### **Hearing Conservation Program**



### Hazard

- Workplaces are filled with loud noises, which over time can cause permanent damage that results in hearing loss. This occupational condition is known as noiseinduced hearing loss (NIHL).
- Noise is logarithmic: as the noise level increases, the sound pressure on the eardrums increases exponentially.
  - Example:
    - 20 dB is 10 times more intense than 10 dB.
    - 30 dB is 100 times more intense than 10 dB.



### Hazard

- Some workplaces at uOttawa are noisy.
- In response, we have developed the *Hearing Conservation Program*, which includes ongoing procedures to identify, assess, and control noise that could be harmful.
- This brief presentation outlines the components of the program and the control measures in place to preserve your health and safety.



### **Effects of Noise on Hearing**

- Acoustic trauma acute damage
- **Tinnitus** ringing or buzzing in the ear
- **Temporary hearing loss** occurs immediately after exposure to high noise level. Gradual recovery
- Permanent hearing loss usually results from chronic exposure. Not noticeable at first, it is often noticed too late.



### **Types of Hearing Loss**

- Conductive occurs in the outer/middle ear and results in the loss of our ability to detect "loudness"
- Sensorineural occurs in inner ear, where hair cells are located
- Mixed occurs as a result of both of the above



# Types of Hearing Loss (cont.)

- Central nervous system occurs between inner ear and brain; may not be caused by exposure to noise
- Psychogenic occurs in the mind and may be the result of emotional trauma



# **Major Causes of Hearing Loss**

- Obstruction and/or disease
- Acoustic trauma
- Presbycusis (age-related hearing loss)
- Sociocusis (socially related hearing loss)
- Noise induced hearing loss (occupationally related)



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## How Loud Is ...?





## **Occupational Health and Safety Act**

- Ontario Regulation 381/15 applicable to all workplaces.
- Employers must take all measures reasonably necessary to protect workers from exposure to hazardous sound levels.
- Every employer shall ensure that no worker is exposed to a sound level greater than or equivalent to 85 dB(A)  $L_{ex.8.}$



### **Occupational Health and Safety Act**

 Three (3) decibel exchange rate: the permissible exposure time is halved for every 3 dB increase in sound pressure level

Exposure Time	Decibel Level
8 hours	85
4 hours	88
2 hours	91
1 hour	94
30 minutes	97
15 minutes	100



## **Occupational Health and Safety Act**

- Whenever possible, employers shall protect workers by using a hierarchy of controls prior to using personal protective equipment.
- A clearly visible warning sign shall be posted at all approaches to an area where the sound level *regularly* exceeds 85 dB(A).
  - uOttawa has adopted a more conservative level of 80 dB(A).



## **Control Measures**





### **Personal Protective Equipment (PPE)**

- Last resort for worker protection. Does not remove hazard, only protects the wearer and is only effective if worn and fitted correctly
- Predominantly roll-down ear plugs/ earmuffs
- Noise reduction rating (NRR) achieved in ideal, laboratory conditions
- iPods are not PPE





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### **Personal Protective Equipment (PPE)**



Fitting foam earplugs (video)



### **Noise Reduction Rating**

- Example you're at a rock concert where the noise level is 100 dB. You like the music, but you value your hearing too. You decide to wear roll down earplugs with a NRR of 33dB.
- What is your level of exposure?
  - 100 dB
  - 67 dB
  - 75 dB
  - 87 dB



# **Noise Reduction Rating**

- While the noise reduction rating (NRR) is measured in decibels, the selected protection does not reduce the surrounding decibel level by the exact number of decibels indicated on the package.
- The NRR is achieved in laboratory trials, assumes optimum and proper fit, etc.





# **Noise Reduction Rating (NRR)**



- To determine the actual amount of decibel attenuation:
  - Take the NRR number (in dB) = 33 dB
  - Subtract seven = 26
  - Divide by two = 13
- So:
  - 100 dB rock concert with 33 dB NRR means that your new exposure level is 87 dB.
- If doubling up HPDs, add 5 dB to the higher NRR value.



# **Audiometric Testing**

- Testing is a form of secondary prevention for at-risk personnel.
- We monitor current levels of exposure and the natural degradation of hearing.
- Typical process involves listening for tones: i.e., the test subject signals when they can hear a particular tone.
  - The Workplace Safety and Insurance Board (WSIB) posts a basic version at <u>http://toneitdown.ca</u>



# **Audiometric Testing**

- Testing is voluntary, although strongly encouraged, and is provided free to at-risk personnel. Testing is coordinated by Health and Wellness.
- Workers are notified of the outcomes. Results are confidential to the extent required by law.
- We encourage at-risk personnel to take:
  - Baseline audiogram within 6 months of starting their employment
  - Every 2 years thereafter
  - Upon termination of employment



### **Tone It Down**

Age of your ears Starting from the top, click on each frequency to see how old your ears are.		
3 000 Hz	»®	÷
8 000 Hz	»®	÷
13 000 Hz	»@	÷
15 000 Hz	»@	÷
19 000 Hz	»@	÷

#### Age of your ears (activity)



### **At-Risk Workplaces**

- The power plant
- Mechanical rooms (including basements, attics, etc.)
  - Limited noise exposure in small houses
- Generator rooms, when active
- Workshops and laboratories
  - For both direct **and** indirect users





# **At-Risk Occupations**

- Facilities workers (e.g. power plant workers, trades including mechanical, electrical, plumbing, architectural, grounds, project managers)
- Workshop/laboratory personnel (e.g. PIs, technical officers, animal care personnel, etc.)
- Musicians (including the headphone generation)
- Information Technology personnel



### **Campus Inventory**

- Major buildings (i.e. those presenting the greatest risks) have been assessed for noise levels
  - Specific workplaces (e.g. power plant, laboratories, workshops, etc.) are assessed at the supervisor's request
- We try to find hazard controls to eliminate or reduce noise levels, where possible
- Regularly "noisy" areas (i.e. those over 80 dB) are identified with signage and HPDs nearby.



# Warning Sign





### **Example HPD Installation Near Hazard Zone**





# **Sound Measuring Equipment**

- uOttawa is equipped with:
  - REED SL4012 sound level meter intended for spot-checking potential exposure, identifying potential need for further evaluation, etc.
  - Quest NoisePro Dosimeter intended for longer-term sampling and computes overall noise level and dose.







### **Health and Safety Committee**

- Health and safety committee continues to be involved regularly in this program.
- February 2018 Facilities and Protection Functional Occupational Health and Safety Committee
  - 5. AFFAIRES DÉCOULANTS DE LA DERNIÈRE RÉUNION | LAST MEETING BUSINESS
    - 5.1. Hearing Conservation Program

As a follow-up from the last H&S committee meeting, the Hearing Conservation program document was sent to the committee members for their review. A member asked whether the document included measurements in server rooms. Graham answered in fact that noise measurements had been taken in several server rooms around Campus. The committee was asked to send any additional comments/questions to Guy prior to March 16, 2018.



### **uOttawa Services**

- For all employee health-related concerns, or for audiometric testing information:
  - Health and Wellness Sector, Human Resources
    - Ext. 1473 | <u>hrhealth@uOttawa.ca</u>
- For requests for basic sound level testing, information on hearing protection devices, or information on Ontario legislation:
  - Office of Risk Management
    - Ext. 5892 | <u>safety@uottawa.ca</u>



# Quiz

 Successful completion of this workshop requires that log in and complete the knowledge assessment. Only successful <u>completion of the knowledge assessment</u> will log your mark in the LRS system.

