WESTERN REGION UNIVERSITIES CONSORTIUM

Incorporating Hands-On Activities During Virtual Training

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UCLA LOSH

OCCUPATIONAL NOISE EXPOSURE

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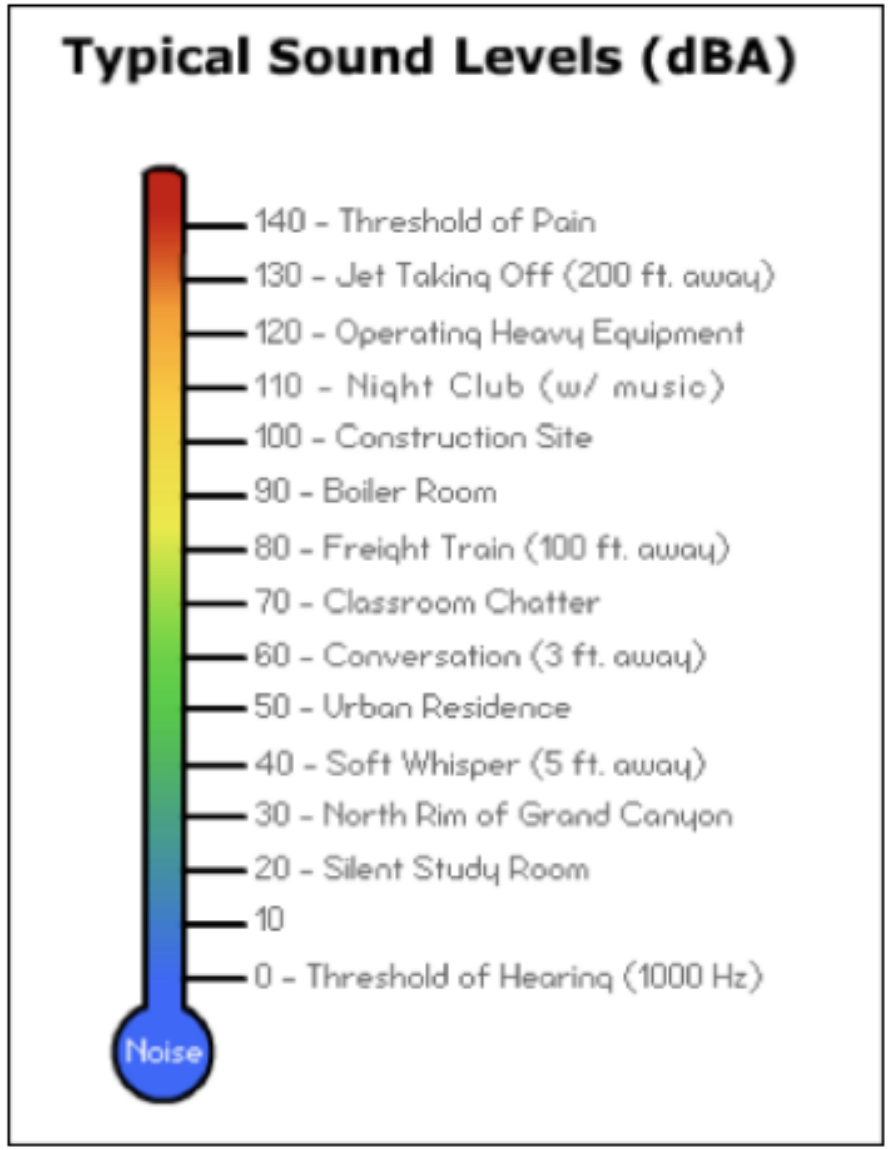
Objectives

- Explain what noise is and why hearing loss is an important issue
- Recognize the signs and symptoms of noise exposure
- Understand how noise exposure is measured
- Describe noise exposure control measures
- Increase awareness of the different types of hearing protective devices available and understand how to use them correctly

