

CALIFORNIA STATE UNIVERSITY, FRESNO

HEARING CONSERVATION PROGRAM



Office of
Environmental Health and Safety

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Hearing Conservation Program

1.0 Regulatory Authority

California Code of Regulations, Title 8, Article 105, Sections 5095 to 5100 (see Appendix A); and Title 29, Code of Federal Regulations, Section 1910.95.

2.0 Policy

2.1 It is the policy of California State University, Fresno to establish and maintain effective noise control and hearing conservation programs designed to eliminate or control, as so far as is reasonable and practical, overexposure to harmful noise among students, faculty, and staff.

2.2 The University shall identify noisy areas on campus and shall take steps to protect personnel who work in these areas. When noise cannot be controlled by administrative and engineering controls, the University shall distribute hearing protectors to all employees exposed to an 8-hour time-weighted average noise level of 90 decibels or greater. Under certain conditions, employees shall be required to use hearing protectors.

2.3 The University shall provide at no cost to employees a hearing exam program designed to provide safe job placement, satisfactory maintenance of hearing, and to ascertain the effectiveness of noise control methods.

3.0 Purpose

The purpose of this program is to establish a coordinated approach toward controlling excessive occupational noise exposure as directed by University policy and state law.

4.0 Scope

The Hearing Conservation Program affects all employees exposed to an 8-hour time-weighted average noise level of 85 dBA or greater. These levels either have been or may potentially be found in the following departments:

- Boiler/Chiller Plant
- Carpenter's/Metal Shop
- Groundskeeping
- Theatre Arts Scene Shop
- Print Shop
- Agricultural Mechanics Shop

All other employees that believe they are working in an environment above 85 dBA TWA should notify the Office of Environmental Health and Safety/Risk Management.

5.0 Control of Noise Exposure

The State of California and the Federal Government regulate a worker's exposure to noise. The regulations set exposure limits and detail the University's responsibilities when the limits are exceeded.

The following is a summary of the safety orders regulating exposure of workers to occupational noise. The actual regulations are attached for reference (See Appendix D).

5.1 Hearing Conservation Program

When workers are exposed to an 8-hour time-weighted average (TWA) of 85 decibels (dBA) or greater, the university must institute a hearing conservation program. This program will include monitoring of exposure, an audiometric testing program for all exposed workers and an expert evaluation of the test results.

Required audiometric testing must be conducted by an expert (licensed audiologist, otolaryngologist, qualified physician, or trained technician). The

results will be made available to employees. Annual audiograms are compared with the baseline audiogram to determine if there has been any deterioration of the worker's hearing (threshold shift).

5.2 Hearing Protectors

Workers must wear hearing protectors when:

5.2.1 They are exposed to a sound level in excess of the limits set in Section 5096(b); or

5.2.2 They are exposed to a sound level of 85 dBA or greater and have experienced a standard threshold shift in hearing, or are required by Section 5097(c)(9).

Hearing protectors shall be made available to workers when the sound level exceeds an 8-hour TWA of 85 dBA.

5.3 Training Program

Workers who are exposed to noise at or above an 8-hour time-weighted average of 85 dBA shall participate in an annual training program. The program will include the effects of noise on hearing, the purpose and effectiveness of hearing protectors, and the purpose of and an explanation of audiometric testing.

5.4 Recordkeeping and Records Access

The employer will maintain records of exposure measurements for at least two (2) years; and audiometric tests for the duration of the affected employee's employment.

These records must be made available upon request to employees, former employees, employee representatives (with prior written approval from the affected employee), and authorized representatives of the Division of Occupational Safety and Health.

6.0 Responsibilities

6.1 Human Resources

- 6.1.1 New employees assigned to work in areas listed in Section 4.0 shall be referred to the Office of Environmental Health and Safety to determine if a baseline audiogram is required.
- 6.1.2 If an audiogram is required, it shall be performed within the first two weeks of the employee's assignment.
- 6.1.3 An exit audiogram shall be given to every separating employee who has been a participant in medical monitoring. This exam shall be performed prior to the employee's last day of employment.

6.2 Office of Environmental Health and Safety/Risk Management (EH&S/RM)

- 6.2.1 Coordinate the campus Hearing Conservation Program, providing consultation to departments according to their specific needs.
- 6.2.2 Conduct noise surveys in response to department requests or upon EH&S/RM's initiative.
- 6.2.3 Assist departments in developing methods for noise abatement, reduction or control.
- 6.2.4 Establish and conduct an audiometric testing program for appropriate employees, providing consultation and notification of exam results.
- 6.2.5 Maintain and make available records of exposure measurements and audiometric tests.
- 6.2.6 Maintain records of general training activities.

