

ADMINISTRATIVE PROCEDURES

SUBJECT: Hearing Loss Prevention Program

The Hearing Loss Prevention Program procedures apply to all employees and workplaces of the Lambton Kent District School Board and are designed to prevent Noise Induced Hearing Loss (NIHL) by protecting employees from exposure to workplace hazardous noise levels.

Technology shop students and workers who fall under the expanded definition of “worker” in the Occupational Health & Safety Act are also included in this program in terms of a provision of Hearing Protection Devices. Noise exposure standards are established by the Ontario Ministry of Labour. The regulation requires that every employer shall ensure that no worker is exposed to a sound level greater than an equivalent sound exposure level of 85 dB(A) ((time weighted average (TWA) sound exposure level over 8 hours, Lex8)) and the employer must take all measures reasonably necessary in the circumstances to protect workers from exposure to hazardous sound levels.

1) Responsibility

a) Lambton Kent District School Board:

- Support and appropriately fund the Hearing Loss Prevention Program;
- Evaluate the effectiveness of the Hearing Loss Prevention Program;
- Take every precaution reasonable in the circumstances to protect workers and students.

b) Purchasing Supervisor:

- In consultation with building services, must consider specification and selection of lower noise machinery when purchasing new equipment;
- Maintain a list of Board approved Hearing Protection Devices;
- Maintain agreement(s) for third party audiometric services.

c) Coordinator of Sites and Design:

- Where appropriate, include plans for noise control when planning capital construction projects for facilities within the Board in accordance with the Ontario regulation 381/15 made under the Occupational Health and Safety Act.

d) Supervisor of Maintenance:

- Install noise warning signage in areas based on information provided by the Health and Safety Officer.

1) Responsibility

e) Technology Curriculum Leader:

- Submit the *Technology Equipment Checklist* from the Technology Shop Safety Administrative Procedure, A-OP-437 along with the *Capital and Furniture Budget Request* form when purchasing new or used technology shop machinery;
- Notify the Program Consultant and the Health & Safety Officer of the planned purchase;
- Consider specification and selection of lower noise machinery when purchasing new equipment;
- Investigate possible noise reducing engineering controls (refer to Section 3a, Engineering Controls);
- Ensure a paper copy of the noise assessment report is posted in a conspicuous place in each Technology shop;
- Ensure Hearing Protection Devices are made available to technology shop workers and students.

f) Technology Teachers:

- Comply with employee responsibilities under this procedure;
- Maintain all machinery in good working order to prevent unnecessary high noise levels;
- Train students on proper use of Hearing Protection Devices.

g) Music Curriculum Leader:

- Ensure a paper copy of the noise assessment report is posted in a conspicuous place in each Music Classroom;
- Comply with employee responsibilities under this procedure.

h) Music Teachers:

- Ensure a paper copy of the noise assessment report is posted in a conspicuous place in each Music Classroom;
- Comply with employee responsibilities under this procedure.

1) Responsibility

i) Principal/Supervisor:

- Request a noise survey, by submitting a potential incident report, if a concern is raised that a worker that may be exposed to a hazardous noise level;
- Request a noise survey, by submitting a potential incident report, whenever it is thought that worker(s) noise exposure could have changed significantly (i.e. machinery being installed; change in workload or length of time spent in high noise areas; etc.);
- Notify the Health and Safety Officer, within 3 weeks, whenever a worker is hired/transferred into a job position known to expose a worker to hazardous noise levels;
- Ensure that workers working in identified areas or performing identified tasks are provided with and properly use Hearing Protection Devices; consult with the Health and Safety Officer to ensure proper selection of Hearing Protection Devices;
- Purchase Hearing Protection Devices through the Purchasing Department;
- Submit the *Technology Equipment Checklist* from the Technology Shop Safety Administrative Procedure, A-OP-437 along with the Capital and Furniture Budget Request form when purchasing new or used technology shop machinery;
- Notify the Program Consultant and the Health & Safety Department of the planned purchase;
- Consider specification and selection of lower noise machinery when purchasing new equipment;
- Investigate possible noise reducing engineering controls (refer to Section 3a, Engineering Controls);
- Ensure all machinery is maintained in good working order to prevent unnecessary high noise levels;
- Consider using Administrative Controls for the purpose of limiting noise exposure, when warranted and practical (refer to Section 3b, Administrative Controls).

j) Employees:

- Take the Hearing Loss Prevention training provided by the Board, if applicable;
- Report to their supervisor, any concern that he/she may be exposed to a hazardous noise level;
- Wear Hearing Protection Devices as required;
- If participating in the Audiometric Test Program, spend at least 14 hours without workplace noise before undergoing an audiometric test (refer to Section 5, Audiometric Testing Program).

