



# **East Carolina University**

## **Office of Environmental Health & Safety**

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## **Hearing Conservation Program**



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## 1. Introduction

This program is developed to protect employees of East Carolina University whose essential job duties expose them to noise levels that equal or exceed an 8-hour time-weighted average of 85 decibels on the A scale (slow response) or equivalently, a dose of fifty percent as contained in OSHA 29 CFR 1910.95 standard. The standard requires that when employees are exposed to sound levels exceeding the permissible noise exposures limit, adequate engineering or administrative controls shall be utilized. In the event of failure of such controls to reduce the noise levels, the use of personal protective equipment shall be used within the approved limits. Therefore, this program provides the minimum steps required by all affected departments in ensuring that the goal of the University's Hearing Conservation Program is successfully achieved.

## 2. Scope

The implementation of this program shall apply to employees of East Carolina University. Focus will be on departments or operations that are known to generate elevated noise levels which include but not limited to the following:

- Steam plant
- Grounds
- Masonry and Carpentry Workshops
- Some clinical and non-clinical labs
- Animal sounds at Department of Comparative Medicine
- Gas powered tools (weed trimmers, leaf blowers, chainsaws, concrete saws, etc.)
- Shop tools (table saws, grinders, etc.)
- Electric tools (hammer drills, grinders, etc.)
- Metal fabrication (pounding metal with hammers)
- Mowers (riding and push)
- Snow blowers
- Wind tunnel
- Jackhammers (electric and pneumatic)
- Smoke / fire alarms.
- Computer servers (large banks of machines in enclosed rooms)
- Feed / animal bedding shredders
- Cage washers and process
- Chiller compressors in mechanical rooms
- Concerts, Football games etc.
- Acoustics labs
- High pressure combustion labs
- Engineering labs
- Waste water treatment plant compressors and pumps
- Air compressors
- Ventilation systems in some shops and labs
- Shredders (large library archive machines)

### **3. Responsibilities**

The following are responsible for the successful implementation of this program:

#### **3.1 Office of Environmental Health and Safety**

- i. Conduct walkthrough inspection on campus to identify areas and activities that generate high noise levels by performing noise exposure assessment or sound level measurements.
- ii. Conduct noise hazard training periodically, support department and supervisors in coordinating departmental training. Document and update training records accordingly.
- iii. Coordinate and implement Hearing Conservation Program by ensuring that noise hazards are eliminated or reduced below the permissible exposure limits for the safety of employees.
- iv. Manage the identification and selection of NIOSH approved hearing protection for adequate noise reduction control.
- v. Work with department, supervisors and the Office of Prospective Health in performing audiometric testing, when required, and ensuring the baseline hearing program is effective.
- vi. Ensure documentation of noise exposure assessments. Maintain a database of noise monitoring investigation.

#### **3.2 Office of Prospective Health**

- i. Conduct audiometric testing and provide training to employees regarding their exposure.
- ii. Provide baseline, annual and post-employment audiometric exams to employees at no cost. Ensure audiometric test results are kept for the entire duration of the affected employee's employment.
- iii. Provide results of audiometric testing to employee and/or supervisor as necessary
- iv. Support the Office of Environmental Health and Safety in implementing this program.

#### **3.3 Department Heads, Supervisors and/or Principal Investigators**

- i. Ensure areas of high noise potential are reported.
- ii. Ensure the contents and guidelines of this program are explained to employees in addition to providing them with the required training, protection devices and audiometric testing.
- iii. Implement control measures for high noise areas. Areas with high noise hazard must have a warning hazard indicated to alert personnel working or visiting that location.

### 3.4 Employees

Affected employee enrolled in the Hearing Conservation Program must comply with the implementation of this program by:

- i. Wearing hearing protection devices provided by supervisors or EH&S.
- ii. Handling and maintaining hearing aids in accordance with manufacturers' instructions.
- iii. Participating in training programs.
- iv. Complying with baseline and audiometric testing as required.
- v. Reporting noise hazard to supervisor or the EH&S office directly.

## 4. Definitions

**Action level:** Means the level of noise exposure at or above which employees must be included in a hearing conservation program. This is 85 A-weighted decibels, or 85 dBA over an 8-hour TWA.

**A-Weighting:** The scale used in the measurement of occupational noise that approximates the hearing response of human ear.

**Attenuate:** Means the reduction in strength or intensity of sound.

**Audiogram testing:** Monitors the sharpness and acuity of a person's hearing over time.

**Audiometer:** An instrument for measuring the threshold of hearing or hearing ability.

**Baseline Audiogram:** An audiogram against which future audiograms are compared.

**Continuous Noise:** Means noise with a constant and prolong signal over a long period of time.

**Decibels (dB):** A logarithmic scale measurement of sound level intensity where the sound pressure corresponds to a 6dB increase in level.

**Hearing Conservation:** An approach required by OSHA that involves the administration of a written program whenever employee noise exposure equal or exceed an 8-hour time weighted average of 85dBA measured on the A scale (slow response) or an equivalent dose of fifty percent.

**Hearing Protection Devices:** Refers to barriers that reduce the amount of sound level or intensity transmitted to a person's inner ear/eardrum.

**Noise:** An unpleasant sound.

**Noise Dosimeter:** A specialized instrument that measures the noise exposure of a person integrated over a period of time.

**Noise Induced Hearing Loss:** This is a permanent hearing impairment resulting from prolonged exposure to high levels of noise.

**Noise Reduction Rating (NRR):** Relating to a hearing protection device (HPD), a theoretical unit used to determine its (HPD) effectiveness in reducing the effect of sound if worn correctly.

