Hearing Conservation Program

Safety & Security Services

November, 2003

ALGONQUIN COLLEGE

Glossary

Attenuation: The noise reducing capacity of hearing protection devices.

Leq: An 8-hour time-weighted average of 90 decibels measured on the A-scale, slow response, or equivalently, a dose of fifty percent.

Audiogram: A chart, graph or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Baseline Audiogram: The audiogram against which future audiograms are compared.

Continuous Noise: Noise intervals of one second or less.

Decibel (dB): Unit of measurement of sound level.

Hertz (Hz): Unit of measurement of frequency, numerically equal to cycles per second.

Intermittent Noise: Broadband sound pressure level exposure several times throughout the day.

Impulsive/Impact: Sharp burst of noise.

Noise: Unwanted sound that causes harm, either by causing hearing loss or stress, or interferes with communication.

Sound Level: Ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals. Unit: decibels (dB).

Standard Threshold Shift (STS): A change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000 and 4000 hertz in either ear.

Scope

The purpose of this program is to ensure that no employee is subjected to noise that produces sound levels in excess of those established by the Occupational Health and Safety Act without approved hearing protection.

Authority and Responsibility

Managers are responsible for:

1. Contacting OHS regarding any potential overexposures
2. Consulting with OHS regarding engineering and/or administrative controls, as necessary
3. Arranging audiometric evaluations, through Health Services for employees
4. Maintaining all audiometric test records. Records must be kept on file even after term of employment
5. Providing all necessary hearing protection to employees
6. Supervising and ensuring the correct use of hearing protection devices

OHS is responsible for:

1. Conducting all personal and/or area noise monitoring
2. Notifying all employees exposed at or above an 8-hour **time weighted average (TWA)** of 90 **decibels** (dB) of the monitoring results
3. Ensuring proper initial fitting of all hearing protection devices
4. Ensuring all employees are trained on procedures in the Hearing Conservation Program
5. Maintaining all exposure measurement records.

Employees are responsible for:

1. Using hearing protection as required
2. Participating in annual audiograms, as required
3. Participating in training
4. Inspecting and maintaining hearing protection devices
5. Seeking replacement or repair of hearing protection devices when necessary.

Legislation

- Ontario Regulation 851 (Industrial Establishments) Section 139
- CSA Standard Z94.2-94, “Hearing Protectors”.
- CSA Standard Z107.4-M86, “Pure Tone Air Conduction Audiometers for Hearing Conservation and for Screening”.

- CSA Standard Z107.51-M1980 (R1994), “Procedure for In-situ Measurement of Noise from Industrial Equipment”.
- CSA Standard Z107.56-94, “Procedures for the Measurement of Occupational Noise Exposure”.
- CSA Standard Z107.6-M90, “Pure Tone Air Conduction”.

Sound Surveys and Exposure Monitoring

Employee and/or area monitoring shall be performed when exposure is suspect of being at or above the **L eq** of an 8-hour TWA of 90 dB.

Factors, which suggest that noise exposures in the workplace may be at or above 90 dB, include employee complaints about the loudness of noise, indications that employees are losing their hearing, or noisy conditions which make normal conversation difficult.

All **continuous**, **intermittent** and **impulse/impact** sound levels from 80 dB to 130 dB shall be incorporated into the noise measurement survey.

The degree of noise reduction required shall be determined by comparing the measured levels with acceptable noise levels as presented in Table 1.

Monitoring shall be repeated whenever a change in processes, production, equipment or controls increases noise exposure to the extent that additional employees may be exposed at or above the action level or the **attenuation** provided by hearing protection devices being used by employees may be rendered inadequate.

Affected employees or their representatives shall be provided an opportunity to observe any noise measurements.

Table 1 indicates Occupational Health and Safety Act's permissible noise exposure limits.

Table 1: Permissible Noise Exposures

COLUMN 1	COLUMN 2
Sound Level – in Decibels	**Duration – Hours per 24 hour day**
90	**8**
92	**6**
95	**4**
97	**3**
100	**2**
102	**1 ½**
105	**1**
110	**½**
115	**¼ or less**
Over 115	**No Exposure**

Note: Exposures to impulse/impact noise shall not exceed 140 dB peak sound pressure level.

Control Measures

When employees are subjected to sound exceeding those levels listed in Table 1, feasible engineering and administrative controls shall be utilized as the first step in noise control. If these controls fail to reduce sound to acceptable levels, hearing protection devices shall be used. During the implementation of administrative and/or engineering controls, affected employees shall be provided with hearing protection devices and trained in accordance with this program.

Administrative Controls

Administrative controls normally involve a change in work schedules or operations that reduce noise exposures. Examples include operating a noisy machine on the second or third shift when fewer people are exposed or shifting an employee to a less noisy job once a hazardous daily noise dose has been reached.

