

Hearing Conservation

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Hearing Conservation

Overview

Occupational noise is an on-the-job health hazard. The hazard isn't always obvious at the time, but years down the road employees exposed to excessive noise over extended periods of time may develop hearing loss. Noise-induced hearing loss may be permanent and irreversible.

Employees may be exposed to excessive noise from a variety of sources including some that are non-work related. Some work related examples might be:

- Musical instruments.
- Pneumatic tools - drills, concrete saws.
- Power tools - mowers, snow blowers, hand drills, saws, lathes.
- Ventilation system fans.
- Compressors.
- Generators in mechanical rooms.
- Engines in automotive shops.

Legislative Requirements

Under provincial legislation, the employer must take steps to protect the hearing of employees who are or may be exposed to excessive noise levels.

Hearing conservation is regulated under:

- Alberta Occupational Health & Safety Act, Regulation and Code
 - [Part 16- Noise Exposure, Occupational Health and Safety Code 2009](#)
- Canadian Standards Association (CSA)
 - *Standard Z107.56-06*

Noise Exposure Code

The noise exposure code establishes occupational exposure limits (OEL) for noise. The OEL is the maximum sound level to which the average employee may be exposed for a specified time without adverse effects to their hearing. OELs are indicated in the tables in Appendix I of this section.

The employer must:

- Take all reasonable steps to ensure that no employee is exposed to noise in excess of the OEL by instituting engineering controls, work practice or administrative controls.
- If these measures do not succeed in keeping noise exposure under the OELs, the employer must:

- Ensure a noise-exposed employee undergoes approved audiometric testing
- Supply specified protective equipment to the employee
- Post signs to indicate that a noise hazard exists and the protective equipment required
- Ensure that the exposed employee is informed of the hazards and the purpose and limitations of protective equipment.
- Identify those work situations where a noise hazard exists and ensure that a noise-exposed employee undergoes approved audiometric testing

A *noise-exposed employee* is one who is exposed to noise above the OELs. This employee is considered a noise-exposed employee if the noise measured during one of their typical shifts exceeds the OELs. A noise-exposed employee must wear the hearing protection provided and submit to audiometric testing when the Division identifies their work situation as being noise exposed.

In order to meet legislative requirements, the school or workplace should develop a hearing conservation program where necessary. The goal of an occupational hearing conservation program is to prevent noise-induced hearing loss resulting from exposures to noise at work.

Hearing Conservation Compliance

Hearing conservation is judged from a *prevention* standard.

The questions a government inspector would ask are:

- Are warning signs posted in all areas of the school or workplace where noise levels are excessive?
- Do employees know they are expected to wear hearing protection when exposed to noise above the prescribed Alberta Occupational Exposure Limits for noise?
- Do employees know hearing protective equipment must meet the CSA Standard?
- Do employees know they have to undergo audiometric testing if they become noise-exposed employees?

If the answers to the above questions are YES, then there is compliance.

Principals or non-school based department heads demonstrate compliance by ensuring that:

- No employees are subjected to more noise than the *occupational exposure limit* (OEL).
- Hazardous noise is identified, and where practical, eliminated through engineering controls, e.g., sound barriers and noise dampers, work practice or administrative controls.
- Audiometric testing is conducted by an audiometric technician on noise-exposed employees within six months after they start on the job, within the next year, and every two years thereafter, as long as the employee is exposed to noise.
- Employees are educated about the hazards of high noise levels.
- A supply of approved ear muffs or other protective devices are available, when employees are exposed to continuous noise at excessive levels as defined by OEL.

Guidelines for Meeting Legislative Requirements

Identifying Excessive Noise

Periodically, principals and non-school based department heads should survey their employees concerning excessive noise exposure.

Noise Assessment

- If there is a concern contact a Division health and safety officer to arrange a noise assessment.
- Assessments are done on the day in which the employee is participating in their most noise-exposed shift. Assessments using appropriate sound testing equipment shall be conducted in each work area where there is a potential for exposure to noise levels higher than the OELs. If a change in process or work environment occurs, a reassessment should be considered.

The assessment shall include:

- A general statement of scope of work carried out and an outline of activities or processes measured.
 - The date, time and duration of noise samples.
 - Calibration data on each piece of instrumentation used.
 - Suggestions of possible control strategies and needs specific to this workplace.
- As outlined in the section 6.4.2.1 CSA Standard Procedures for the measurement of occupational noise exposure (CSA Standard Z107.56-06), a follow up noise exposure assessment is required when employee exposure is within 6 dBA of the OEL.

Audiometric Testing

- Those employees identified by the Division as noise-exposed shall have regular audiometric tests.
- Employees shall participate in audiometric testing, as often as required by the Noise Exposure Code, if they are exposed to excessive noise levels.
- A new employee shall be tested prior to working in a Division identified noise-exposed area to establish a baseline audiogram, then tested within a year, and subsequently every two years until leaving the Division or changing work locations.
- The audiometric testing shall be conducted by a qualified audiometric technician who works in consultation with a physician, audiologist or occupational health nurse.
- The Division shall pay for all audiometric testing. Employees can attend testing during normal working hours.
- If any of the audiograms of employees are categorized as “abnormal” or “abnormal shift”, the employee shall be referred to a board physician or audiologist.
- Test results shall be sent to Human Resources and shall be kept on file until the employee is no longer employed by the Division or for not less than 10 years.