Sound Measurement

- Noise is measured in units of sound pressure called decibels (dB), named after Alexander Graham Bell
- The decibel notation is implied any time a “sound level” or “sound pressure level” is mentioned



Noise Regulations

- **29 CFR §1910.95**
  [https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.95]
- **29 CFR §1926.52**
  [https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.52]
- **8 CCR §§ 5095 - 5100**
  - Agriculture, construction, and oil and gas well drilling and servicing operations are exempt from the provisions of Sections 5097 through 5100
  - §5097. Hearing Conservation Program
  - §5098. Hearing Protectors
  - §5099. Training Program
  - §5100. Recordkeeping

Noise Exposure Limits

Time to Reach 100% dose rate	OSHA PEL (5 decibel exchange rate)	NIOSH REL (3 decibel exchange rate)
8 hours	90 decibels	85 decibels
4 hours	95 decibels	88 decibels
2 hours	100 decibels	91 decibels
1 hour	105 decibels	94 decibels
30 minutes	110 decibels	97 decibels
15 minutes	115 decibels	100 decibels

Figure 1. Maximum allowable daily noise dose

- OSHA uses a 5 dBA exchange rate (see Figure 1.)
- When noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half
- NIOSH - 85 dBA for eight hours to minimize occupational noise induced hearing loss
- NIOSH recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time

Noise Evaluation Instrumentation

- Noise Dosimeters
- If high worker mobility and significant variations in sound level are present, the employer shall use representative personal sampling to comply with the monitoring requirements

Hearing Protection Devices (HPDs)

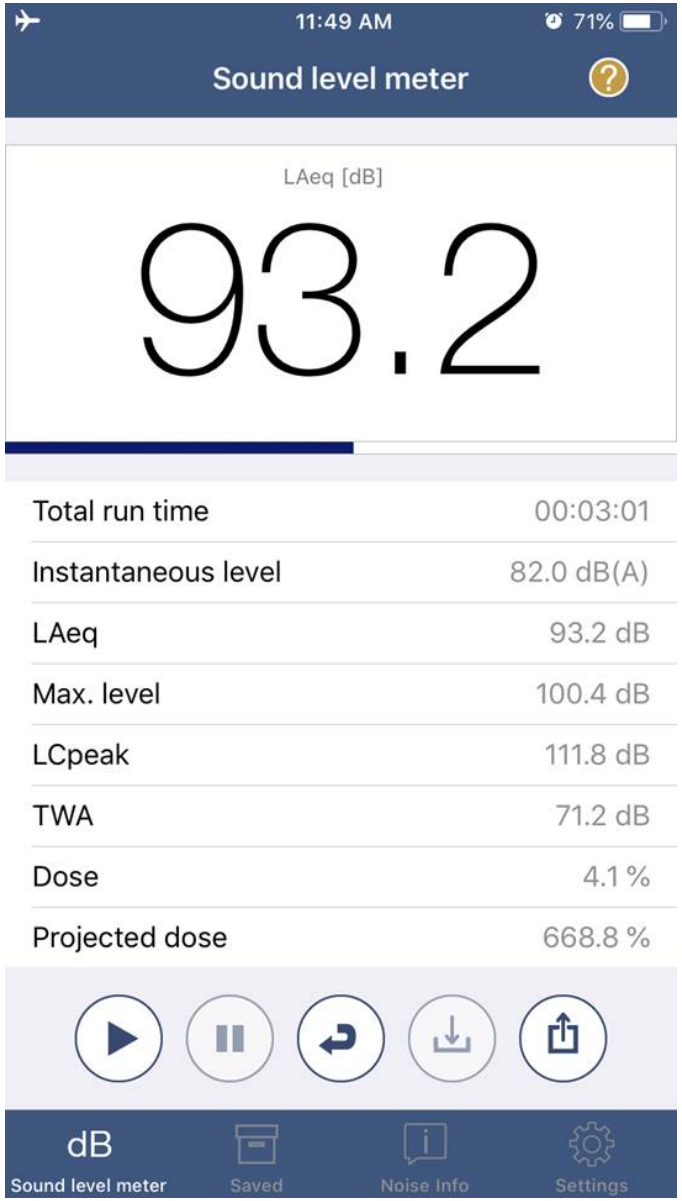
- HPDs are considered the last option for controlling noise exposures
- HPDs are generally used during implementation of engineering or administrative controls, or when such controls are not feasible
- Noise Reduction Rating (NRR)