6.3 Departments

- 6.3.1 Ensure that noise control is considered when procuring equipment, machinery and tools.
- 6.3.2 Identify noisy work areas that may overexpose employees to harmful levels of noise and notify the Office of EH&S/RM.
- 6.3.3 Develop methods for noise abatement, reduction or control.
- 6.2.4 Purchase personal protective devices.
- 6.3.5 Train or arrange training for employees covered by the Hearing Conservation Program; and ensure that they read, understand and comply with all appropriate procedures.
- 6.3.6 Ensure that appropriate personal protective equipment is provided to appropriate employees; enforce the use of such devices when required; ensure that such devices are kept in good repair and maintained in a sanitary manner.
- 6.3.7 Ensure that employees are made available for audiometric testing when such testing is required.

6.4 Employees

- 6.4.1 Employees are ultimately responsible for the wearing of hearing protection whenever working in noisy environments.
- 6.4.2 Read and comply with all appropriate hearing conservation safety procedures while performing assigned duties.
- 6.4.3 Use common sense and good judgment at all times; the unlimited number of potential hazards that may exist or be created in the work place is sometimes unpredictable.

7.0 Sound Levels

The table in Appendix A shows some common equivalents of sound levels in decibels (dBA). Exposure to noise with a loudness of 80 dB is annoying. It is roughly equivalent to the noise level of an alarm clock about two feet from your ear. Exposure to 90 dBA can cause physical damage to the ear. At about 120 dBA, hearing actually becomes painful and damage to hearing, certain and rapid. Appendix B lists the average measured noise level output of equipment used at California State University, Fresno.

8.0 Effects of Overexposure

8.1 The ear has three sections (See Appendix C). The outer ear helps to direct sound into the auditory canal. The middle ear, separated from the outer ear by the eardrum, consists of three connected bones which transmit the vibrations of the eardrum to the inner ear. In the inner ear a coiled hearing organ, the cochlea, transforms the vibrations into nerve impulses for transmission to the brain along the auditory nerve. The cochlea is lined with cells equipped with tiny hairs and is filled with liquid. As the liquid moves in response to the vibrations of the bones of the middle ear, the hairs move, sending nerve impulses to the brain for decoding. The effects of continued overexposure to noise are the destruction of the hair cells and a permanent loss of hearing.

8.2 The first warning of hearing loss is often the inability to hear high frequency sounds. People with hearing deficiencies caused by overexposure to noise lose sensitivity to sound at about 4,000 Hz, the approximate frequency of a bird's song or a voice on the telephone. If the overexposure continues, the range will gradually be extended until the entire hearing is affected. As more and more hair cells of the inner ear are destroyed, the ability to hear is progressively and permanently reduced. Damaged hair cells cannot be repaired or replaced. As a person loses sensitivity to higher frequencies, sound becomes distorted. A person may be able to hear a conversation but not be able to understand it. The use of a hearing aid makes the sound louder, but it is still distorted.

8.3 Overexposure to noise affects the entire body. It is associated with tinnitus (ringing in the ears), increased pulse rate, hypertension, increased secretion of certain hormones, tiredness, nervousness, sleeplessness, and other symptoms of stress.

9.0 Noise Survey

9.1 How can you tell there is a noise problem where you work? Common indications of overexposure to noise are temporary hearing loss and muffled speech, ringing in the ears after leaving the work area, or difficulty hearing normal speech in the work area.

9.2 If you suspect that there is a noise problem, the next step is to request a noise survey. The purpose of the survey is to measure the noise levels workers are exposed to, find the source of the noise, and determine what corrective measures to take, if any. If a noise survey is needed, the affected employee may inform his/her supervisor who will in turn request this service from the Office of Environmental Health and Safety/Risk Management.

10.0 Controlling Noise

If the noise survey reveals an overexposure problem, the following are alternative ways to reduce the exposure to within acceptable limits.

10.1 Administrative Controls

These may also be referred to as operational controls. These controls limit the length of time workers are exposed to the noise in the work area. This involves assigning the worker to less noisy areas in the workplace so that the average of his/her daily exposure is less than the permissible exposure limit. The choice of which kind of controls to use is governed by the particular noise control problem being encountered.

10.2 Engineering Controls

Noise levels can be controlled by making changes in the machinery, the way the machinery operates, or the design of the structure in which the machinery is housed. Engineering controls include barriers, damping, isolation, muffling, noise absorption, mechanical isolation, variation in force, pressure or driving speed, and combinations of these and other means of reducing noise emissions. The way that these solutions are applied depends on the particular source of the noise and the characteristics of the noise being produced. The practical application of noise controls requires the services of an experienced and innovative engineer.

10.3 Personal Protective Equipment

When administrative and/or engineering controls either fail to reduce noise to within required limits or are not technologically feasible. Hearing protectors must be used.

When either ear muffs or ear plugs are used, the department should have a sufficient variety to ensure that workers can get a good fit. Protective devices should be both effective and comfortable.