- All records should be maintained and updated regularly by Human Resources to enable tracking an employee's hearing performance and in evaluating a hearing loss claim.

Hazard Warning

- Any work area with excessive noise exposure shall be clearly marked with a standard danger warning sign and should describe the protective equipment that is required in that area.
- Hearing protection shall be put on prior to working in this area.

Hearing Protection

- Any employee exposed to noise exceeding daily OELs shall be supplied with a hearing protector that is Canadian Standards Association (CSA) approved and receive instruction as to care, proper fit and usage.
- Employees are required to wear hearing protectors at all times when working in areas that have noise exceeding daily OELs.
- Employees shall not modify the hearing protector in a way that would reduce its noise attenuation characteristics.
- As outlined in the section 6.4.2.1 CSA Standard Procedures for the measurement of occupational noise exposure (CSA Standard Z107.56-06), a follow up noise exposure assessment is required when employee exposure is within 6 dBA of the OEL. If this applies, it is recommended that the employee wear hearing protection while working around and/or with noise-generating machinery/equipment.

Refer to Section 7 of the OH&S Manual for further information and guidelines on hearing protection.

Refer to Administrative Procedure:

[AP 405 – Workplace Health and Safety](#)

Based on the information contained in the noise assessment report refer to the following tables to determine the maximum amount of time (OEL) your employee can be exposed to at the noise level in their work area.

The standards in this section are minimum standards (see Appendix I). The focus of workplace accident and injury prevention efforts should be to exceed minimum standards.

Training Requirements

All new or present employees, who will be working in a noise-exposed area of the workplace, shall be trained by the appropriate Division supervisor / consultant so they have a clear understanding of noise and its effects as well as knowledge about how to prevent hearing loss.

Retraining should occur when:

- New work processes or equipment are introduced into the school or workplace.
- New hearing protection equipment is purchased.
- There are changes in legislation.

Implementation

Getting Started

Principals or non-school based department heads shall:

1. Identify if excessive noise is present at the school or workplace, through discussions with employees and, if necessary, request a formal noise assessment through a health and safety officer.
2. Develop action plans for reducing noise at the source by identifying situations where improvement can be made by:
 - Substituting quieter equipment or machinery for noisy equipment or machinery or quieter processes when and where feasible.
 - Modifying equipment by running equipment more slowly, improving lubrication, balancing rotating parts, or reducing vibration.
 - Isolating noise by using sound barriers, partitions, adding sound absorbent material around noisy equipment, or enclosing a noisy machine in a sound proof room.
 - Maintaining equipment at a high standard.
3. Develop a system for preventive maintenance of hearing protection equipment.
4. Have detailed written standard work procedures available for employees operating equipment that exposes them to excessive noise levels. Recommended changes shall be identified as budget priorities and submitted during the annual budget process.
5. Maintain accurate records of the workplace hearing conservation program.

Ongoing Activities

Principals and non-school based department heads shall:

1. Monitor employees to see if hearing protection equipment is being worn as required.
2. Monitor the preventive maintenance program to ensure high standards for hearing protection equipment.

Appendix I

Occupational Exposure Limits for Noise

Exposure Level (dBA)	Duration
82	16 hours
83	12 hours and 41 minutes
84	10 hours and 41 minutes
85	8 hours
88	4 hours
91	2 hours
94	1 hour
97	30 minutes
100	15 minutes
103	8 minutes
106	4 minutes
109	2 minutes
112	56 seconds
115 and greater	0

Note: Exposure levels and exposure durations to be prorated if not specified

Selection of Hearing Protection Devices

Maximum Equivalent Noise Level (dBA L_{ex})	CSA Class of Hearing Protection	CSA Grade of Hearing Protection
< 90	C, B or A	1, 2, 3 or 4
< 95	B or A	2, 3 or 4
< 100	A	3 or 4
< 105	A	4
< 110	A earplug + A or B earmuff	3 or 4 earplug + 2, 3 or 4 earmuff
> 110	A plug + A or B earmuff and limited exposure time to keep sound reaching the worker's eardrum below 85 dBA L_{ex}	3 or 4 earplug + 2, 3 or 4 earmuff and limited exposure time to keep sound reaching the worker's ear drum below 85 dBA L_{ex}

- dBA means a measure of sound level in decibels using a reference sound pressure of 20 micropascals when measured on the A-weighting network of a sound level meter.
- “ L_{ex} ” means the level of a worker’s total exposure to noise in dBA averaged over the entire workday and adjusted to an equivalent eight hour exposure.

Permissible Background Noise Conditions during Audiometric Testing

Octave Band Centre Frequency (Hz)	Maximum Level (dB)
500	22
1000	30
2000	35
4000	42
8000	45

Noise Level – Examples

Level (decibels)	Example	Maximum Hours/Day of Exposure
65	Normal Speaking	No Limit
75	Average Factory	No Limit
86	Lawn Mower	8 hours
92	Compressor	4 hours
95	Bandsaw	2 hours
99	Siren	2 hours
100	Chain Saw	1 hour
105	Router	1 hour
119	Average Car Horn	2 minutes

- To reduce or eliminate the risk of injury owing to continuous noise levels, the appropriate precautions should be taken, by using hearing protection and/or limiting exposure time. The most common types of hearing protection are earplugs and earmuffs.