COTTINGHAM & BUTLER

RISK MANAGEMENT SAFETY WEBINAR

TODAY'S PRESENTER

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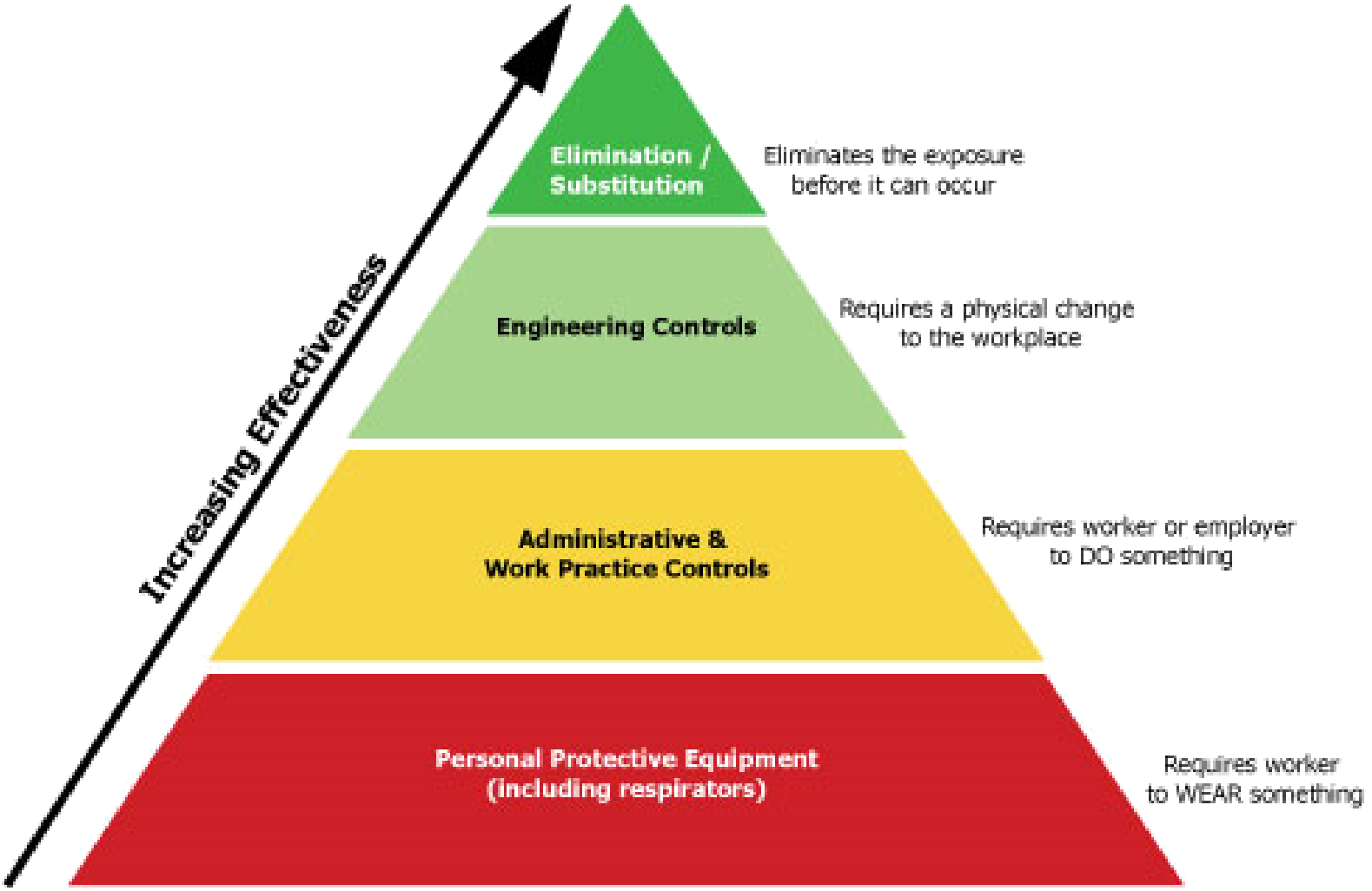
PERSONAL PROTECTIVE EQUIPMENT - PPE

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Barrier between your body and the hazard
- Last resort for protecting employees against hazards
- PPE must be made readily available to employees at no cost to them (exceptions for some specialty footwear and eyewear)

HIERARCHY OF HAZARD CONTROL



PERSONAL PROTECTIVE EQUIPMENT (PPE)

The basic elements of a PPE policy

- Hazard Assessment
- PPE Selection
- Employee Training
- Enforcement of PPE use

POLL QUESTION #1

Have you conducted PPE hazard assessments for your facility?

A. Yes
B. No
C. Currently work in progress
D. Thought about it

HAZARD ASSESSMENT

Conducted to identify sources of hazards to workers

Should document

- Location
- Date
- Person conducting assessment
- JSA's can serve this purpose

PPE HAZARD ASSESSMENT FORM

PPE HAZARD ASSESSMENT FORM

I am reviewing (check the appropriate box):		
	☑ A worksite	Specify location:
	☐ A single employee's job description	Name of employee: Position Title:
	☐ A job description for a class of employees	Position Titles: Location:

Your Name: **Department/Division:** **Date:**

EYE HAZARDS: Tasks that can cause eye injury include: working with chemicals or acids; UV lights; chipping, sanding, or grinding; welding; furnace operations; and metal and wood working.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Chemical Exposure ☐		
High Heat/Cold ☐		
Dust/Flying Debris ☐		
Impact ☐		
UV/IR Radiation ☐		
Other:		

