Environmental Health and Safety Training

Occupational Noise
OSHA 29 CFR 1910.95
Elements of OSHA’s Standard

- Noise monitoring
- Permissible noise exposure levels
- Hearing Conservation Program (HCP)
- Training
- Recordkeeping
Characteristics of Noise

- Noise is unwanted sound
Effects of Noise

- Physical effects of noise:
  - Elevated blood pressure
  - Higher incidence of circulatory problems
  - Ringing in ears

- Social effects of noise:
  - Frustration levels with/by others
  - Distraction from others
  - Safety issues

#1 Effect: Noise induced hearing loss (NIHL)
Noise Monitoring

- Purpose is to identify:
  - Noise sources
  - Employees exposed to noise levels above allowable levels
  - Employees to be included in the HCP
Noise Sources/Areas at Facility

- Mechanical Rooms
- Power Plant
- Machine Shop
- Construction Activities
- Power Tools
Noise Monitoring – Area/Source Survey Readings

Relative Noise Levels

- Quiet Room
- Normal Speech
- Truck
- Mechanical Room
- Ditch Witch
- Skill Saw
- Chain Saw
- Chipper
Noise Monitoring – Example of Personal Dosimetry

![Dosimeter Time History Chart for Noise Exposure](image)

- **Circular saw**
- **HVAC units**
- **Router**

**Sound Pressure Level**
- **Average (dBA)**
- **Maximum (dBA)**
- **Peak (dB)**
Noise Monitoring - Notification and Observation

- The employer must:
  - Notify each employee exposed above 85 decibels (AL) of the results of noise monitoring
  - Allow employees to observe any noise measurements conducted
Elements of OSHA’s Standard - Permissible Noise Exposures - PEL

- Permissible Exposure Level (PEL) – 90 dBA as an 8-hour TWA
- If employee exposure is above this level (regardless of the use of hearing protection) then:
  - Feasible administrative/engineering controls must be implemented
  - Hearing protection must be worn if administrative and/or engineering controls are not feasible or do not reduce noise levels to acceptable levels
Elements of OSHA’s Standard - Permissible Noise Exposures (PEL)

Example:
8-hour PEL=90dBA
4-hour PEL=95dBA
1-hour PEL=105dBA

<table>
<thead>
<tr>
<th>Duration per day, hours</th>
<th>Sound level, dBA, slow-response</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>90</td>
</tr>
<tr>
<td>5.0</td>
<td>92</td>
</tr>
<tr>
<td>4.0</td>
<td>95</td>
</tr>
<tr>
<td>2.0</td>
<td>100</td>
</tr>
<tr>
<td>1.0</td>
<td>105</td>
</tr>
<tr>
<td>0.5</td>
<td>110</td>
</tr>
<tr>
<td>0.25</td>
<td>115</td>
</tr>
</tbody>
</table>

Source: 29 CFR 1910.95, Table G-16.
Elements of OSHA’s Standard - Action Level (AL)

- The AL is sort of like a warning track on a baseball field….you need to know where the danger levels are **before** you reach them.
Elements of OSHA’s Standard - Permissible Noise Exposures - AL

- Action Level (AL) – 85 dBA as an 8-hour TWA (50 % of the PEL)
- If employee exposure is at or above this level a Hearing Conservation Program (HCP) must be implemented
Elements of OSHA’s Standard - PEL Noise Exposures – Ceiling Limits

- 115 dBA for A-weighted steady-state noise. If employees are exposed to noise above this level,
  - Hearing protection **must** be worn at all times
- 140 dB for peak (impulse/impact noise). If employees are exposed to noise above this level,
  - Hearing protection **should** be worn at all times
Hearing Conservation Program (HCP)

- If employees are exposed at/above the Action Level of 85 dBA as an 8-hour TWA, the employer must implement a Hearing Conservation Program (HCP) which includes:
  - Specific noise monitoring for exposure levels
  - Audiometric testing
  - Use of hearing protection
  - Employee notification of monitoring and audiometric test results
  - Specific training on noise hazards and use of PPE
  - Recordkeeping
Noise-Induced Hearing Loss

