

---

---

# Hearing Conservation



Texas Department  
of Insurance



Wear a Protective Hearing Device NOW...  
or Wear a Hearing Aid LATER.

Provided by

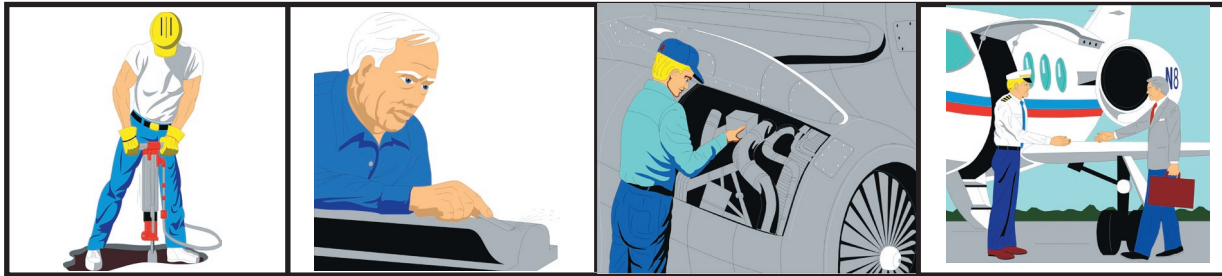
Workers'  
Health & Safety

HS98-120C(6-05)

# Contents

<b>Introduction</b> .....	1
Noise and It's Effects .....	1
<b>Table 1 - Decibel Chart</b> .....	2
Determine if a Program is Required .....	3
<b>Steps for Creating an Effective Hearing Conservation Program</b> .....	3
<i>Program Administrator</i> .....	3
<i>Identify Noise Hazards</i> .....	3
<i>Quantify Employee Exposure to Noise</i> .....	4
<b>Table 2 - Permissible Noise Exposures</b> .....	4
Perform Medical Auditory Evaluations .....	5
<b>Select Hearing Conservation Measures</b> .....	5
<i>Engineering Controls</i> .....	5
<i>Administrative Controls</i> .....	5
<i>Personal Protective Equipment (PPE)</i> .....	5
Issue Personal Protective Equipment .....	5
Conduct Training .....	5
Program Review .....	5
The Role of Managers and Supervisors .....	5
Hearing Protection Devices .....	6
<b>Summary</b> .....	6
<b>Table 3 - Hearing Conservation Program Flowchart</b> .....	7

# HEARING CONSERVATION



### Introduction

Millions of people are exposed to hazardous noise on and off the job. Fortunately, hearing loss caused by noise can be prevented. This information provides supervisors a basic knowledge of noise, hearing, and the effects of noise on hearing. 29 CFR 1910.95 (General Industry) and 29 CFR 1926.52 (Construction Industry) govern all aspects of the Hearing Conservation Program for the respective industries. The regulations state that each employer will implement and maintain a written hearing conservation program that includes noise evaluations, audiometric testing, noise controls, record keeping, and education. For any additional information about noise, its effects, or protection from its hazards call your local Occupational Safety and Health Administration (OSHA) or Occupational Safety and Health Consultation office.

### Noise and It's Effects

Noise is defined as any undesirable sound, even though it might be a meaningful one. The criterion of undesirability is based on the capacity of the sound to disrupt communication or interfere with other day-to-day activities. Some important characteristics of noise are:

- intensity levels-at the same intensity, higher frequency noises are more irritating than lower frequency noises;
- time and place of occurrence-noise in open space is less annoying than in enclosed space; and
- duration-plays a direct role on the impact noise will have on employees.

Unprotected exposure to hazardous noise can result in hearing loss. Unfortunately, noise-induced hearing loss is not readily apparent to a worker. A noise-induced hearing loss is sensorineural, caused by nerve damage, permanent and very real. In its early stages, hearing loss occurs in a frequency range not readily apparent to the worker. Aural tinnitus is hearing loss which is a noticeable high pitch ringing. If noise-induced hearing loss continues, it will progressively involve higher and lower frequencies. The loss will eventually progress to a degree that impairs speech communication (audiometrically from 500 to 2000 Hz). When this happens the individual has increased difficulty understanding voice communications.

Prevention requires that noise control measures begin when a worker begins work in a high-noise environment and continues as long as the employee is exposed to the noise hazard. For a Hearing Conservation Program to be successful, workers must be made aware of the noise exposure and the potential hazards.

Simply controlling potentially hazardous noise exposures does not ensure a noise-induced hearing loss will not occur. Every worker included in the hearing conservation program must be educated concerning the undesirable effects of noise. For example, a person may suffer noise-induced hearing loss from unprotected hazardous noise exposure away from work.

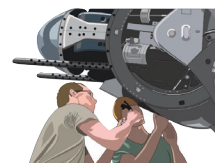
Examples would be:

- sporting events such as skeet shooting;
- hobbies such as metal or woodworking; and
- leisure activities such as loud music or the use of headphones.