Sized ear plugs are made of safe, flexible material which will conform to the shape of the wearer's ear canal. Other plugs are malleable, made of cotton, paper, plastic, and other materials. They can be thrown away after each use and are designed to fill all ears.

When ear muffs are used, make sure that the seal between the muff and the head is tight. Long hair, glasses, and other obstructions may diminish the effectiveness of the device.

Appendix A

Common Equivalent Sound Levels in Decibels

<u>Sound Level (dBA)</u>	<u>Example of Common Equivalent Sound</u>
0	Hearing Threshold
20	Whisper
40	Average Library
50	Average Office
60	Ordinary Conversation
70	Freight Train @ 100 ft
80	Noisy Restaurant
90	Printing Plant
100	Sports Arena
110	Wood/Metal Shop
120	Siren @ 100 ft
140	Jet Aircraft Takeoff
180	Rocket Launch

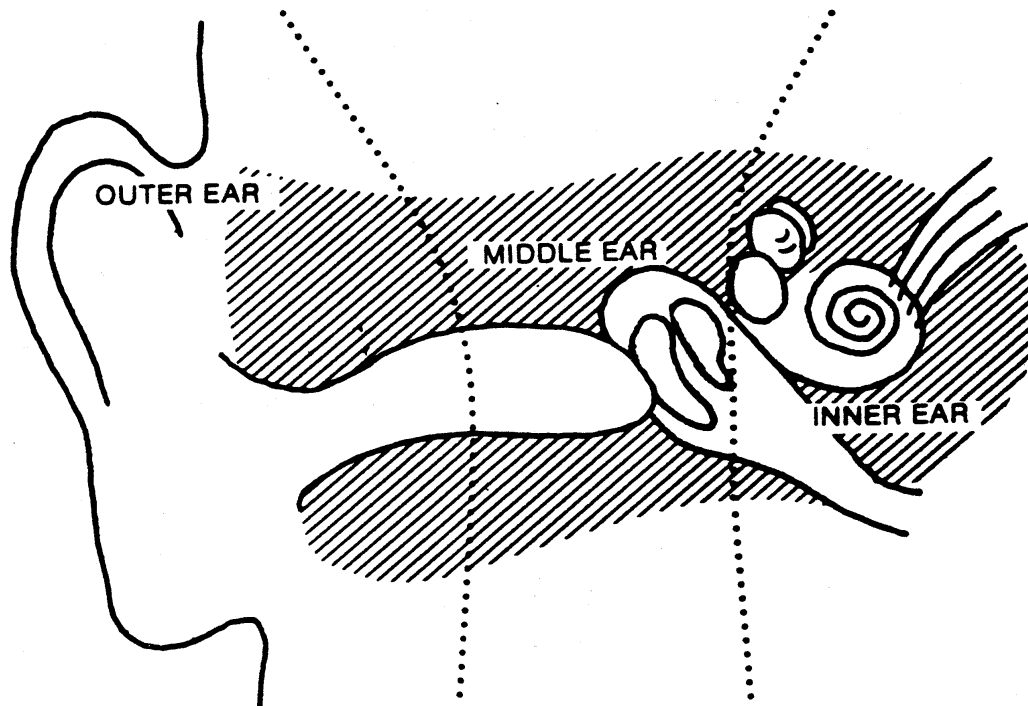
Appendix B

Noise Level Output of Equipment

<u>Equipment</u>	<u>Sound Level (dBA)</u>
Chain Saw	112
Jackhammer	110
Radial Saw	108
Table Saw	104
Planer	104
Leaf Blower	101
Jointer	96
Grinder	95
Concrete Saw	94
Rotary Mower	92
Grass Cutter	91
Belt Sander	91
Band Saw	88
Lathe	84
Disc Sander	83
Photocopier	78

Appendix C

Effects of Overexposure on the Human Ear



The ear has three sections. The outer ear helps to direct sound into the auditory canal. The middle ear, separated from the outer ear by the eardrum, consists of three connected bones which transmit the vibrations of the eardrum to the inner ear. In the inner ear a coiled hearing organ (the cochlea) transforms the vibrations into nerve impulses for transmission to the brain along the auditory nerve. The cochlea is lined with cells equipped with tiny hairs and is filled with liquid. As the liquid moves in response to the vibrations of the bones of the middle ear, the hairs move sending nerve impulses to the brain for decoding.

The effect of continued overexposure to noise is the destruction of the hair cells and a permanent loss of hearing. As more and more hair cells of the inner ear are destroyed, the ability to hear is progressively and permanently reduced. Damaged hair cells cannot be repaired or replaced.

Overexposure to noise affects the entire body. It is associated with tinnitus (ringing in the ears), increased pulse rate, hypertension, increased secretion of certain hormones, tiredness, nervousness, sleeplessness and other symptoms of stress.