**Presbycusis:** Means loss of hearing that occurs in most individuals which is due to aging.

**Permissible Exposure Limits:** This is the legal limit of 90dBA for an 8-hour Time Weighted Average that an employee must not be exposed beyond as regulated by the Occupational Health and Safety Administration (OSHA).

**Sound:** This is a pressure wave which is created by a vibrating object.

**Sound Level Meter:** This is a hand held instrument with microphone that is used for measuring sound that travels through air.

**Standard Threshold Shift:** This is a change in hearing threshold, relative to baseline audiogram for a particular employee of an average of 10 decibels (dB) or more at 2000, 3000, and 4,000 hertz (Hz) in one or both ears.

**Temporary Threshold Shift:** This is a temporary loss of hearing that occurs immediately after exposure to a high level of noise. This occurs usually at frequencies ranging from 4000 to 6000 hertz.

**Time Weighted Average Sound Level:** Refers to an employee daily exposure to occupational noise (normalized to an 8 hour day), with consideration to the average levels of noise and the time spent in each area.

## 5. Program Elements

This program includes the following OSHA required elements:

- Noise exposure evaluation (monitoring and notification)
- Audiometric testing
- Provision of hearing protection
- Employee education and training
- Record keeping

### 5.1 Noise exposure evaluation

- i. The Office of Environmental Health and Safety will identify high noise areas through routine inspections and in response to employee concerns. Departments Managers can request EH&S to evaluate any area in their department that is perceived to have high noise levels.

- ii. Exposure monitoring, if warranted, will be performed by EH&S when information indicates that employee exposure is at or above an 8-hour time-weighted average of 85decibels.
- iii. The sampling strategy shall be designed to identify employee for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.
- iv. All continuous, intermittent and impulsive sound levels from 80 to 130 decibels shall be integrated into the computation of an 8-hour time weighted average.
- v. Where circumstances such as high worker mobility, significant variation in sound level, or a significant component of impulse noise make an area monitoring generally inappropriate, representative personal sampling shall be substituted.
- vi. Noise monitoring shall be conducted in accordance with OSHA requirements. Monitoring shall be repeated whenever a change in production, process, equipment or control increases noise exposure such that additional employee may be exposed at or above the action level or the attenuation provided by the hearing protectors being used is no longer adequate.
- vii. Results of employee noise exposure monitoring shall be communicated to employee, whether such result is below, at or above the action level.

## **5.2 Audiometric Testing**

The audiogram testing is an essential element of the hearing conservation program. It compares the baseline audiogram to successive annual audiograms. Thus, it helps to determine the effectiveness of the Hearing Conservation Program or whether a noise induced hearing loss (NIHL) has occurred. The audiogram shall be performed on these occasions:

- i. Pre-placement, or where not feasible:
  - Within 6 months of an employee's first exposure at or above the action level.
  - Annually as long as the employee exposure is constant at or above the action level
  - During reassignment from a noise hazard environment and/or
  - At the termination of employment
- ii. Audiometric testing will be provided by the Office of Prospective Health to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels. Audiometric testing shall be provided at no cost to employees.
- iii. At least annually after obtaining a baseline audiogram. A new audiogram will be performed for each employee exposed at or above an 8-hour time-weighted average of 85 decibels. OSHA requires that baseline audiogram be preceded by at least 14 hours without exposure to workplace noise. Hearing protection devices may be worn during this time as a substitute for this requirement.



- iv. Each employee annual audiogram shall be compared to the initial baseline audiogram to determine if the audiogram is valid. Also, to establish if a standard threshold shift (STS) has occurred or whether there is a need for further evaluation.
- v. The Office of Prospective Health shall inform employee of audiogram results within 21 days of testing –whether or not there is indication of a work-related standard threshold shift.

### **5.3 Provision of hearing protection**

- i. Hearing protectors will be provided by affected departments when employee is exposed to an 8-hour time-weighted average of 85 decibels or greater. Employee with documented standard threshold shift or without a baseline audiogram shall use hearing protectors if the noise exposure levels is at or above the action level of 8-hour time weighted average.
- ii. Hearing protectors shall be replaced as necessary. Employees will be given the opportunity to select hearing protector from a variety of suitable hearing protectors.
- iii. Hearing protector must attenuate the noise level to an 8-hour time weighted average (TWA) of 90dBA or less.
- iv. The department shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

### **5.4 Employee education and training**

- i. The Office of Prospective Health, in conjunction with the Office of Environmental Health and Safety will train affected employees. Training program shall be repeated annually for each employee included in the hearing conservation program.
- ii. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.
- iii. Training program shall include a brief review of the OSHA standard, the effects of noise on hearing; the purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and the purpose of audiometric testing, and an explanation of test procedures.

### **5.5 Recordkeeping**

Records of hearing exposure assessment including audiometric testing will be maintained as contained in the standard. Records shall be retained for at least 2 years by the Office of Environmental Health and Safety.

Prospective Health will maintain audiometric testing records as part of the employee's medical history record. These records shall include:

- Name and job classification of the employee

- Date of the audiogram
- Examiner's name
- Date of the last acoustic or exhaustive calibration of the audiometer and
- Employee's most recent noise exposure assessment and the measurement of the background sound pressure levels in the audiometric test rooms.

Records of audiometric test results shall be retained for the duration of the affected employee's employment.

## Appendix

### OSHA PERMISSIBLE NOISE EXPOSURE STANDARD RANGE

DURATION PER DAY (HOURS)	SOUND LEVEL DBA (SLOW RESPONSE)
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

[OSHA Occupational Noise Exposure Standard 29 CFR 1910.95](#)

[OSHA's recommendation for an effective Hearing Conservation Program](#)