1) Responsibility

k) Health and Safety Officer:

- As per requests by supervisors, arrange for/conduct sound level measurements to determine if hazardous noise levels exist;
- Arrange for/conduct a noise dosimetry if sound level measurements suggest an employee may be overexposed to noise;
- Notify employees and their supervisor of the employee's noise exposure level;
- Arrange for identified noise exposed employees to receive Hearing Loss Prevention training and offer to enlist the employee into the Audiometric Test Program;
- Arrange for audiometric tests as per Audiometric Test Program;
- Provide written notification, to employees found to have a Standard Threshold Shift (STS), within 21 days of an audiogram being performed;
- Provide, to the plant and maintenance supervisor, information about where noise warning signs must be posted based on noise measurements;
- Develop a list of job positions/job tasks/machinery and equipment that have been identified as having hazardous noise levels (share list with all affected workers and groups and post a copy on the portal);
- Post copies of noise assessment reports in school folders on the portal.

l) Joint Health and Safety Committees:

- Review this administrative procedure once every three years and whenever relevant legislative changes occur.

2) Noise Measurement and Monitoring

- The Board's Health and Safety Officer arranges for/conducts sound level measurements to determine if hazardous noise levels exist. If a concern is raised that a worker may be exposed to a noise level in excess of Leq, 8 of 80dB(A) in the course of the working day, the supervisor must request a noise survey by submitting a Potential Incident report. If sound levels suggest an employee may be overexposed to noise, noise dosimetry may be performed. The measured sound levels shall be noted without regard to any use of personal protective equipment (Hearing Protection Devices);
- All measurements will be carried out in accordance with Regulation 381/15.

3) Noise Reduction

a) Engineering Controls:

- The regulation requires that workers are to be protected from equivalent sound levels of Leq, 8 of 85dB(A) first by means of noise reducing engineering controls, rather than by use of Hearing Protection Devices, unless the engineering controls are not in existence or are not obtainable; are not reasonable or practical to adopt, install or provide because of the duration or frequency of the exposures or because of the nature of the process, operation or work;
- The goal of engineering controls is to ensure that machinery does not produce noise that damages hearing, or the machinery absorbs or reflects the noise before it reaches the person. An acoustic engineer can be consulted for assistance. Controls may include, mufflers, acoustical enclosures or barriers, sound absorbing material, vibration mounts, or quiet saw blades (i.e. blades with built-in vibration dampening and carbon blades);
- Additionally, all machinery should be maintained in good working order to prevent unnecessary higher noise levels; for example, ensure proper oiling, greasing, and replacement of worn out noisy parts.

b) Administrative Controls:

Administrative controls are needed in areas where the noise level cannot be reduced by engineering controls. These are management processes and procedures designed to limit noise exposure.

- Selection and specification of lower noise machinery shall be considered when purchasing new equipment;
- Facility construction plans should include plans for noise control;
- A clearly visible warning sign shall be posted at every approach to a work area where the measured sound level regularly exceeds 85 dB(A);
- A copy of the noise assessment report must be posted in technology shops in a conspicuous place;
- Limiting Exposures: other types of administrative controls may include, restricting access to high noise areas for workers whose jobs do not require them to be in the area, notifying workers in advance when noisy work is to be carried out so that they can limit their exposure to the noise; Appendix "A" provides a table from the Ministry of Labour, of maximum permissible daily exposure durations for various steady sound levels;
- Hearing Protection Devices;
- Education and Training.

4) Hearing Protection Devices

- In work areas where the noise level cannot be reduced to below 85 dB(A), Hearing Protection Devices must be provided and must be worn as required. Hearing Protection Devices should be purchased through the Board's Purchasing Department. The Health and Safety Officer should be consulted for assistance in proper selection of Hearing Protection Devices;
- Hearing Protection Devices shall be selected having regard to sound levels to which a worker is exposed, the attenuation provided by the device, and the manufacturer's information about the use and limitations of the device. Hearing Protection Devices shall be used and maintained in accordance with the manufacturer's instructions. (Reg. 381/15 s. 4);
- Appendix "B" provides a table from the Canadian Centre for Occupational Health and Safety (CCOHS) which shows a comparison of the advantages and disadvantage between earplugs and earmuffs;
- Appendix "C" provides a table from CSA Z94.2-02 which shows the CSA Class of Hearing Protection Devices suitable for various equivalent sound levels (Lex, 8).
- Appendix "D" provides information for how to calculate Noise Reduction Rating (NRR) for selection of Hearing Protection Devices suitable for various noise levels.

