# CONSTRUCTION NOISE & HEARING LOSS PREVENTION

## Webinar

Gary Gustafson, Director, Environmental Hazard Training

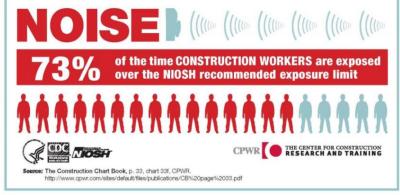
Eileen Betit, Director, Research to Practice



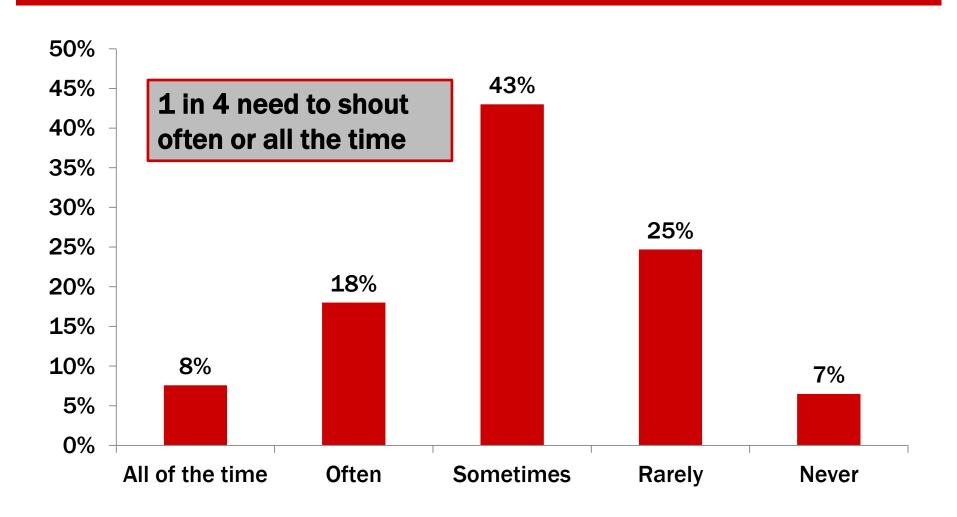
April 26, 2017

### HEARING LOSS PREVENTION

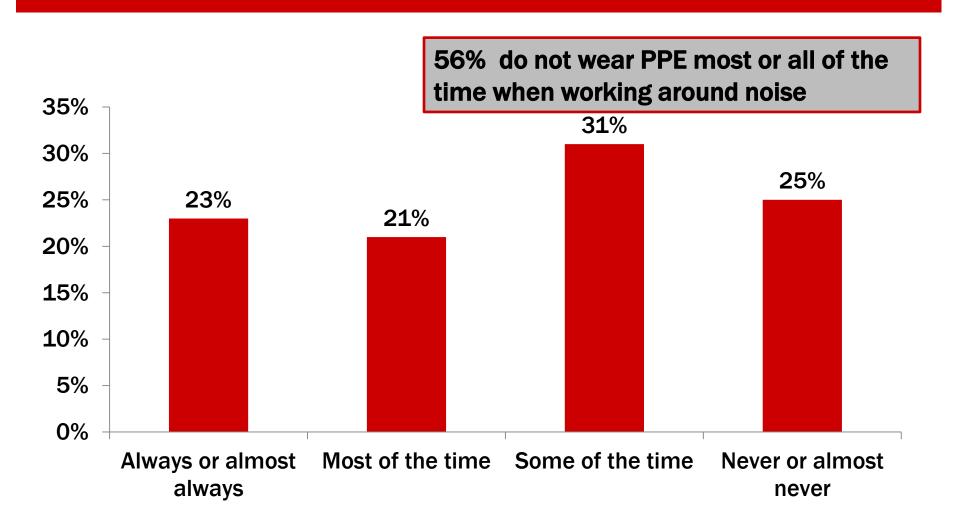
- Conducted surveys of more than 200 trainers and 4,000 workers to identify:
  - Awareness of noise hazards
  - Use of controls and hearing protection
  - Barriers to use of controls and hearing protection
  - Gaps in the types of training conducted & received



