

Hearing Conservation for QC Lab Personnel

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Agenda

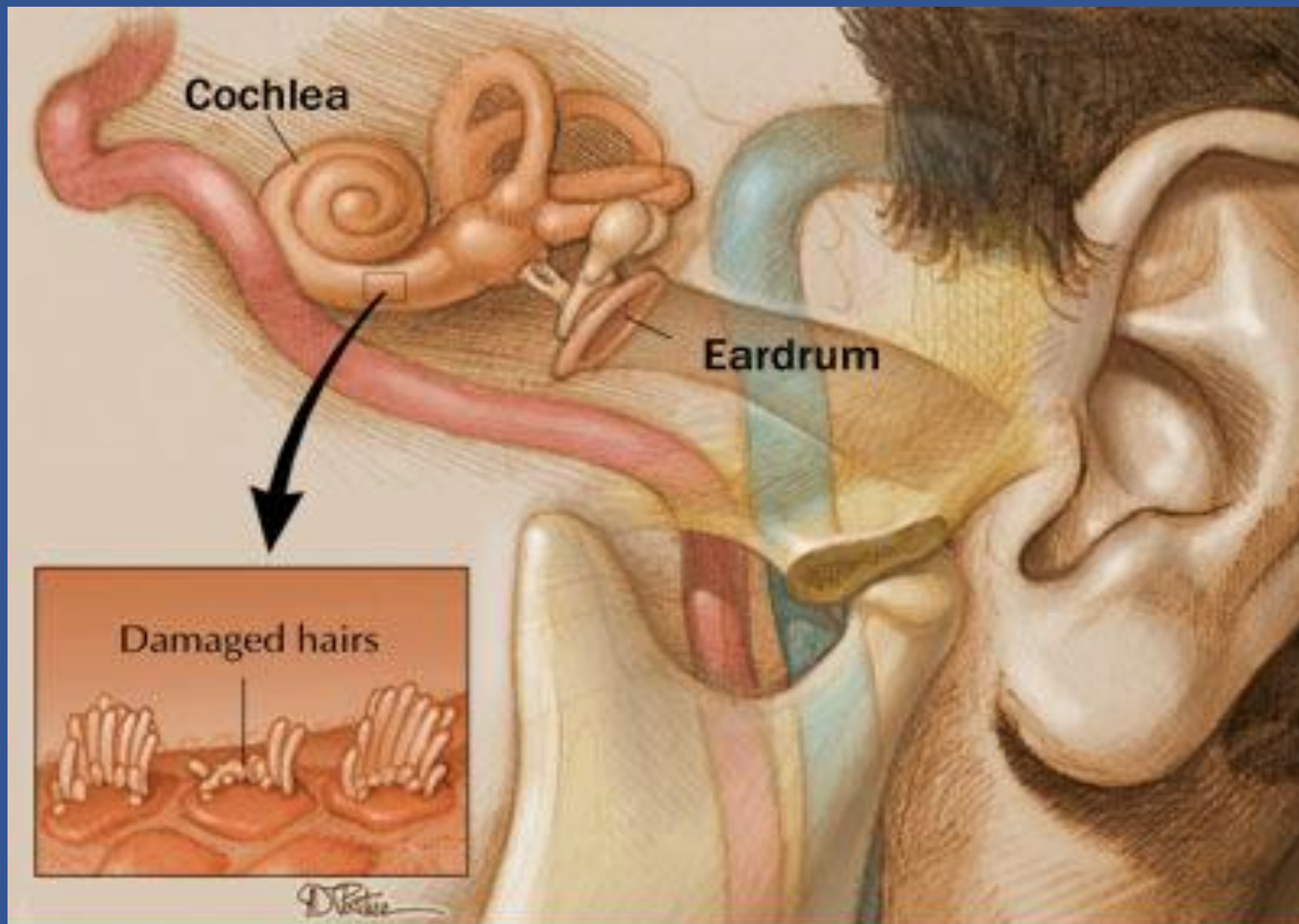
- Background
- Regulations
- Monitoring Strategy and Equipment
- Data Analysis
- How to Control



Noise Induced Hearing Loss (NIHL)

- NIHL is one of the most prevalent and common occupational diseases
- Results from high intensity sound exposure
 - Rarely from a single exposure
 - Commonly over years of unprotected exposure to excessive noise