HEAD/NECK/FACE HAZARDS: Tasks that can cause head/neck/face injury include: working below other workers who are using tools or materials that could fall, working on energized electrical equipment or utilities, and working in trenches or confined spaces.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Chemical Exposure ☐		
Dust/Flying Debris ☐		
Impact ☐		
UV/IR Radiation ☐		
Electrical Shock ☐		
Other:		

FOOT HAZARDS: Tasks that can cause foot injury include: exposure to chemicals or acids, welding or cutting, materials handling, renovation or construction, and electrical work.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Chemical Exposure ☐		
High Heat/Cold ☐		
Impact/Compression ☐		
Electrical ☐		
Puncture ☐		
Slippery/Wet Surfaces ☐		
Other:		

PPE HAZARD ASSESSMENT CERTIFICATE

PPE HAZARD ASSESSMENT CERTIFICATE

HAND HAZARDS: Hand injury can be caused by: work with chemicals or acids, exposure to cut or abrasion hazards (for example, during demolition, renovation, woodworking, or food service preparation), work with very hot or cold objects or materials, and exposure to sharps.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Chemical Exposure ☐		
High Heat/Cold ☐		
UV/IR Radiation ☐		
Electrical Shock ☐		
Puncture ☐		
Cuts/Abrasion ☐		
Other:		

BODY HAZARDS: Injury of the body (torso, arms, or legs) can occur during: exposure to chemicals, acids, or other hazardous materials; abrasive blasting; welding, cutting, or brazing; chipping, sanding, or grinding; use of chainsaws or similar equipment; and work around electrical arcs.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Chemical Exposure ☐		
High Heat/Cold ☐		
Impact/Compression ☐		
Electrical Arc ☐		
Cuts/Abrasion ☐		
Other:		

FALL HAZARDS: Personnel may be exposed to fall hazards when performing work on a surface with an unprotected side or edge that is 4 feet or more above a lower level, or 10 feet or more on scaffolds. Fall protection may also be required when using vehicle man lifts, elevated platforms, tree trimming, performing work on poles, roofs, or fixed ladders.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Fall hazard ☐		

NOISE HAZARDS: Personnel may be exposed to noise hazards when working in mechanical rooms; machining; grinding; sanding; cage washing; dishwashing; working around pneumatic equipment, grounds equipment, generators, chillers, motors, saws, jackhammers, or similar equipment.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Noise hazard ☐		

RESPIRATORY HAZARDS: Personnel may be exposed to respiratory hazards that require the use of respirators: during emergency response, when using certain chemicals outside of a chemical fume hood; when working with hazardous powders; when entering fume hood plenums, when working with animals; when applying paints or chemicals in confined spaces; when welding, cutting, or brazing on certain metals; and when disturbing asbestos, lead, silica, or other particulate hazards.

Check the appropriate box for each hazard:	*Description of hazard(s):*	*Required PPE*
Chemical exposure ☐		
Particulate exposure ☐		
Other:		

I certify that the above hazard assessment was performed to the best of my knowledge and ability, based on the hazards present on this date.

_____ (signature)

HAZARD ASSESSMENT

Common workplace hazard categories

- Sources of motion
- High or low temperatures
- Chemicals
- Dust/air contaminants
- Electrical
- Falling objects
- Sharp objects
- Flying objects or debris

HAZARDS TO EYES

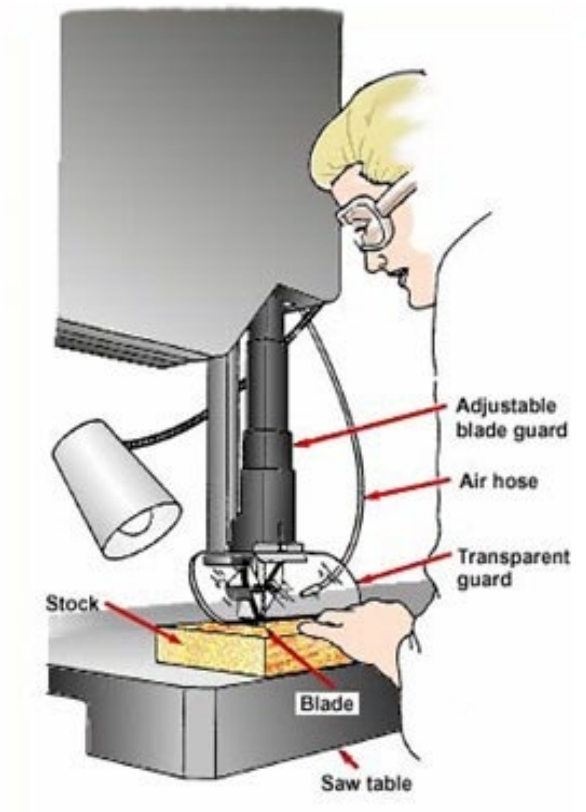
- Dust and other flying debris, such as metal shavings, sawdust, chips
- Molten metal that might splash
- Acids and other caustic liquid chemicals that might splash
- Blood and other potentially infectious body fluids that might splash, spray, or splatter
- Intense light such as that created by welding and lasers

ENGINEERING CONTROLS

Plant equipment and machinery are major sources of eye injuries

To guard against this, use:

- Guards
- Screens
- Shields



EYE AND FACE PROTECTION

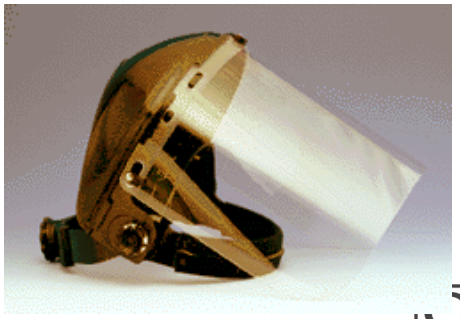
Safety glasses with side shields (ANSI Z87.1)