## NOISE ON THE JOBSITE - HOW OFTEN WORKERS NEED TO SHOUT TO BE HEARD



## USE OF HEARING PROTECTION WHEN WORKING AROUND NOISE



## NOISE-RELATED TOPICS THAT NEED MORE ATTENTION

- How to recognize a hazard
- Use of hearing protection:
  - ✓ How to determine when needed
  - ✓ How to select
  - ✓ Limitations on use
  - ✓ When to replace
- Risk & signs of hearing loss
- Engineering & administrative controls

### **CHALLENGES**

Reducing the risk of hearing loss

Training about hearing loss & prevention

- 1. Convincing workers of the hazard
- 2. Raising awareness of noise sources
- 3. Getting workers to apply what they learned

### TRAINERS' RECOMMENDATIONS

- 1. Create noise-related training materials for use in training programs (OSHA 10-hour, 30-hour, etc.)
- 2. Send regular notices and reminders "once is not enough."
- 3. Include regular reminders in articles, magazines, newsletters, Facebook posts, and Twitter feeds

## CONSTRUCTION NOISE & HEARING LOSS PREVENTION TRAINING PROGRAM

Goal – Respond to trainer needs for flexibility and ready access to materials that could be used for refresher training

Result – Training resources to use for a standalone class or as part of OSHA training:

- 1 Hour Module
- 30 Minute Module
- In-Class & Hands-On Refresher Exercises

# Construction Noise & Hearing Loss Prevention

Provide the necessary training to identify a noise hazard, understand the risk for hearing loss, and know what steps should be taken to work safely to prevent hearing loss

## The 1 Hour & 30 Minute Modules Cover

- 1. Why noise and hearing loss is an important issue for construction workers
- 2. The signs and effects of hearing loss and tinnitus
- Hazardous noise, types of noise, and common noise sources
- 4. How to measure noise using common indicators and free mobile applications (apps)
- 5. Ways to control noise exposure
- Types of hearing protection devices used in construction and their use

## How big is the problem?

Did you know that hearing loss is one of the most common work-related illnesses in the United States?



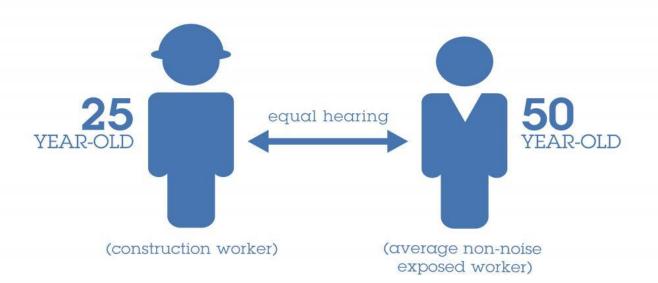
You can do something to prevent hearing loss. Buy Quiet!





## Why care about hearing loss?

It's common for construction workers to have the hearing of workers twice their age.



Is it too loud at work? Talk to your employer about quieter tools and machinery.





http://www.cdc.gov/niosh/topics/buyquiet

## Have you experienced the following...

□ Have trouble hearing people talk when there is background noise
 □ People sound like they are mumbling
 □ Often have to ask people to repeat what they say
 □ Turn up the radio or TV a lot
 □ Have difficulty hearing people on the phone

☐ Have constant ringing in your ears

## **Are You Talking to Me?**

What it's like to lose your hearing

	Exercises					
	1	2	3	4	5	
Word 1						
Word 2						
Word 3						
Word 4						
Word 5						

		Exercises				
	1	2	3	4	5	
Word 1						
Word 2						
Word 3						
Word 4						
Word 5						