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NIOSH 1997 risk estimates for development of material hearing impairment

Permissible Exposure Level	% at risk
90 dBA TWA	25%
85 dBA TWA	7%
80 dBA TWA	1%

TWA based on 8 hour work shift



MSHA Noise Standard

- Action Level (AL)
 - 85 dBA – 8 hr TWA
 - Monitoring required
 - Need to be included in Hearing Conservation Program (HCP)
 - Hearing Protection Devices (HPD) offered

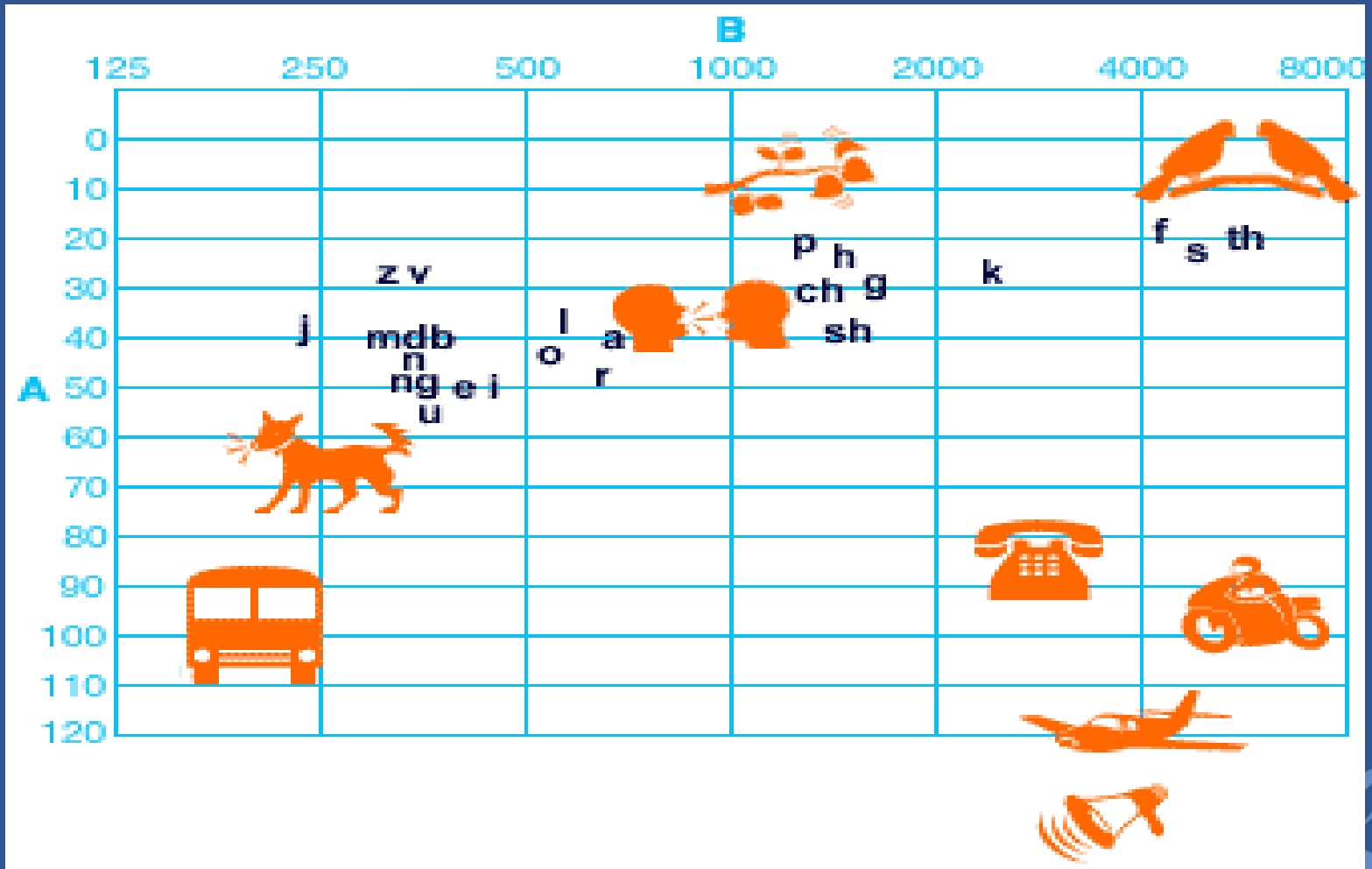


MSHA Noise Standard (cont'd)