5) Audiometric Test Program

Audiometric Testing allows for early detection of noise induced hearing loss and helps identify when further measures are needed to ensure ongoing effectiveness of the *Hearing Loss Prevention Program*. The Board offers audiometric testing to employees who's noise exposure is greater than Lex of 80dB(A) and employees new/transferring into jobs where noise dosimetry for these jobs has revealed noise exposures greater than Lex of 80 dB(A).

- The audiometric test should be completed within 4 months of approval of this Administrative Procedure. Participating employees will submit to an initial baseline audiometric test. This test is to occur within the first 2 months of employment. Thereafter, a yearly audiometric test is provided. A final audiometric test is to occur upon the end of employment with the Board;
- The Health and Safety Officer arranges audiometric tests;
- Audiograms will be kept with the audiology services provider, as they are medical documents;
- Audiology services must be conducted by a certified audiologist or by a certified audiometric technician under the direction of an audiologist. The audiometric test must be performed according to criteria established by CSA Standards. Employees must have spent at least 14 hours without workplace noise before a baseline test is performed. The employee's annual audiometric test shall be compared to his/her baseline audiometric test by a certified audiologist. Retests will be done in cases where the audiologist recommends. Employees will receive a confidential statement explaining their results;
- Employees found to have a Standard Threshold Shift (STS) must be notified in writing within 21 days of the audiogram being performed.

6) Employee Education and Training

- Noise Awareness e-Bulletin – mandatory for all employees and new employees, one time;
- Hearing Loss Prevention Training – mandatory for all employees who work in areas and/or job categories with sound levels known to be in excess of 80dB(A); every three years;
- Training may be provided by means of on-line courses, handouts, and during audiometric tests. Appendix “E” provides an outline of required content of training.

7) Program Evaluation and Improvement

- This program shall be reviewed once every three years and whenever relevant legislative changes occur.

8) Record Keeping

- Audiometric and associated records will be kept indefinitely by the audiometric evaluation provider;
- Noise Assessment and Noise Dosimetry reports and associated equipment calibration records will be kept with the Health and Safety Department.

Implementation Date: October 13, 1999

Revised: February 22, 2016

Reference:

- 1) *Regulation 381/15, Noise, made under the Occupational Health and Safety Act*
- 2) *CAN/CSA-Z94.2-02 (reaffirmed 2011), Hearing Protection Devices – Performance, selection, care, and use*
- 3) *CAN/CSA-107.6-M90, Pure Tone Air Conduction Threshold Audiometry for Hearing Conservation*
- 4) *CAN/CSA-Z107.56 Procedures for the Measurement of Occupational Noise Exposure*

Appendix A: *Terms and Definitions*

- **Attenuation** – a reduction in sound pressure level incident upon the ear
- **Audiologist** - provides clinical services for hearing or balance disorders, using audiometer, computers, and other testing devices. An audiologist is a key provider of information and counseling to those exposed to excessive noise. They also work cooperatively with other
- Professionals, such as doctors, therapists, and teachers, to coordinate appropriate health care and education
- **Audiometric technician** - is a certified Audiometrist; administers the audiogram and provides advice on hearing protection and follow-up care and may also perform noise assessment in workplaces using sound level meters and dosimeters
- **Audiometric test** - is a graph of hearing sensitivity. The various test frequencies are plotted on the horizontal axis from 250 Hz to 8000 Hz. The vertical axis shows the degree of hearing loss in decibels (dB)
- **Baseline Audiogram** - the audiogram against which future audiograms are compared
- **Decibel (dB)** - is the measurement unit used for sound; the decibel scale is logarithmic (i.e. sound intensity doubles with every 3 decibel increase)
- **Decibel, A-weighted (dB(A))** – a standard weighting of audible frequencies. The sound level meter uses electronic filters to adjust the way the instrument measures noise to reflect how the human ear perceives the noise; the use of A-Weighting is required for measurement of workplace noise levels
- **Decibel, C-weighted (dB(C))** – is a standard weighting of audible frequencies commonly used to measure peak sound pressure levels
- **Equivalent sound exposure level (Leq)** – is sound level measurement used to determine the Lex (noise exposure level). Leq is an equivalent steady sound level of noise energy averaged over time.
- **Dosimeter** – is an instrument worn by a worker for determining the full shift exposure to noise and the average sound level. The dosimeter is programmed before use with an exchange rate and other criteria
- **Hearing Protection Devices** – Earmuffs, earplugs or circumaural (around the ear) devices that block a certain amount of sound energy transmitted to the middle and inner ear. Plugs are inserted into the external ear canal, earmuffs are applied over the external ears, and circumaural devices cover the entrance to the external ear
- **Hertz (Hz)** – Unit of measurement of frequency, equal to cycles per second
- **Noise Dosimetry** – is the use of dosimeters to evaluate worker exposure to noise
- **Noise exposure Limit** – as defined by Ontario Ministry of Labour is 85dB(A) Lex,8 (the permissible time-weighted average (TWA) noise exposure that is averaged over an 8 hour work shift)
- **Noise Induced Hearing Loss (NIHL)** – is permanent hearing loss from being exposed to high levels of noise over a long time
- **Noise Reduction Rating (NRR)** – describes the average sound level reduction provided by a hearing protection device (HPD) in a laboratory test; based on ANSI Standard S3.19-1974.
- This method does not take into consideration the loss of protection that occurs when HPD are not fitted properly
- **Noise Reduction Rating (NRR(SF))** – describes the average sound level reduction provided by a hearing protection device (HPD) using the newer “subject fit” method of testing; based on Standard S12.6-1997
- **Noise Survey** – is the measurement of sound level in an environment using a sound level meter
- **Sound Level Meter (SLM)** – is an instrument consisting of a microphone, amplifier, output meter, and frequency weighting networks that is used for the measurement of noise and sound levels
- **Standard Threshold Shift (STS)** – is a significant shift in hearing thresholds as compared to the person’s baseline audiogram. As defined by OSHA, a STS has occurred if the hearing threshold has changed (relative to the baseline audiogram) an average of 10dB or more at 2000, 3000, or 4000 Hz in either ear