			Exercises		
	1	2	3	4	5
Word 1					
Word 2					
Word 3					
Word 4					
Word 5					

	1	2	3	4	5
Word 1					
Word 2					
Word 3					
Word 4					
Word 5					

	Exercises					
	1	2	3	4	5	
Word 1	Star	Star	Star	Star	Dust	
Word 2	Few	Few	Few	Few	Stiff	
Word 3	Bathe	Bathe	Bathe	Bathe	Nest	
Word 4	Сар	Cap	Сар	Сар	Then	
Word 5	West	West	West	West	Camp	

## **Effects of Hearing Loss**

- ☐ Temporary hearing loss
- ☐ Difficulty hearing warning signals on the job
- ☐ Increase the risk of falling
- ☐ Contribute to loneliness and depression
- ☐ Increase stress, blood pressure, hypertension and cardiovascular disease
- ☐ Lead to nervousness, sleeplessness fatigue



## What causes hearing loss?

- ☐ Exposure to loud noise
- ☐ Certain drugs and chemicals
- □Aging
- □ Heredity
- ☐ Head injury
- ☐ Headphone use
- □ Childhood illness

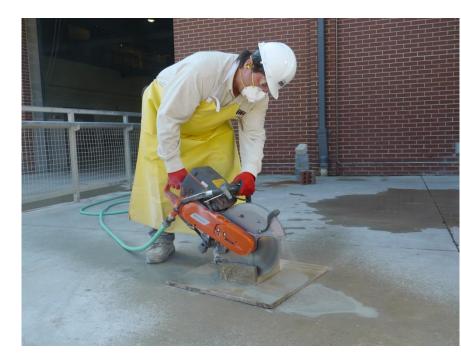


Photo courtesy of the International Masonry Institute & OSHA

## Noise Induced Hearing Loss (NIHL)

- ☐ Most common workrelated illness
- ☐ Damage to hearing depends how loud the noise is, and
- ☐ How long you are exposed to it



## How do you know if it's too loud at work?

## You have to:

- ☐Shout to be heard an arm's length away (2-3 feet)
- ☐ Turn equipment off to be heard
- ☐ Move to another location to talk & be heard
- ☐ Turn up the car radio at the end of the day

### **How Sound Is Measured**

- ☐ Sound is measured in units called **decibels** (dB) using A-weighted sound levels (dBA)
- ☐ A reduction of 3 dBA cuts the noise energy in half

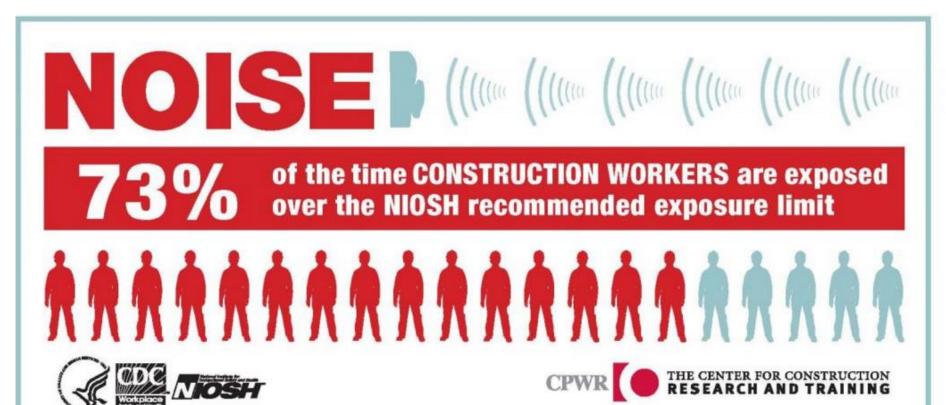
### **OSHA Noise Limits In Construction**

Permissible Noise Exposure Limits (dBA)					
Duration per	NIOSH	OSHA			
day in hours	(recommended)	(Construction			
		Standard)			
8	85	90			
4	88	95			
2	91	100			
1	94	105			
1/2	97	110			
1/4	100	115			

Source: NIOSH, Occupational Noise, Revised Criteria, 1998. Table 1-1, and OSHA, 1910.95 (b)(2); Table G-16