- Permissible Exposure Level (PEL)
 - 90 dBA – 8 hr TWA
 - Must use hearing protection devices and implement engineering controls
 - At 105dBA, dual protection
- Ceiling – 115 dBA (maximum)



Relative Noise Levels



MSHA Noise Standard (cont'd)

- MSHA
 - Area monitoring acceptable but if highly mobile/significant variation then representative personal sampling
 - Employees must be able to observe
 - Notification of results

<http://www.msha.gov/regs/complian/PIB/2008/pib08-12.pdf>



When to Measure

- Baseline measurements
 - Identify individual and/or area msmts
- Periodic measurements
 - Change in equipment
 - Change in work practices
 - Re-evaluate baseline



Monitoring Strategy

- # of distinct employees
- Working environment
- Prior results
- Hearing Loss Work Related Recordables or Concerns
- Site Modifications from last monitoring results or survey



Types of Measurements

- Area
- Personal
- Instantaneous/Spot



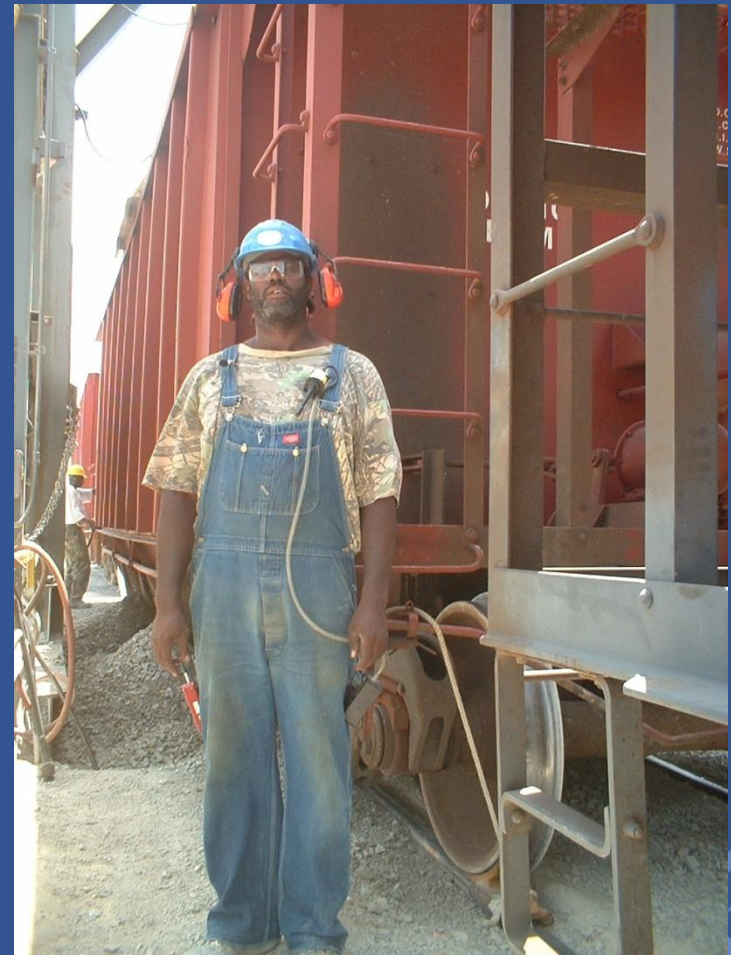
Area Monitoring

- Static Environments
- Sound Mapping
- Update if environment changes
- Identifying noise sources
- Verifying controls



Personal Dosimetry

- Changing Environments
- Mobile workers
- Representative #/ job classification
- Periodic monitoring



Spot Msmts

- Should supplement personal/area msmts
- Identify peak and impulse noises
- Meet standard of 115 dBA?