- Options include prescription, foam lined, tinted

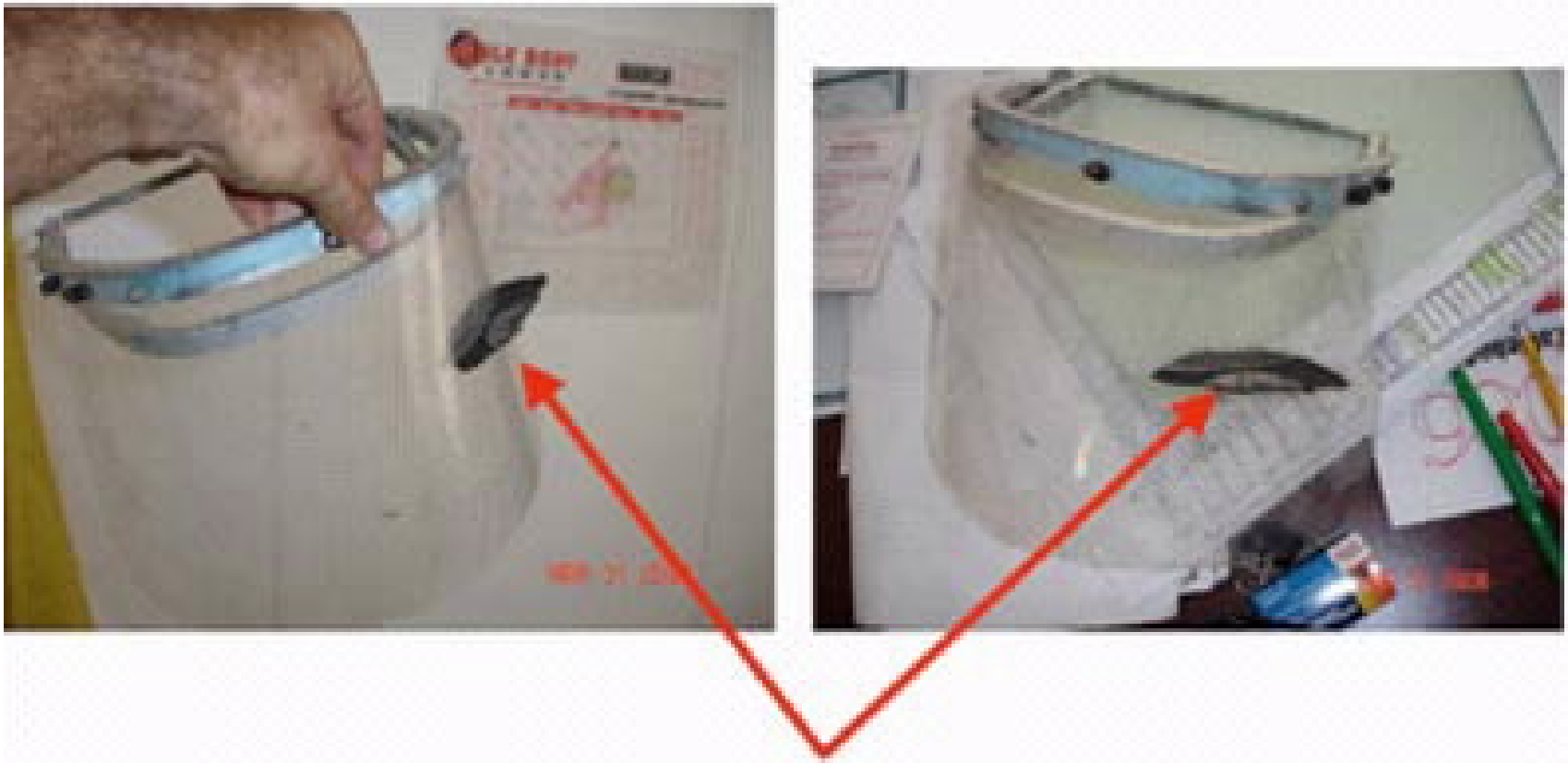
Goggles (dust or splash hazards)

Face shields

- Provide full-face protection
- Always wear eye protection under a face shield



EYE AND FACE PROTECTION



EYE AND FACE PROTECTION

Welding hoods/shields

- Must use proper shade

Laser glasses/goggles

HEAD PROTECTION

Hardhats come in 3 primary classes and protect against:

- Falling objects
- Bumping head against fixed objects, such as exposed pipes or beams
- Contact with exposed electrical conductors