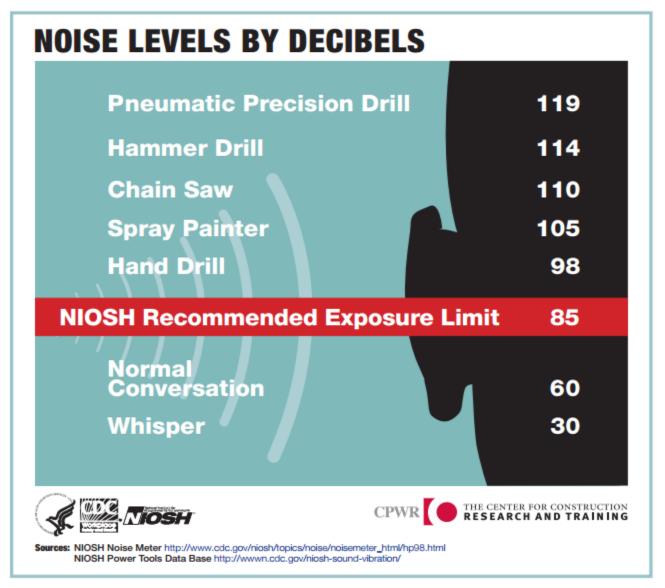
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## How frequently are construction workers exposed to dangerous noise levels?



Source: The Construction Chart Book, p. 33, chart 33f, CPWR. http://www.cpwr.com/sites/default/files/publications/CB%20page%2033.pdf

## **Noise Levels**



NIOSH Power Tools Database: <a href="https://wwwn.cdc.gov/niosh-sound-vibration/">https://wwwn.cdc.gov/niosh-sound-vibration/</a>

## **Noise Sources At Work**

■ Noise you create

☐ Noise your trade creates

□Noise from other trades

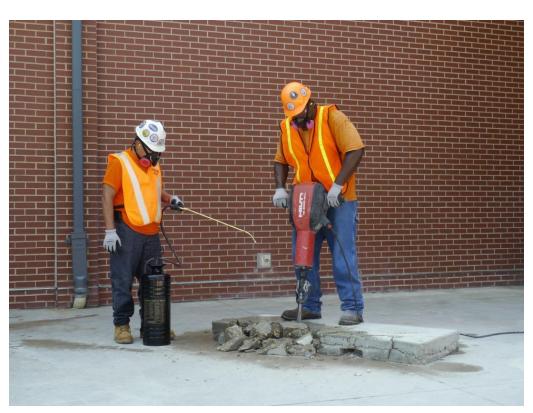


Photo courtesy of the International Masonry Institute & OSHA

### **Measuring Noise**



Source:

3-M Company website :

https://www.3m.com/3M/en\_US/company-us/all-3mproducts/~/3M-NoisePro-Dosimeter-Kit-NP-DLX-AC3-

Calibrator?N=5002385+8709322+8711405+32938435 41&rt=rud

#### **Noise Measurement Devices**



#### PERSONAL DOSIMETER

Source:
3-M Company website:
https://www.3m.com/3M/en\_US/compa
ny-us/all-3m-products/-/3M-NoiseProDosimeter-KI-NP-DLX-AC3-AC300Calibrator/NI=5002385+8709322-871
1405+32938436418/draud



#### IN-EAR DOSIMETER

Source: State Building & Construction Trades Council of California, AFL-CIO: Construction Noise & Hearing Loss Prevention training program, Funded by Federal OSHA, 2015 (courtesy of Howard Leight, Honeywell).



### SOUND LEVEL METER

Source: State Building & Construction Trades Council of California, AFL-CIO: Construction Noise & Hearing Loss Prevention training program, Funded by Federal OSHA, 2015 (courtesy of Howard Leight, Honeywell).