NIOSH Sound Level Meter 4+

EA LAB

4.7, 883 Ratings

Free



ACTIVITY: Occupational Noise Exposure

Goal:
To familiarize you with measurement of sound levels using the NIOSH Sound Level Meter app and to relate those measurements to OSHA and NIOSH exposure limits.

What you will need:
- NIOSH Sound Level Meter app
- Timer or stopwatch

1. Identify a device in and around your home or office that generates a high level of noise. This might include a kitchen or office appliance (blender, coffee grinder, vacuum, paper shredder), personal care item (hair dryer, electric hand dryer in restroom), garden tool (lawn mower, leaf blower), etc.

Device: _____

2. Use the NIOSH Sound Level Meter app to measure the instantaneous sound level of the device at the source (i.e., as close to the device as safely possible).

Point source sound level: _____dBA

3. Now use the NIOSH Sound Level Meter app to estimate a projected dose. Hold your phone near the device and take a recording of the sound level for 60 seconds. Use the ▶ and ⏸ icons at the bottom left corner of the screen to start and stop the recording.

Once you are done, click the ↓ icon to save. Then click the "Saved" button at the bottom of the screen to find summary data for your recording.

Equivalent continuous sound level (LAeq): _____dBA

Maximum sound level during recording period: _____dBA

Time Weighted Average (TWA) of sound level: _____dBA

Dose: _____ %

Projected dose: _____ %

*[**NOTE**: If the maximum sound level during the recording period does not exceed 80 dBA, the app will not provide a time weighted average or projected dose]*

4. Use the chart below to determine how long a user could be exposed to the *maximum sound level* of your device without risk for noise-induced hearing loss according to NIOSH and according to OSHA.

Exchange Rates of NIOSH and OSHA Standards – National Institute for Occupational Safety and Health 1998; Occupational Safety and Health Administration 2009. According to each governing body, a person can safely be exposed to each decibel level for its corresponding time without risk of NIHL. For example, according to the OSHA standard, a person can withstand an environment with sound levels at 95 dBA for four hours. After four hours they are at risk for NIHL. NIOSH maintains that a person is safe in a 95 dBA environment for less than one hour.

NIOSH Standard	
Sound level (dBA)	**Duration (Hours: Minutes: Seconds)**
82	16:00:00
85	8:00:00
88	4:00:00
91	2:00:00
94	1:00:00
97	0:30:00
100	0:15:00
103	0:07:30
106	0:03:45
109	0:01:53
112	0:00:56
115	0:00:28
118	0:00:14
121	0:00:07
124	0:00:03
127	0:00:01

OSHA Standard	
Sound level (dBA)	**Duration (Hours: Minutes: Seconds)**
85	16:00:00
90	8:00:00
95	4:00:00
100	2:00:00
105	1:00:00
110	0:30:00
115	0:15:00
120	0:07:30
125	0:03:45
130	0:01:53
135	0:00:56
140	0:00:28
145	0:00:14
150	0:00:07
155	0:00:03
160	0:00:01

5. Does the TWA of your device exceed 85 dBA?

Yes: ☐ No: ☐

6. Return to the Zoom class for discussion and review.

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Examples of Devices Measured

- Fume hood
- Computer server room
- Paper shredder
- Audio on computer
- Restroom sink
- Hair dryer
- Nose hair clipper
- Bathroom fan
- Barking dog
- Wind chime
- Led Zeppelin song (in car)


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