HEAD PROTECTION

Hardhats should be worn as designed by manufacturer

POLL QUESTION #2

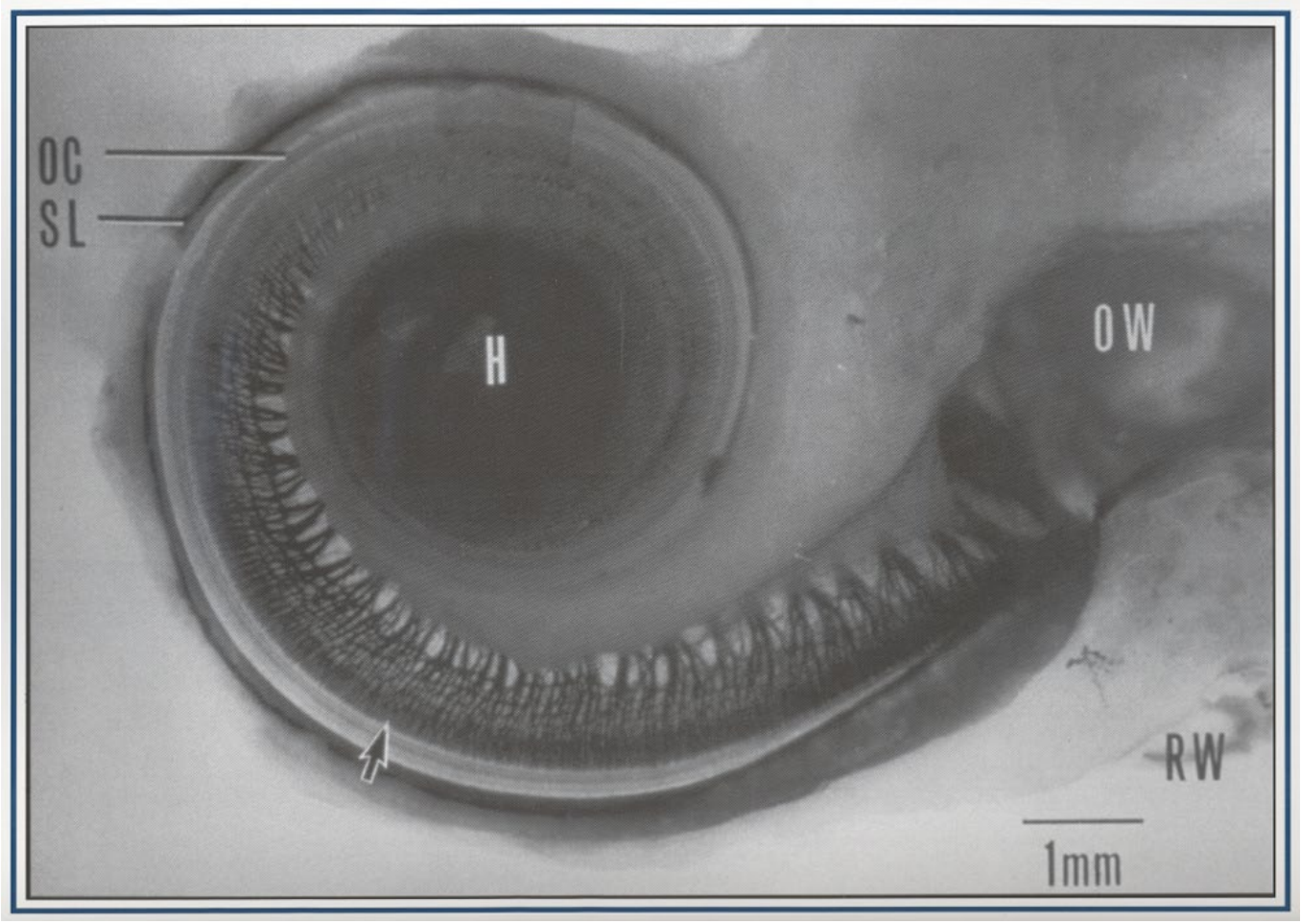
When it comes to a hearing conservation program, my company:

A. Has a Hearing conservation program with annual hearing testing
B. Is under the exposure limit and offers hearing protection
C. Is under 85dB for a TWA
D. Unsure if a program is needed or haven't conducted Dosimetry testing

HEARING PROTECTION

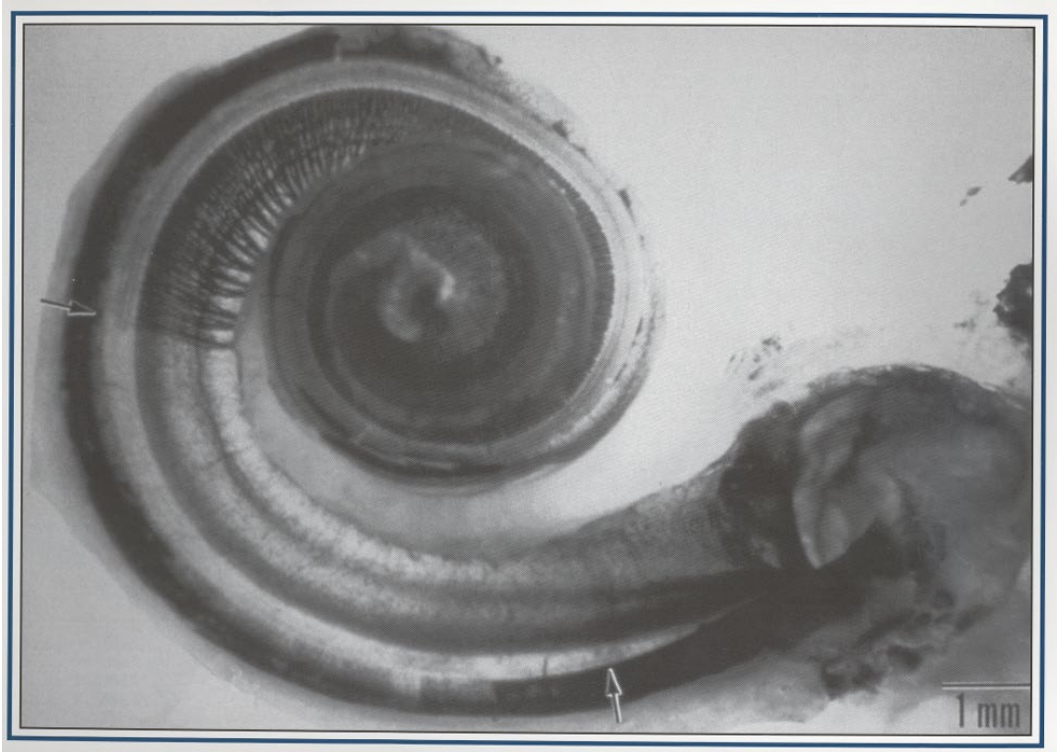
- When exposure levels meet or exceed the action limit of 85 dB, employees must implement a hearing conservation program and provide protection
- When exposure levels exceed 90 dB, protection must be provided and mandatory
- Hearing PPE must keep employee exposure under 90 dB