### **Sound Level Meter Apps**

#### **NIOSH SLM for iPhones**

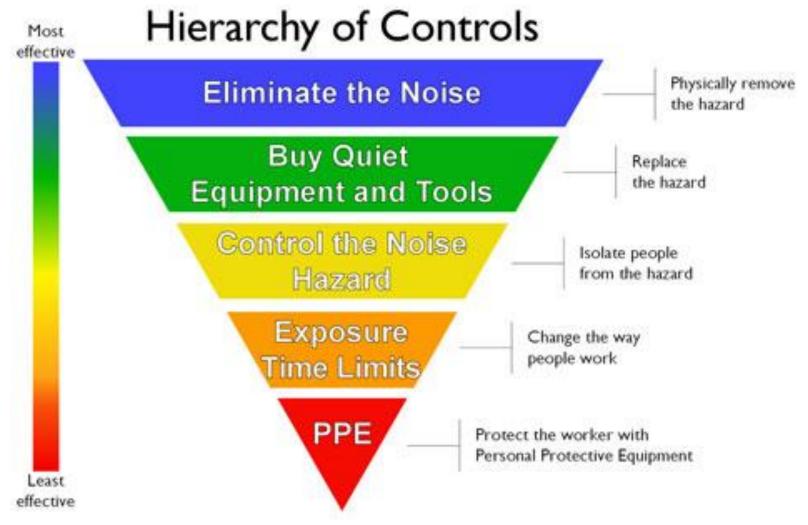
https://itunes.apple.com/us/app/niosh-slm/id1096545820?mt=8lphone app

#### **Sound Meter for Android**

https://play.google.com/store/apps/details?id=com.gamebasic.decibel



## Ways To Control Construction Noise



Source: NIOSH Workplace Safety & Health Topics, Controls for Noise Exposure

## What Employers Should Do to Protect You

☐ Plan: Before the job starts identify noisy tasks and equipment and plan for controlling noise — including buying or renting quieter equipment. ☐ Each day - do a walk-around inspection to make sure the plan is being implemented **■** Monitor noise levels ☐ Provide different types of hearing protection - one size or style may not fit all workers ☐ Conduct training on each type of hearing protection provided

## "Buy Quiet" Now, Hear Later

Repeated exposures to noise above 85 decibels OR one exposure above 140 decibels can lead to irreversible hearing loss



Buying a tool just 3 decibels lower will cut the noise energy reaching your ear in half!





http://www.cdc.gov/niosh/topics/buyquiet

## Hearing Protection Devices (HPDs)



Source: 3M Company -

https://www.3m.com/3M/en\_US/company-us/all-3m-products/~/3M-Diamond-Grade-Safety-Signs-200-299-Series?N=5002385+3294571656&rt=rud

### **Types of Hearing Protection**

- ☐ Foam (formable) plugs
- ☐ Reusable earplugs
- ☐ Custom molded plugs
- ☐Banded or semi-aural
- **□**Earmuffs



Source: State Building & Construction Trades Council of California, AFL-CIO: Construction Noise & Hearing Loss Prevention training program, Funded by Federal OSHA, 2015 (courtesy of Build It Smart.)

#### **Care and Maintenance**

#### Foam roll plugs

√ dispose of foam roll plugs after each use

#### Reusable plugs

✓ clean with soap and water, replace when damaged

#### **Custom plugs**

√ wash in mild soapy water

### **Selecting Hearing Protection**

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- □ Comfort
- □ Communication needs
- ☐Hygiene
- ☐ Hearing ability of worker
- ☐Noise level
- ■Noise reduction needed

## Advantages & Disadvantages of Different Types of Hearing Protection

Туре	Noise Reduction	Advantages	Disadvantages
Foam Plugs/ Moldable	High	Readily Available	-Hygiene Issues -Take Time to Fit
Reusable (Pre- formed Plugs)	Mid	Quick Fit	-Costly to replace
Banded/ Semi-aural	Low	Quick Fit	-Uncomfortable -If the band is hit it transfers sound to the ear
Earmuffs	High	Quick Fit	-Hot, heavy, cumbersome
Custom	Low to Mid	Quick Fit	-Costly -Replace in 3-5 yrs

Source: State Building & Construction Trades Council of California, AFL-CIO: Construction Noise & Hearing Loss Prevention training program, Funded by Federal OSHA, 2015.