Engineering Controls

Engineering controls shall be used when any modification or replacement of equipment, or related physical change at the noise source or along the transmission path can be altered which reduces the noise level to the employee's ear.

Typical engineering controls may involve the following:

1. Reducing noise at the source;
2. Interrupting the noise path;

3. Reducing reverberation;
4. Reducing structure-borne vibration;
5. Employee/equipment isolation; and
6. Equipment/process substitution.

Hearing Protection Devices

Hearing protection devices shall be made available to all employees exposed to an 8-hour TWA of 85 dB or greater at no cost to the employees. Hearing protection devices shall be replaced as necessary.

The use of hearing protection devices is mandatory for all employees exposed to an 8-hour TWA of 90 dB or greater.

Audiometric Evaluations

Audiometric evaluations shall be made available at no cost to all College employees whose exposure equals or exceeds an 8-hour TWA of 85 dB.

Baseline Audiograms

Baseline audiograms shall be required within six months of an employee's first measured exposure at or above the **Leq** to compare subsequent audiograms.

Prior to the audiogram, employees shall be informed to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

Annual Audiograms

Audiograms shall be performed at least annually after obtaining the baseline audiogram for each employee exposed at or above the 8-hour TWA of 90 dB. Each employee's annual audiogram shall be compared to his/her baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. If the annual audiogram shows that an employee has suffered a standard threshold shift, the employee may obtain a retest within 30 days and the retest results may be considered the annual audiogram. If a comparison of the annual audiogram to the baseline indicates a standard threshold shift, the manager and OHS shall inform the employee of this in writing within 21 days of the determination.

All audiometric tests and equipment calibration shall be performed in accordance with the criteria established by CSA Standard Z107.56-94, “Procedures for the measurement of Occupational Noise Exposure”

Information and Training

Employees who are exposed to noise at or above an 8-hour TWA of 90 dB shall receive training on the following:

1. Health effects of noise;
2. Purpose of hearing protection devices;
3. Advantages and disadvantages of hearing protection devices;
4. Attenuation of various types of hearing protection devices;
5. Instructions on selection, fitting, use and care of hearing protection devices; and
6. The purpose of audiometric testing including an explanation of the test procedure.

OHS shall conduct annual training for all employees included in the College's Hearing Conservation Program.

Recordkeeping

Exposure Measurements

All managers and OHS shall maintain accurate records of all employee exposure measurements for a period of two years.

Audiometric Tests

Records of all employee audiometric tests shall be retained for the duration of the affected employee's employment and thirty years from the date of termination. These records shall include:

1. Name and job classification of the employee;
2. Date of the audiogram;
3. The examiner's name;
4. Date of last acoustic or exhaustive calibration of the audiometer;
5. Employee's most recent noise exposure assessment; and
6. Background sound pressure level measurements in audiometric test rooms.

All records shall be made available upon written request to the employee or designee at any time without regard to employment status.

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Audiometric And Identification Information

Test Date: _____ Test Time: _____

Test Type: _____ Time Since Last Exposure: _____ hours

Exposure Level: _____ dBA

Name: _____

Student/Employee No: _____

Campus: _____ Program/Department: _____

Coordinator/Supervisor: _____ Tele No/Ext.: _____

Self-Reported Employee Histories

Medical History (Y/N)		Hobby & Military History (Y/N)		Additional Information (Y/N)	
Diabetes:	_____	Hunting:	_____	Noisy 2nd Job:	_____
Ear Surgery:	_____	Shooting:	_____	Noisy Past Job:	_____
Head Injury:	_____	Racing Cars:	_____	Difficulty Hearing Right Ear:	_____
High Fever:	_____	Motorcycles:	_____	Difficulty Hearing Left Ear:	_____
Measles:	_____	Other Loud Vehicles:	_____	Hearing Aid Right Ear:	_____
Mumps:	_____	Loud Music/Band:	_____	Hearing Aid Left Ear:	_____
High Blood Pressure:	_____	Power Tools:	_____	Recent Change in Hearing:	_____
Ringing in Ears:	_____	Military Service:	_____	See Physician About Ears:	_____
Ear Infection:	_____	Branch:	_____	See Prior History:	_____
Other:	_____	Other:	_____	Other:	_____

Audiogram

Test Frequency

Ear	500	1000	2000	3000	4000	6000	8000
Right							
Left							

Audiometer: _____ Serial Number: _____

Exhaustive Calibration Date: _____ Biological Calibration Date: _____

Tester Identification: _____ Test Reliability (Good/Fair/Poor): _____

Reviewer Identification: _____ Audiogram Classification Code: _____

Comments: _____