EFFECTS OF NOISE – NORMAL COCHLEA



EFFECTS OF NOISE – DAMAGED COCHLEA

- Causes hearing loss
- Amount of damage depends upon the intensity of the noise and duration of exposure
- Noise-induced hearing loss can be temporary or permanent

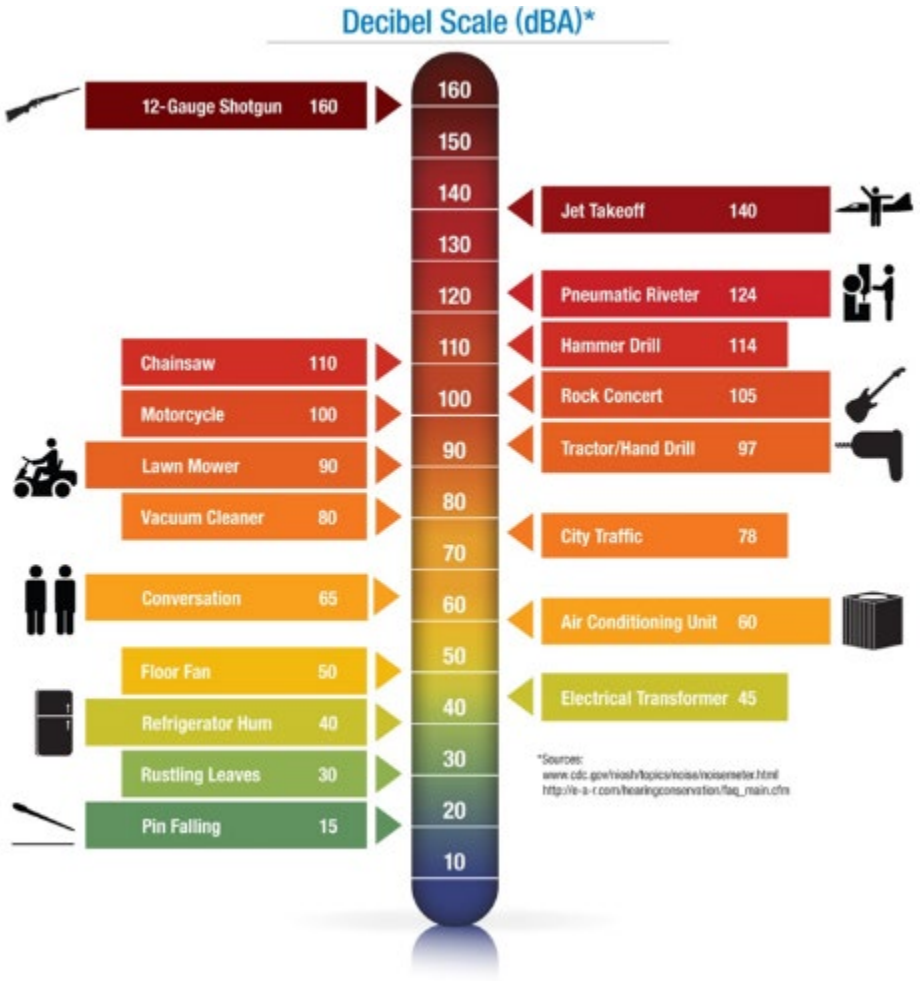


CONDUCTING A SOUND LEVEL SURVEY

- Also referred to as “monitoring”
- Required when exposure may equal or exceed 85 decibels TWA (action level, or AL)
  - Used to identify noise generators to reduce noise levels
  - Used to determine employees for hearing conservation program
  - Used for determining appropriate hearing protection
- Monitoring repeated when noise exposures increase from
  - Change in production
  - Change in process
  - Change in equipment or controls
- Employees exposed at or above TWA notified of results

DETERMINING HIGH-NOISE GENERATORS

Duration per Day (Hours)	Sound Level (dBA Slow Response)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115