## **Noise Reduction Rating (NRR)**

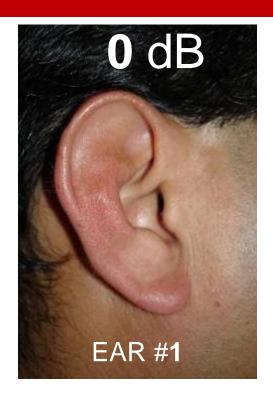
- NRR is measured in decibels
- The NRR is found on the earplug package
- The higher the NRR number, the greater the protection



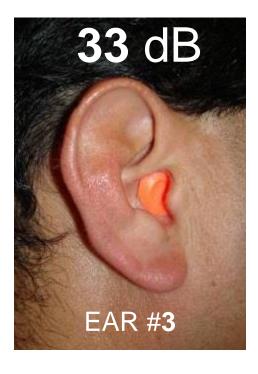
(NRR - 7)/2 = NRR reductionExposure level – NRR reduction = level of protection

(33-7)/2 = 13 95dBA – 13 = 82 dBA (level of protection)

## Hearing Protection Won't Work if it Doesn't Fit

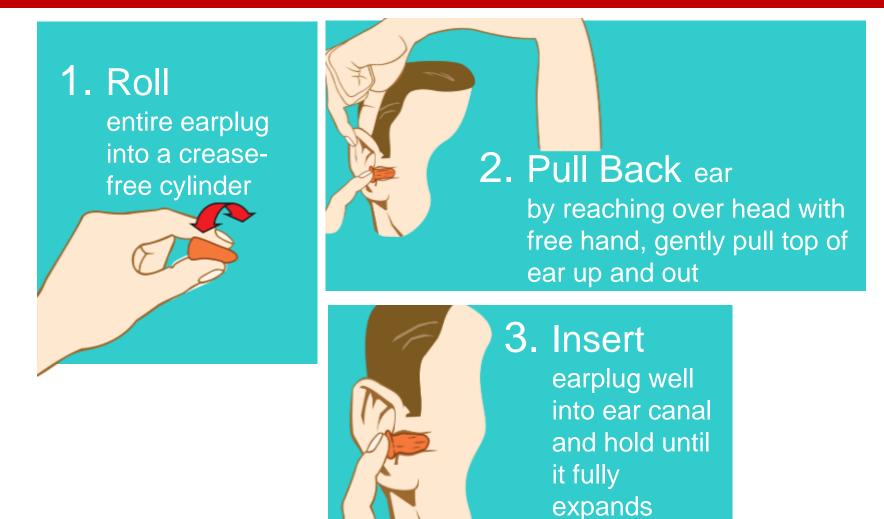






Source: State Building & Construction Trades Council of California, AFL-CIO: Construction Noise & Hearing Loss Prevention training program, Funded by Federal OSHA, 2015 (courtesy of Howard Leight, Honeywell)

## Fitting An Ear Plug



## 10-15 MINUTE IN-CLASS & HANDS-ON REFRESHER EXERCISES

Section A -- NOISE TRAINING EXERCISES FOR USE IN OSHA 10- AND 30-HOUR MODULES (SUCH AS TRAINING ON PPE, USE OF POWER TOOLS, etc.):

- Exercise A-1 The Impact of Hearing Loss
- Exercise A-2 Are You Talking To Me?
- Exercise A-3 What Does Hearing Loss Sound Like?
- Exercise A-4 How to Properly Use Ear Plugs
- **Exercise A-5** How Loud is TOO Loud?
- Exercise A-6 How Would You Describe Your Hearing?