- In general, noise-induced hearing loss:
  - Occurs over a long period of time due to repeated exposure of excessive noise
  - Is cumulative
  - Results from a “physical” destruction of part of your hearing
  - It is rarely reversible
  - Can be made worse if you have a family history of hearing loss, certain medical conditions or are on certain medications
  - Can be prevented
Audiometric Testing Program

- Audiometric testing requires that employees with noise exposures at or above the AL (85 dBA) be provided with:
  - Baseline audiograms within 6 months of an employee’s first exposure to noise at/above the AL
  - Annual audiograms within 1 year of baseline
  - Audiograms conducted by qualified individuals

- Standard Threshold Shift (STS) - a change in hearing threshold (impairment of ability to hear) relative to the baseline audiogram of an average of 10 dB or more at 2,000, 3000 and 4,000 Hz in either ear
Audiometric Testing Program – Changes in Hearing Over Time
Anatomy of the Ear

Normal hair cells

Damaged hair cells

Damaged hair cells cannot conduct sound efficiently. If hair cells die, sound cannot be transmitted at all.
Noise Protection and Control

- Post noise hazards
- Where possible, eliminate the noise source or substitute a “quieter” piece of equipment
- Decrease time of exposure
- Increase your distance from the noise source
- Use hearing protection where required
Engineering controls include:

- Eliminating the noise source
- Substituting a with equipment that emits less noise
- Adding sound/noise barriers
- Adding noise mufflers
- Enclosing the noise source

Mufflers on generators reduce noise levels
Engineering and Administrative Controls – Time and Distance

- Administrative controls include:
  - Keeping distance from the noise source (i.e., if you are 3’ away from a noise source, the noise level your ears hear is drops by 1/2)
  - Reducing the amount of time spent in a noisy area

Noise levels of grinders/polishers often run 100 dBA or more. If you are 9 feet away, noise level you hear drops to @ 82 dBA
Hearing Protection Devices (HPDs) – Elements of the HCP

- Proper fitting of hearing protectors must be provided.
- Hearing protection must be sufficient to attenuate exposure to an 8-hour TWA of 90 dBA.
- Hearing protection must be sufficient to attenuate exposure to an 8-hour TWA of 85 dBA or below for employees with a STS.
- Exposed employees must be trained annually.
Ways to Protect Yourself From NIHL

- Commit yourself to take care of your hearing
- Ask questions about noise hazards
- Wear your hearing protection
- Encourage coworkers to wear their hearing protection
- Find the types of hearing protectors that work best for you
- Take care of your hearing protectors
- Think about ways to lower noise levels in your work area and make suggestions
Q&A

- Noise-induced hearing loss is generally due to a single, very high but short-term noise exposure.
  - False. Most hearing loss is due to repeated exposure to excessive noise over long periods of time.
- Noise-induced hearing loss is generally reversible.
  - False. It is usually permanent as parts of your hearing system are damaged or entirely destroyed.
- You may be more likely to develop hearing loss if there is a family history of hearing loss.
  - True. Some individuals are genetically predisposed towards hearing loss.
Q&A

- Hearing protection is required whenever you are exposed at or above OSHA’s permissible exposure level for noise.
  - True. It is also required if you are exposed to noise at/above the OSHA’s noise Action Level and also suffer a recordable hearing loss, or wherever our policy requires you to wear it.

- You can decrease your exposure to noise by increasing your distance from a noise source.
  - True. Also, decreasing your exposure time or wearing hearing protection also helps.
Q&A

- If I am just going to be in a posted “noise zone” for a few minutes, I do not have to wear hearing protection.
  - False. Our policy requires the use of hearing protection in certain posted areas. You may think of a few minutes may not matter, but noise exposure is cumulative over the whole work day.

- There is nothing that I can do outside of work to prevent hearing loss.
  - False. Most of us receive a considerable noise dose each day outside of work from traffic noise, power tools, hobbies, etc. The first step towards protecting our hearing usually requires turning down the volume on our car stereos!