Current Technologies

- Sound Level Meters
- Dosimeters
- Calibrators
- Octave Band Analyzers
- Noise Indicators



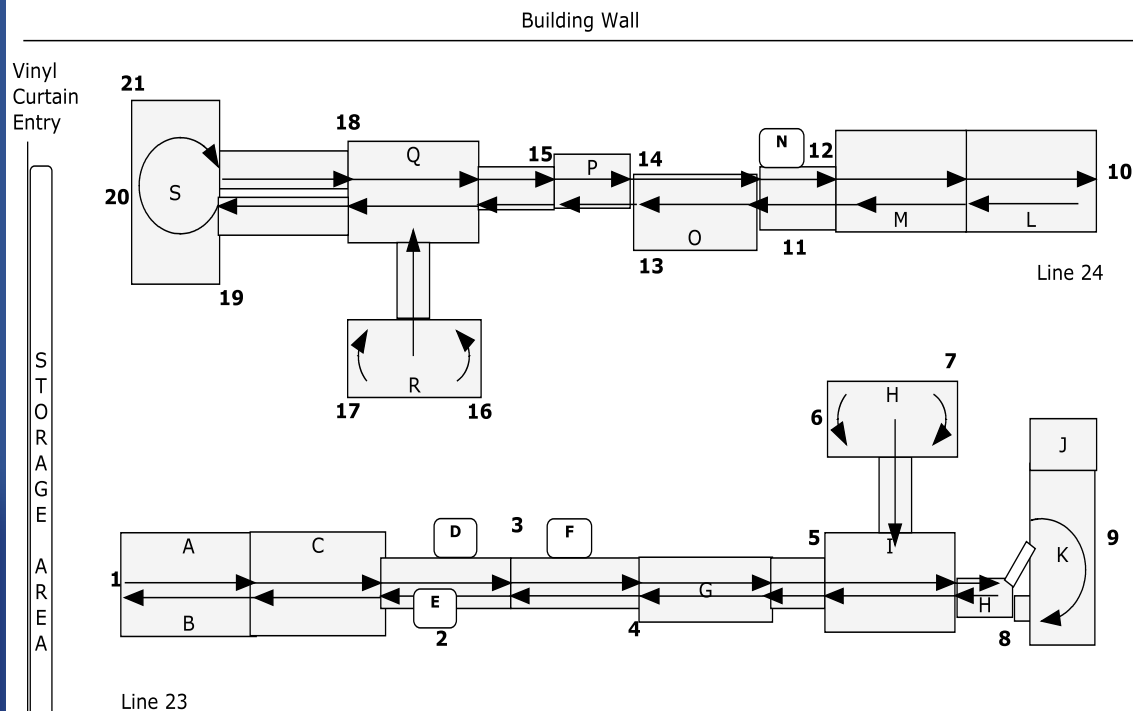
Sound Level Meter (cont'd)

- Type 1: Precision (± 1 dB)
- Type 2: General Purpose (± 2 dB)



Noise Map

Keystone - Line 23 and Line 24



Line 23	
Sample Location (see figure)	Sound Level dB(A)
1	77.7-78.8
2	83.6-84.8
3	82.0-83.4
4	84.3-85.2
5	81.7-83.3
6	79.9-80.6
7	77.9-79.0
8	79.3-80.3
9	77.9-82.7

Line 24	
Sample Location (see figure)	Sound Level dB(A)
10	77.6-78.3
11	78.4-81.0
12	79.1-81.0
13	78.2-79.8
14	79.1-80.2
15	79.4-80.4
16	78.5-79.8
17	78.7-79.5
18	80.8-81.4
19	78.0-79.2
20	78.1-79.0
21	80.6-81.2

Noise Dosimeter

- Integrating SLM
- Calculates individual noise dose
- Microphone – placed in vicinity of ear
- Belt or shoulder mounted



Evaluating IH Data and Investigating Exposures

- On-site Measurements
 - Dosimetry
 - Spot Measurements (Sound Level Meter)
- Comparing the results to standards
 - MSHA/OSHA
 - ACGIH
 - Others



Noise Data

- From 2000 to 2010
- 229 Samples on QC Lab Technicians
 - Most samples full shift
 - Very common for QC Lab Technicians to do other tasks during the day
- Spot Measurements



Noise Data (cont.)