## 10-15 MINUTE IN-CLASS & HANDS-ON REFRESHER EXERCISES

## Section B -- NOISE TRAINING EXERCISES FOR USE IN IN-CLASS FOR SKILLS TRAINING PROGRAMS:

- Exercise B-1 Cumulative Presentation: Noise & Hearing Loss The risk & prevention
- Exercise B-2 Stand-Alone Slides: Noise & Hearing Loss The risk & prevention
  - B-2 (A) Noise What are the risks?
  - B-2 (B) The Cost of Hearing Loss
  - B-2 (C) How Loud is TOO Loud?
  - B-2 (D) Preventing Hearing Loss

## 10-15 MINUTE IN-CLASS & HANDS-ON REFRESHER EXERCISES

## Section B -- NOISE TRAINING EXERCISES FOR USE IN THE HANDS-ON PORTION OF SKILLS TRAINING PROGRAMS:

- Exercise C-1 Identifying Noise Levels of Equipment (Group Activity)
- Exercise C-2 Measuring Noise Levels Throughout the Day (Individual Activity)
- **Exercise C-3** Choosing the Right Hearing Protection

## **HANDOUTS**

#### HANDOUT - ARE YOU TALKING TO ME?

	Exercises					
	1	2	3	4	5	
Word 1						
Word 2						
Word 3						
Word 4						

#### STEPS FOR INSERTING EAR PLUGS



Roll the earplug up into a small, thin
 "snake" with your fingers. You can use one
 or both hands.

 Pull the top of your ear up and back with your opposite hand to straighten out your ear canal. The rolled-up earplug should slide right in.



Hold the earplug in with your finger.
 Count to 20 or 30 out loud while waiting for the plug to expand and fill the ear canal. Your voice will sound muffled when the plug has made a good seal.

Pull Back ear

Check the fit when you're all done. Proper insertion should result in an acoustic seal, which causes a very pronounced lowering of noise levels. With earplugs inserted, cup your hands firmly over your ears and release. The earplugs should be blocking enough noise so that covering the ears with your hands results in no significant change in noise level.



Watch NIOSH show you how

Handout A4 – Small Exercises
Construction Noise & Hearing Loss Prevention Training Program





#### CHOOSING THE RIGHT HEARING PROTECTION

Reparated exposure to high noise levels can lead to permanent hearing loss. Secures construction jobsthes a confern suppose workers to these high levels of noise, you are as a much higher risk of jobsthes are some an exposure of the confernment of the industries. — In fact, one study auggest the risk is as much as 3.5 times higher among construction trade workers. It is important to use proper hearing protection whenever you are around load equipment or noise producing tasks. Selow are the different types of protection and for for using their from NICEM.

#### EXPANDABLE FOAMPLUGS

What w

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Handout (

These plugs are made of a formable material designed to expand and conform to the shape of each person; are cans. But the expandable plugs this a thin, crease-fine cylinder. Whicher jour origings with thumb and infrageror across your paint doesn't mater. Whater collect the final residual—amough tube thin enough so that about half the length will fit easily this your ear cans! Some individuals, especially women with a mail ear cansals, have difficulty rollingly plotal plugs email enough to make them fit. Afew manufactures now offer a mail date expandable plug.

#### PRE-MINITED DELISABLE PLUGS

Pre-molded plugs are made from allcone, plastic or nubber and are manufactured as either "one-sizefize-most" or are available in several daes. Many pre-molded plugsare available in daes for small, medium or face are carels.

A critical tip about pre-molded pluge is that a person may need a different doe plug for each ear. The pluge should seal the ear-carel without being uncomfortable. This takes that and error of the various date. Directions for fitting each model of pre-molded plug may differ slightly depending on how many franges they have and how the tip is shaped. Insert this type of plug by reaching over-your head with one hand to pull up on your ear. Then use your other hand to insert the plug with a gentle rocking motion until you have easied the sex cancel.

Advantages of one-molded plugs are that they are relatively inexpensive, neusable, washable, oppyenjet, to carry, and come in a variety of size. Nearly everyone can find a plug that will be comfortable and effective. In only or duty washinonments, you don't need to handle or not list be.

#### CANAL CAP

Canal caps often recemble earplage on a flexible plastic or metal band. The earplag tips of a canal cap may be a formable or pre-moded material. Some have headbands that can be som over the head, behind the neck or under the chin. Nesser models have jointed bands increasing the ability to properly sail the earolat.

