatory requirements are met and best practices considered.

It is not enough to have good equipment that is well cared for and calibrated. Those who measure noise must know when and what to measure, how to do it, and how to ensure they have taken sufficient measurements. Generally, the major factors considered are:

- Knowing when and whom to measure
- Planning ahead
- Selecting the correct equipment
- Considering environmental conditions
- Taking sufficient measurements
- Incorporating all types of noise (impulse versus continuous)

The Council for Accreditation in Occupational Hearing Conservation (CAOHC) now offers web-based training that provides basic knowledge about why we measure noise, the importance

of noise-exposure information in HCP management, selection of equipment and procedures appropriate for determining noise exposure, and the terms used to describe noise and noise exposure. Information about this web-based course can be found at www.caohc.org/education-courses/noise-measurement-course.

Purpose of Noise Measurement

We measure workplace noise to:

- Quantify workers' exposures and identify those who exceed noise criteria levels
- Assess the noise situation for engineering and administrative controls
- Measure background levels in audiometric rooms

If sound levels were constant over an entire work shift (assumed to be 8 hours for regulatory purposes), noise measurements would be greatly simplified. However, because this is rarely the case, **time-weighted average** (TWA) is the combination of all the sound intensities throughout the work shift to identify the *integrated* overall exposure. Exposures at or above an 8-hour TWA of 85 dB(A) require implementation of an HCP and enrollment of affected workers. This trigger point is called the **action level** (AL). Noise exposures of 85 dB(A) over 8 hours represent a 50% dose. When the noise exposure reaches an 8-hour TWA of 90 dB(A), the **permissible exposure limit** (PEL), or 100% dose, is reached. Once the PEL is reached, interventions are required to protect workers, which may include engineering and administrative controls.

Identifying and Quantifying Noise Exposures

Workers exposed to noise at or above the AL must be included in an HCP. Under the Occupational Safety and Health Administration (OSHA), those with exposures exceeding 90-dB(A) TWA must wear **hearing protection devices** (HPDs). The appropriate actions required under different jurisdictions may vary. For example, workers covered by Washington State OSHA must wear hearing protectors when exposed at or above a TWA of 85 dB(A).

The Mine Safety and Health Administration (MSHA) requires miners exposed above 105 dB(A) TWA to wear dual HPDs (plugs and muffs at the same time). To determine the variety and intensity of exposures, measurements are taken and noise