- Average Exposure Levels
 - Approx. 80.5 with respect to HCP
 - Approx. 77 dB with respect to PEL
- Spot Measurements
 - Near Shakers – 95 to 100 DB
 - Near Shakers w/ Covers – 88 to 92 dB
 - In adjacent Rooms – 83 to 87 dB

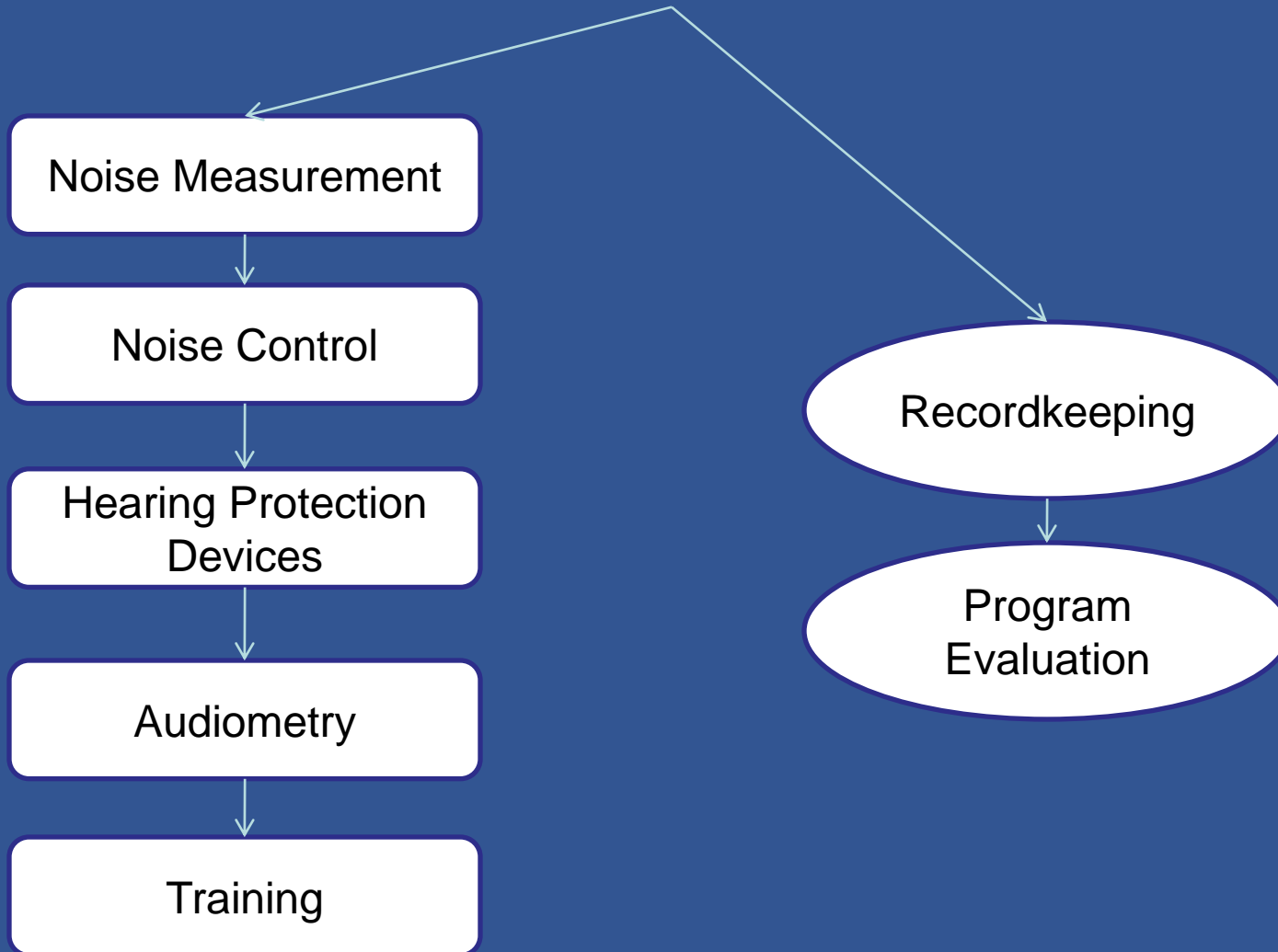


How to Control

- Hearing Conservation Programs
- Reduce Noise Exposures
 - Time, Distance and Shielding
 - Isolation
 - Sound-proofing