## Table 1

DECIBEL CHART		
	dBA	Source
Extreme danger (painful)	155	Rifle blast; close-up jet engine; nearby siren
	140	Shotgun blast (to shooter); drag strip (near starting line); nearby jet engine
	120	Jet airport; some electronic music; rockdrill
Probable permanent hearing loss	115 - 125	Drop hammers; chipping hammers
	110 - 115	Planers; routers; sheet metal speed hammers
	90 - 100	Subway; weaving mill; papermaking machine
	90 - 95	Screw machines; punch press; riveter; cut-off saw
Possible damage	80 - 95	Spinners; looms, lathes
	80	Heavy traffic; plate mill
	65 - 75	Stenographic room; noisy typewriter
	70	Busy street
	60	Normal speech
	50	Average office
	45 - 50	Low conservation
	20 - 30	Quiet city apartment; whisper; comfortable sleeping limit
	15	Average threshold of acuity; leaf rustling
	0	Threshold of acute hearing (0 dBA is 0.0002 dyne per sq cm)

Sustained exposure to dBA above the upper levels may cause vibration of cranial bones, blurred vision, even weakening of body muscular structure. Frequencies of 500-2,000 Hz are most critical to noise-induced hearing loss.



# Hearing Conservation

---



Research shows that noise does not have to cause pain or discomfort for it to cause permanent hearing loss. This kind of noise causes the largest range of exposures that eventually lead to permanent sensorineural type noise-induced losses.

Employers should ensure workers are aware of locations and duties with potentially hazardous noise exposure. These areas must be properly monitored to ensure safety precautions are followed.

Possible areas of hazardous noise exposure are:

- carpenter shops (including wood hobby shops);
- areas where pumps and other motor-driven equipment operate;
- places where electric generators are in operation;
- structural repair shops;
- machine shops;
- aircraft ground equipment operations;
- metals processing shops;
- pneumatic equipment;
- firing ranges;
- printing machine sections;
- vehicle maintenance areas (including auto hobby shops);
- aircraft maintenance training areas;
- power generating plants;
- areas in the immediate vicinity of taxi ways and flight lines;
- sound/music amplifiers;
- close to internal combustion engines;
- gas-powered lawn maintenance equipment (mowers, edgers, trimmers);
- heavy construction equipment (bulldozers, cranes, and earth movers);
- bottling plants; and
- hairdressing salons and barber shops.

## Determine if a Program is Required

In order to determine if a hearing conservation program is needed, a site noise evaluation must be done. This can be accomplished by conducting point source noise evaluations of machinery and work activities. If these reveal noise levels of 85 dB or greater, then a Job Hazard Analysis (JHA) must be performed. If during these tests noise is found to average 85 dB or higher for 8 hours, a hearing conservation program will need to be written. If noise is found to average greater than 90 dB, hazard controls must be used.

## Steps for Creating an Effective Hearing Conservation Program

1. Designate a program administrator.
2. Identify noise hazards
3. Quantify employee exposure to noise hazards.
4. Perform medical auditory evaluations on all individuals who are (potentially) exposed to hazardous levels of noise.
5. Select appropriate hearing conservation measures.
6. Issue personal hearing protectors and community hearing protectors.
7. Perform training, both initial and annual.
8. Review and update program annually.

### *Program Administrator*

The purpose of a program administrator is to ensure that there is a person who is responsible for the effectiveness of the hearing conservation program. The program administrator will manage all aspects of the program including policies, procedures, noise monitoring and testing, audiometric testing, training, noise controls, record keeping, and program reviews. The program administrator will not perform all of these functions, but he or she will be responsible for ensuring that they are completed correctly and on schedule.

### *Identify Noise Hazards*

The key to any hearing conservation program is finding all the noise hazards that are above 85 dB. This is done by several different methods,



## Hearing Conservation

---

including work area machine noise monitoring, JHAs, and equipment specification sheets. Be sure to document all of the readings that are taken, not just the ones that are more than 85 db. This will provide documentation that the whole site was evaluated.

### *Quantify Employee Exposure to Noise*

It is important to measure all employees who will come in contact with noise, if only for a few minutes. These employees with short exposures may be exposed in other areas as well and the accumulated average of exposures may exceed 85 dB. One way to accurately measure this is to have each employee wear

a dosimeter that records all noise that they are exposed to during their shift. Next, perform JHAs to determine if the noise sources are involved in their job duties.

The employee's exposure to the noise hazard will help determine how to protect the employee from the noise. For instance, if the employee passes by a piece of support equipment on a regular basis and that equipment is not operated by the employee, then that piece of equipment may be isolated in a soundproof structure to eliminate the hazard. Once all of the measurements have been taken, compare the measurements to the following table to determine if they are within permissible exposures.