IDENTIFYING HIGH-NOISE GENERATORS

Vacuum Pump Exhaust

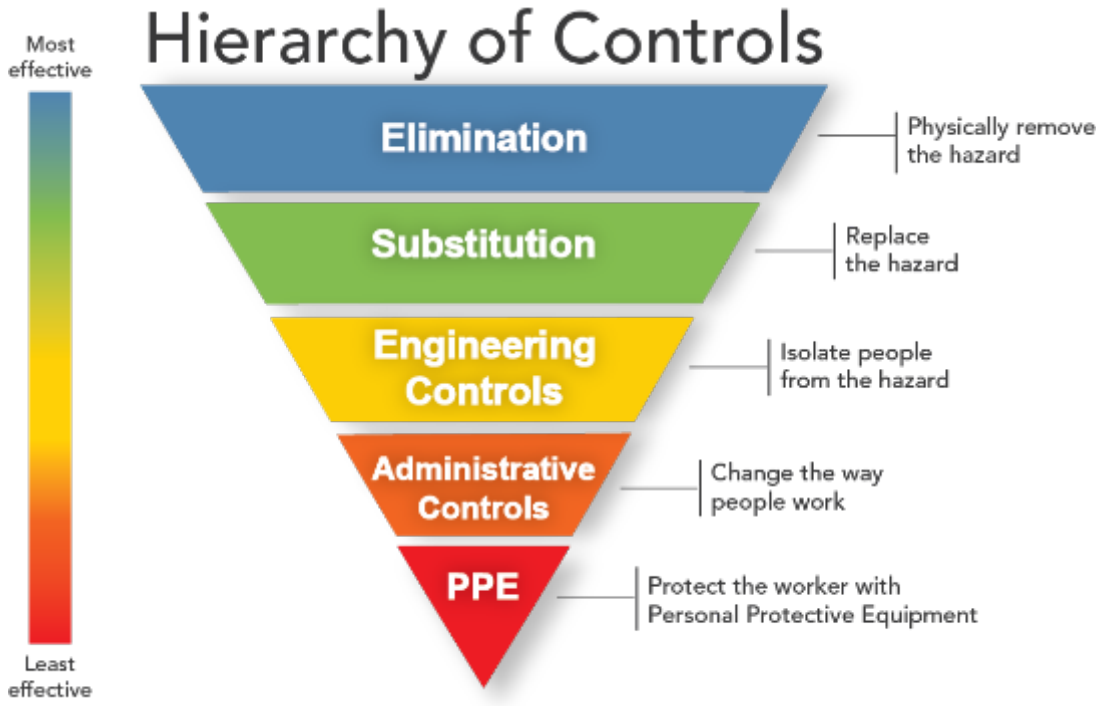
Riveters

Pneumatic Jack Hammers

Pneumatic Pump Exhaust

HAZARD MITIGATION

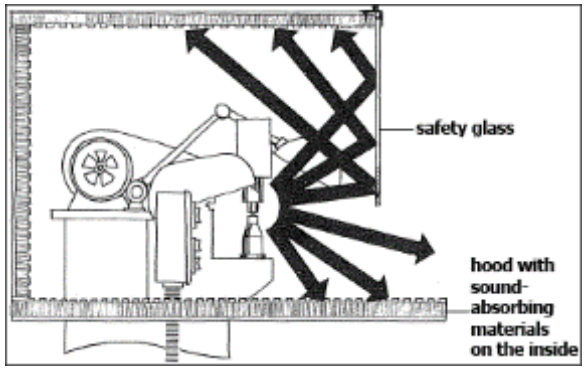
Hazard-Control Hierarchy: eliminating or reducing exposures by implementing feasible and effective controls



HAZARD MITIGATION

Vacuum Pump Exhaust Silencer

Peristaltic Pump



Sound-Absorbing Enclosure

Jack Hammer Muffler

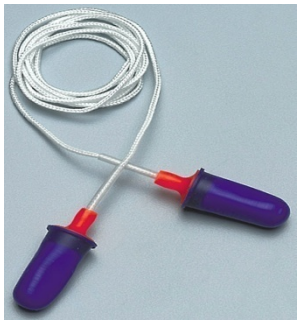
Pneumatic Pump Exhaust Silencers

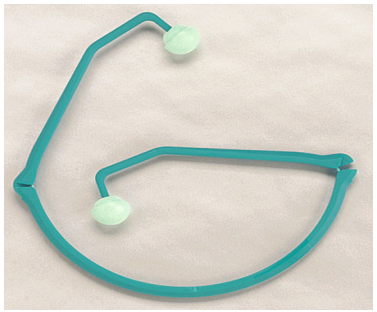
Sound-Absorbing Panel

TYPES OF HEARING PROTECTION

- Ear plugs
- Ear muffs
- Canal caps

Employer must provide “a variety” of protection options





AUDIOMETRIC TESTING

- For employees whose exposures equal or exceed the AL
- Performed by a licensed/certified audiologist, otolaryngologist, or other physician, or by a CAOHC-certified technician
- Baseline audiograms (against which future audiograms are compared)
  - Within 6 months of an employee's first exposure at or above AL
  - 14 hours without exposure high-noise levels (or use of hearing protection) prior to test
- Annual audiometric testing
  - For employees whose exposures equal or exceed the AL
  - Compared to baseline for identifying Standard Threshold-Shifts (STSs)

STANDARD THRESHOLD-SHIFTS

- An average of 10 dB or more change in hearing threshold at 2000, 3000, and 4000 Hz in either ear relative to the baseline audiogram
  - Allowance may be made for the contribution of aging
- If an STS is identified:
  - Retest within 30 days
  - Notify the employee (in writing) of their STS within 21 days
- If retest indicates a work-related STS:
  - Provide hearing protection, train or retrain, provide additional testing
  - Annotate on OSHA 300 Log
- Revised baseline
  - If STS is persistent
  - If significant improvement over original baseline