Hearing Conservation Program



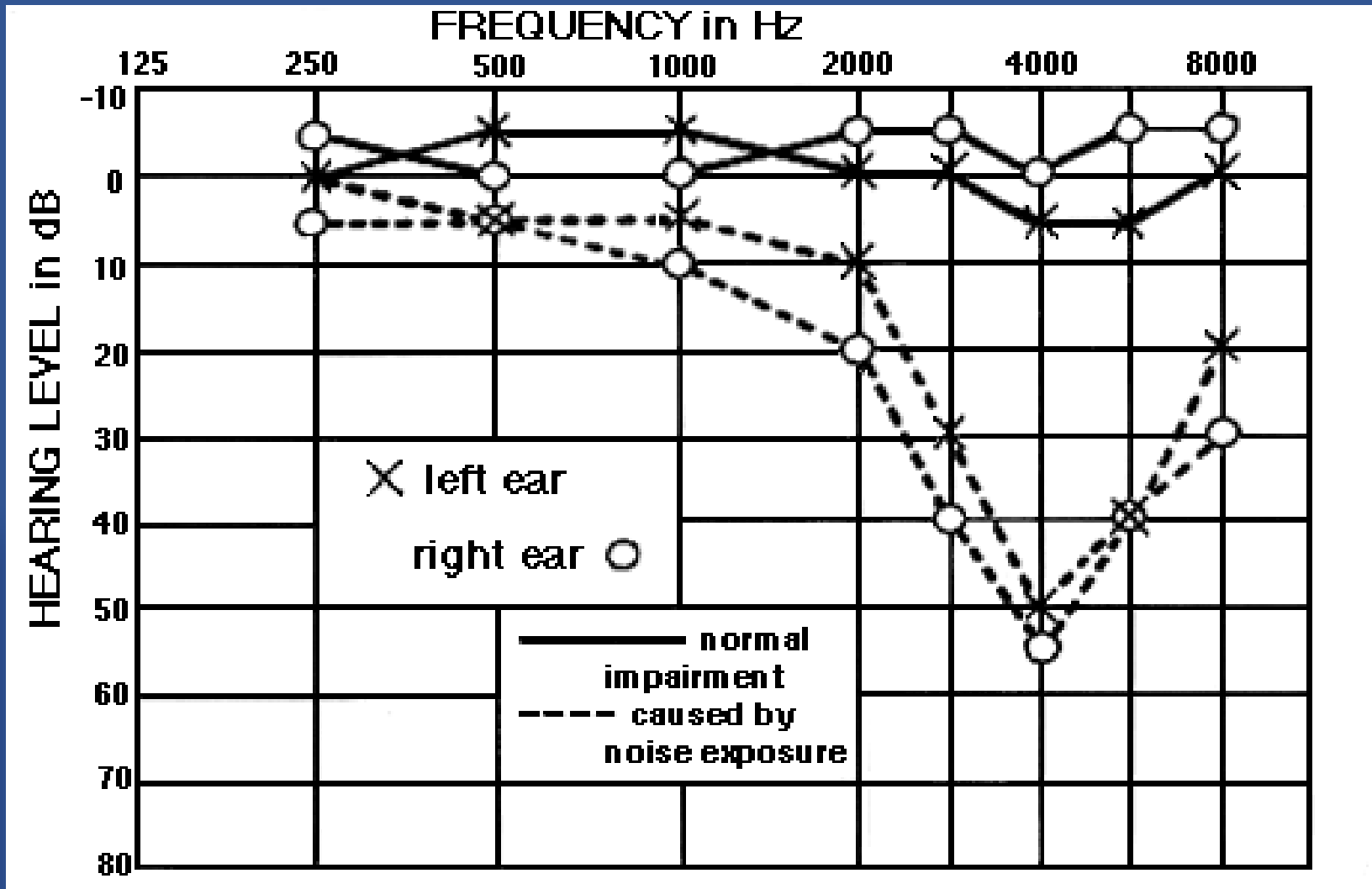
Audiometric Surveillance

- Audiometric Testing = Hearing Tests
- Certified Technicians (COHC)
- Calibrated Audiometers and Booth
- Standard Threshold Shift (STS):

Average change of 10 dB or more between the current test and baseline test at 2000, 3000, 4000 Hz...*Age correction is allowed*



Sample Audiogram



Recordable Hearing Loss

- Approximately 11% – 12% of recordable injuries
- Since 2004 nearly 125,000 employees recorded as permanent NIHL (OSHA only)
- Mostly from manufacturing and mining
- OSHA estimated >100,000 cases of recordable hearing loss/year



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