The main advantage canal caps offer is convenience. When it's quiet, employees can leave the band hanging around their nects. They can quickly heart the july glow when hazardour notes exists again. Some people find the pressure from the bands uncomfortable. Not all canal caps have tight that

#### When to use Hearing Protection

Hearing protection should be used anytime the noise level is above 85 decibels. To give you an idee of what that means, normal conversation is about 50 decibels and a hand drill is 98 decibels. If you have to raise your voice to be heard by someone an arm's length away, it is probably too bud!



Noise Levels by Decibel	
Pneumatic Precision Drill	119
Hammer Drill	114
Chain Saw	110
Spray Painter	105
Hand Drill	98
OSHA Permissible Exposure Limit (PEL)	90
NIOSH Recommended Exposure Limit (REL)	85
Normal Conversation	60
Source: The National Institute for Occupational Safety & Health, https://ww	w.ofc.gov/



Not sure how loud it is?

Download the NIOSH Sound Level
Meter App in your IPhone app store!

https://www.co.go/nich/trpisshride

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#### What you need to know about **Hearing Protection**

Your employer should provide hearing protection. The louder the job, the more protection is needed. Common types include: expandable foam ear plugs, pre-molded, reusable plugs, canal caps, and earmuffs. They only protect your hearing if used correctly.



- 1. Roll entire earplug into a crease-free cylinder,
- 2. Pull Back your ear by reaching over your head with your free hand, and
- gently pull the top of the ear up and out,
  3. Insert the earplug well into ear canal, and
- Hold until it fully expands.



What type of hearing protection should I use?

NIOSH's Hearing Protector Compendium can help you decide.

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Handout C-A - Small Exercises - Construction Noise & Hearing Loss Prevention Training Program

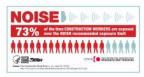
### WWW.CPWR.COM/RESEARCH/RESEARCH-PRACTICE-LIBRARY/R2P-AND-P2R-WORK/PREVENTING-HEARING-LOSS





#### r2p & p2r at Work: Preventing Hearing Loss

Hearing loss is a serious problem for workers in the construction industry, with three out of every four construction workers being overexposed to noise on a jobsite. That is why hearing loss prevention is a priority for the OSHA-NIOSH-CPWR r2p Working Group. In order to understand more about noise exposure and hearing loss prevention, CPWR used its Trainers and Researchers United Network (TRU-Net) to conduct multi-trade surveys of trainers and workers



The results of the <u>trainer</u> and worker surveys identified a need for additional training materials and new strategies to improve retention of training materials. Based on these findings, CPWR's r2p and training staff developed the **Construction Noise and Hearing Loss Prevention Training Program**. This comprehensive program includes modules and exercises that can be used on their own or as part of OSHA training programs:

- 1 Hour Elective Module. Provides instructors/trainers with the information needed to successfully fulfill the OSHA 30-hour training program requirement for training on a health hazard.
  - Instructor Manual
  - Presentation
- 30 Minute Elective Module. Designed to fulfill the OSHA 10-hour training program requirement for a ½ hour training module on a health hazard. Alternatively, it can be used for a portion of the OSHA 30-hour health hazard training requirement.
  - Instructor Manual
  - Presentation
- In-Class & Hands-On Refresher Exercises. A series of short (5-10 minutes) exercises designed to reinforce and
  apply lessons learned about noise hazards and hearing loss prevention. It includes materials that can be incorporated
  into safety and health training modules (e.g., PPE, power tools, etc.) or as part of a hands-on skills training program.
  - Instructor Manual
  - Presentations for Noise Training Exercises for use in OSHA 10- & 30-Hour Modules
    - Exercise A-1: The Impact of Hearing Loss
    - Exercise A-2: Are you talking to me?
    - Exercise A-3: What does hearing loss sound like?
    - Exercise A-4: How to Properly Use Ear Plugs

## **QUESTIONS?**

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