RECORDKEEPING

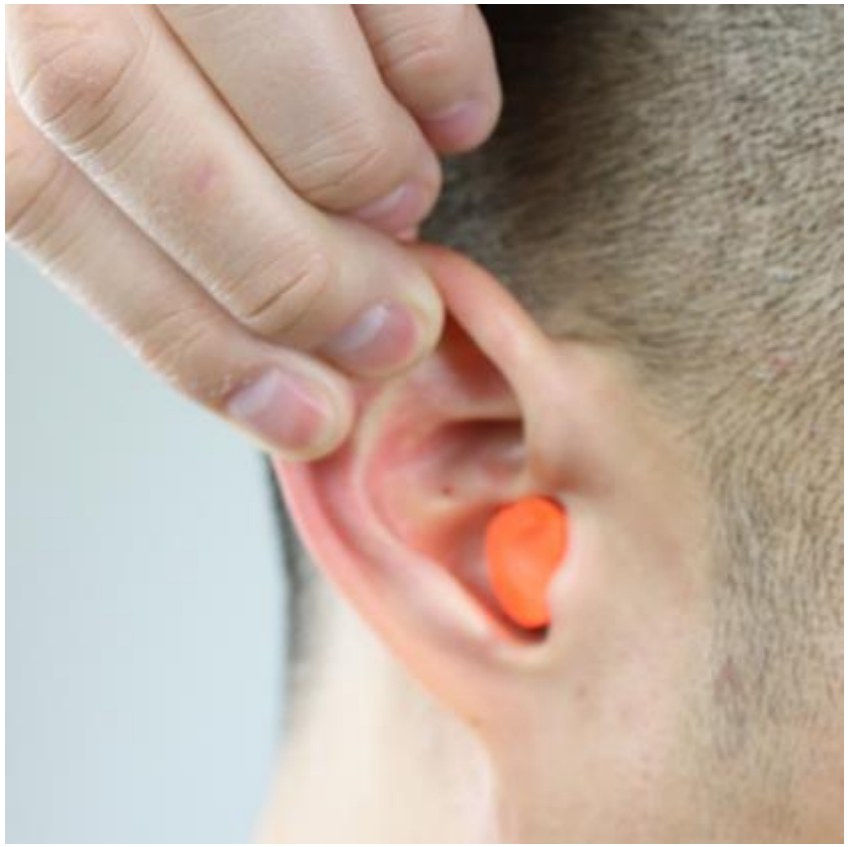
- Exposure measurements (two years)
- Retain employee audiometric test records (duration of the affected employee's employment)
  - Employee name and job classification
  - Audiogram date
  - Last acoustic or exhaustive audiometer calibration date
  - Employee's most recent noise exposure assessment
- Employees have the right to access exposure measurements and their test results
- OSHA Logs: current year and previous 5 years

TRAINING REQUIREMENTS

- Train each employee who is exposed at or above the AL
- Initial and annual
  - The effects of noise on hearing
  - The purpose of hearing protectors and the advantages, disadvantages, and attenuation of various types
  - Instructions on selection, fitting, use, and care
  - The purpose of audiometric testing and an explanation of the test procedures
  - Engineering and administrative controls

PROPER PPE INSERTION

- Roll (depending on type)
- Open ear canal
- Insert ear plug

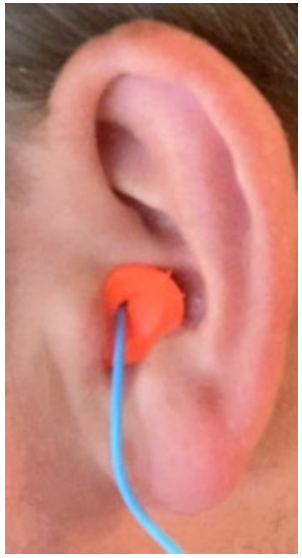


POLL QUESTION #3

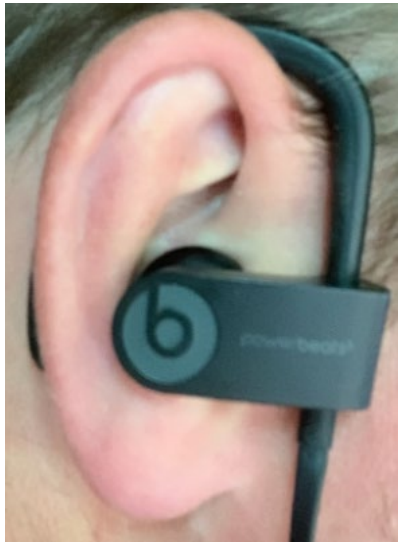
Which hearing protection is inserted correctly?

(A)

(B)



(C)



(D)

FOOT PROTECTION

Protective footwear can guard against:

- Heavy objects that might fall on employees' feet
- Equipment (forklifts, pallet jacks, vehicles) that might roll over employees' feet
- Punctures from sharp objects
- Molten metal that might splash on feet
- Hot or wet surfaces
- Slippery surfaces
- Electrical hazards

Tests have shown that compliant safety footwear can withstand being run over by a forklift!

FOOT PROTECTION

- Employers may mandate the wear of protective footwear based on workplace hazards
- Employers are not required to pay for “non-specialized” footwear- footwear that could reasonably be expected to be worn during off duty hours, unless the footwear is required to be kept at the workplace
- Examples of specialized footwear would be rubber safety boots, metatarsal boots, welding boots.
- Most employers choose to pay for all or some of the cost of non-specialized safety footwear

HAND PROTECTION

Hand protection can guard against:

- Burns
- Bruises
- Abrasions
- Cuts
- Punctures
- Chemical Exposures

HAND PROTECTION

- ANSI rates gloves on cut, puncture, and abrasion resistance from levels 1-5
- Leather gloves are rated below cut level zero !
- Cut rated gloves are available in a multitude of styles and applications, including hi-grip, food grade, and insulated
- Ensure that gloves are compatible with any chemicals being used
- The wrong gloves can create their own hazards
  - Decrease dexterity
  - Increase amount of force/grip required to do the job
  - Give employee false confidence in protection

POLL QUESTION #4

What level of respiratory protection do you use within your facility?

A. Just voluntary use
B. APR
C. PAPR
D. SAR
E. SCBA

RESPIRATORS - WHAT DETERMINES THE NEED?

Hazardous Atmospheres

Oxygen-deficient

- Does not contain enough oxygen to sustain breathing (<19.5%)
- Confined spaces

Toxic Environment (contains dangerous levels of toxic materials)

- Dust
- Spray
- Smoke
- Vapors
- Fumes
- Harmful gases

RESPIRATOR SELECTION

What are the hazards here?