**Table 2**

Permissible noise exposures	
Duration per day	Sound level dBA
8hrs	90
6hrs	92
4hrs	95
3hrs	97
2hrs	100
1.5 hrs	102
1 hr	105
30 min	110
15 min or less	115

### **Perform Medical Auditory Evaluations**

Medical auditory evaluations are required to ensure that the exposed employees are being properly protected. The first step in auditory evaluations is to obtain a baseline. Without a baseline measurement it is impossible to determine if any hearing loss has happened to your employees. The baseline evaluation must be completed before the employee starts the job. If this does not happen, the employee must wear hearing protection until the evaluation takes place. This is only permitted when the company uses a traveling testing service that cannot be there in time for the employee to start work. If this situation happens, the employee must be tested within six months. After a baseline evaluation is obtained, the employees will need to be tested annually and the test results compared to the baseline evaluation to determine if any hearing loss has occurred.

### **Select Hearing Conservation Measures**

There are three different types of control measures used to abate hazards. These controls are as follows:

#### *Engineering Controls*

Engineering controls either isolate or eliminate the noise hazard. Engineering controls include equipment replacement, equipment isolation, and adding sound absorbing materials.

#### *Administrative Controls*

Administrative controls involve changes to policies and procedures to protect employees. Administrative controls include employee rotation, changing maintenance schedules, and defining permissible noise limits for new equipment.

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

PPE is considered a control of last resort. PPE does nothing to limit the exposure or eliminate the exposure of noise to the employee. PPE includes earplugs, canal caps, and earmuffs.

### **Issue Personal Protective Equipment**

Even though PPE is considered a last resort for noise hazard abatement, they can add to the effectiveness of other controls. PPE can be issued in two different ways. The first way is to issue PPE to individuals. Only issue the PPE to those individuals who work

regularly in the areas where PPE is required. The other way is to issue PPE by offering community PPE. Community PPE is for those individuals that do not routinely work in the areas that require PPE. Only earmuffs can be used in this fashion. For the individuals that do not regularly need PPE, provide disposable earplugs.

### **Conduct Training**

All employees need to be trained on the importance of hearing conservation, hearing conservation policies and procedures, and how to properly wear and maintain PPE. This training needs to be performed initially, annually and when changes to policies and procedures occur.

### **Program Review**

Your program review should be scheduled just after the annual auditory evaluations. This way when all the information comes back from the evaluations, it can be used to determine the overall effectiveness of the hearing conservation program. If employees are suffering a hearing loss then, program changes can prevent it from happening again. All changes to the program need to be communicated to the employees.

### **The Role of Managers and Supervisors**

Managers and supervisors need to stress the importance of hearing conservation with employees. The most effective motivational method is by example. For example, when a manager walks through a cabinet making shop. Even though the manager will not be there long enough to damage the ears, it is extremely important the manager wears the required hearing protection and other PPE correctly.

Managers and supervisors should ensure:

- Employees are wearing hearing protection devices when potentially hazardous noise is encountered;
- an evaluation of each worker's acceptance and use of personal hearing protection;
- noise safety regulations and directives are followed;
- workers are referred to medical assistance

## Hearing Conservation

---

when necessary;

- routine PPE equipment inspections are provided;
- records are maintained indicating the type of hearing protection issued to a worker;
- hearing protection provided is compatible with the work or task the employee must perform. For example, if earmuffs are indicated and are considered appropriate, management should ensure that the earmuffs are ordered and issued;
- records are maintained on baseline audiograms for each worker exposed to hazardous noise. Tests to establish a baseline audiogram should be preceded by at least 14 hours without exposure to workplace noise;
- audiograms are performed annually for each worker in the hearing conservation program; and
- unprotected workers are kept out of areas designated as hazardous noise areas.

### Hearing Protection Devices

Noise-induced hearing loss can be prevented by limiting exposure. When it is impossible or impractical to eliminate or control the noise (such as jet aircraft, jackhammer, etc.), use personal protective equipment. Personal protection devices are designed and available to protect noise-exposed workers.

All workers routinely exposed to hazardous noise should be issued appropriate hearing protection. In some instances, earmuffs may be preferred as the most practical type of device. However, earmuffs are not recommended if glasses are worn, as they prevent an effective seal.

Employers should complete the following lists:

- types of operations that require hearing protection;
- types of approved hearing protection for each worker; and
- locations where hearing protection is to be worn.

Hearing protection devices must be available to all workers exposed to an 8-hour time weighted average (TWA) of 85 to 90 dBA. This ensures that employees have access to devices to protect their hearing.

It is mandatory to wear hearing protection devices when:

- workers are exposed to 90 dBA or above for an 8-hour TWA;
- workers have a standard threshold shift; and
- workers are exposed to 85 dBA or above for more than six months until they receive their first audiogram (when it is inconvenient for mobile test vans to visit the worksite more than once a year).

### Summary

Hearing loss is an irreversible condition that can be prevented. Hearing conservation programs can prevent hearing loss and save your company money. In order for any hearing conservation to be successful, the company must locate all noise hazards, implement controls for those hazards, monitor the hearing of the employees, train the employees, keep records, and have a program administrator. Also, policies and procedures need to be written and the whole program needs to be reviewed on an annual basis.



**Table 3**

Hearing Conservation Program