For gases and vapors:

- Change schedule
- Filter certified for gas or vapor

For particulates:

- filter certified for particulates

How to determine:

- Exposure level: 500ppm ÷ PEL: 50ppm = APF: 10

RESPIRATOR TYPES: AIR PURIFYING

Air-purifying

- Particulate
- Vapor and/or gas
- Combination of particulate & vapor & gas

CAUTION: Air-purifying respirators are approved for use only when the atmosphere:

- Contains enough oxygen to sustain breathing
- Contaminant concentration is known and does not exceed the face piece limitations.
- Contaminants are not immediately dangerous to life or health (IDLH).

AIR PURIFYING RESPIRATORS

Disposable

Quarter Face Mask

Half Face Mask

Full Face Mask

COLOR CODES AND LETTERS/#S FOR CARTRIDGES

- Acid Gases - White
- Organic Vapors - Black
- Ammonia Gas - Green
- Carbon Monoxide Gas - Blue
- Acid Gases and Organic Vapors - Yellow
- Acid Gases, Ammonia, and Organic Vapors - Brown
- Acid Gases, Ammonia, Carbon Monoxide and Organic Vapors - Red
- Others Not Listed - Olive
- Radioactive Materials - Purple
- Dusts, Fumes, and Mists (non-radioactive) –Orange

- N95 or P100?
- N = not resistant to oil
- R = somewhat resistant to oil
- P = strongly resistant to oil or oil-proof
- 95 to 100

LIMITATIONS OF APR'S

- Labored Breathing
  - Negative Pressure
  - Clogged Cartridges
- Doesn't Supply Fresh Air
- Cannot Use Low Oxygen Atmospheres
- No Warning Device
- Impaired Vision
- Difficult Communication
- Cartridge Shelf Life
- Matching Cartridge with Chemical
- Chemical Atmosphere Must be Within the Rated ppm of the Cartridge

WHEN NOT TO USE APR'S

- Oxygen deficiency or enrichment
- Unknown concentrations of airborne contaminants
- Presence of unidentified contaminants
- Chemicals with inadequate warning properties
- IDLH atmospheres
- Concentrations exceeding the Maximum Use Limit (MUL)

ASSIGNED PROTECTION FACTORS

Table I: Assigned Protection Factors[5]					
Type of Respirator[1, 2]	Quarter mask	Half mask	Full facepiece	Helmet/Hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	10[3]	50	—	—
2. Powered Air-Purifying Respirator (PAPR)	—	50	1,000	25/1,000[4]	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	—	10	50	—	—
• Continuous flow mode	—	50	1,000	25/1,000[4]	25
• Pressure-demand or other positive-pressure mode	—	50	1,000	—	—
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	—	10	50	50	—
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	—	—	10,000	10,000	—

RESPIRATOR TYPES: SUPPLIED-AIR

Self-Contained Breathing Apparatus (SCBA).

- Provides the highest level of respirator protection.
- Commonly used in rescue or emergency situations.
- Wearer limited to the amount of air carried in tanks, usually measure in half-hours.
- Most tanks hold 30 or 60 minutes of air.
- Positive-pressure provides protection for both oxygen-deficient and IDLH contaminants.

SELF CONTAINED BREATHING APPARATUS

Advantages

Disadvantages

MEDICAL EVALUATION

Medical Evaluation

- Required initially
- Must be done by a licensed health care professional
- Must be documented

FIT TESTING

Required initially and annually thereafter.

Respirators rely on a face-to-mask seal.

Fit-testing helps you select the respirator with the best fit.

Face-to-mask seal is negatively affected by:

- Stubble, beards, low hairlines, some mustaches
- Glasses or goggles

Sometimes corrective lenses can be mounted inside the face piece.

FIT TESTING PROCEDURE

Two Steps:

1. Put on the unit
2. Tighten straps.

Two Types of Fit-Testing:

- Qualitative (Challenge agent, vapor or aerosol-released. Fit is considered inadequate if you detect the presence of the challenge agent through:
  - Odor
  - Taste
  - Nasal irritation
- Quantitative (measures actual level of challenge agent both outside and inside your respirator face piece).

RESPIRATORS

Remember there are still limitations to respirators when making decisions.

Areas we didn't discuss but are also required to follow and also train employees on is :

- Maintenance
- Storage and Decontamination

Training is required annually along with fit tests.

OTHER PPE THAT MAY BE REQUIRED

- Aprons
- Welding jackets, chaps, boot covers
- Protective sleeves (chemical, cut resistant)
- Heat resistant clothing
- Arc-flash rated clothing, gloves, shields
- Traction devices for footwear

EMPLOYEE TRAINING

- When PPE is necessary
- What PPE is necessary
- How to properly don, off, adjust, and wear PPE
- The limitations of the PPE
- The proper care, maintenance, useful life, disposal, and replacement of the PPE

RETRAINING

Retraining on PPE is required when:

- Changes in the types of PPE to be used render previous training obsolete; or
- Changes in the workplace render previous training obsolete; or
- Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.
  - Employees not wearing required PPE
  - Employees improperly wearing PPE
  - Employees not properly maintaining/caring for PPE

Best Practice is annual training

SUMMARY

Employers must implement a PPE program where they:

- Assess the workplace for hazards
- Use engineering and work practice controls to eliminate or reduce hazards before using PPE
- Select appropriate PPE to protect employees from hazards that cannot be eliminated
- Inform employees why the PPE is necessary and when it must be worn
- Train employees how to use and care for their PPE and how to recognize deterioration and failure
- Require employees to wear selected PPE in the workplace

Questions?

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