Appendix B:

Table 1: Equivalent Noise Exposures

Where a worker's noise exposure can be easily split into discrete activities during which sound levels are steady, the following table may be used to calculate the Leq for a work shift.

Steady Sound Level dB(A)	Duration
82	16 hours
85	8 hours
88	4 hours
91	2 hours
94	1 hour
97	30 minutes
100	15 minutes
103	7.5 minutes
106	3.75 minutes
109	1.88 minutes

Source: Ministry of Labour, "Amendments to Noise Requirements in the Regulation for Industrial Establishments & Oil and Gas-offshore", May 2007

Appendix C:

Table 2: Advantages and Limitations of Earplugs and Earmuffs:

Comparison of Hearing Protection Devices (CCOHS, Noise Control in Industry)	
Earplugs	Earmuffs
<p>Advantages</p> <ul style="list-style-type: none"> • Small and easily carried. • Convenient to use with other personal protective equipment (can be worn with ear muffs). • More comfortable for long-term wear in hot, humid work areas. • Convenient for use in confined areas. 	<p>Advantages</p> <ul style="list-style-type: none"> • Less Attenuation variability among users. • Designed so that one size fits most head sizes. • Easily seen at a distance to assist in the monitoring of their use. • Not easily misplaced or lost. • May be worn with minor ear infections.
<p>Disadvantages</p> <ul style="list-style-type: none"> • Require more time to fit. • Difficult to insert and remove. • May irritate the ear canal. • Easily misplaced. • More difficult to see and monitor use. • Get dirty when your hands are dirty. 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Heavier, less portable. • Inconvenient for use with other personal protective equipment. • Uncomfortable for long-term wear in hot, humid work areas. • Inconvenient for use in confined areas. • Seals may be broken by safety glasses. • May interfere with wearing of safety or prescription glasses.

Appendix D:

Table 3: Selection of Hearing Devices Based upon Grade and Noise Exposure in dB(A) (from CSA Std. Z94.2-02)

This is a method for HPD selection based on either a grading or classification system in conjunction with sound exposure data (i.e. $L_{ex,8}$). Classes are the "old" CSA system in which HPDs are assigned to Class A, B, or C, based on laboratory attenuation data. In the "new" CSA system, grades are 0, 1, 2, 3, or 4, based on real world attenuation data, the SNR (SF84).

Lex,8 (dBA)	Recommended		
	Grade		Class
≤ 90	1		C
≤ 95	2		B
≤ 100	3		A
≤ 105	4		A
≤ 110		Dual*	
>110		Dual +¥	

*Dual hearing protection required. Use a minimum of a Grade 2 or Class B earmuff and a Grade 3 or Class A earplug. Also, it is recommended that exposure durations be limited.

Note: Lex. 8 - Means equivalent sound exposure level of 85 dB(A) (this column makes reference to the noise level measured by personal dosimetry)

Appendix E:

Selection of Hearing Protection Devices using Noise Reduction Rating (NRR) calculations -

Most hearing protectors provide an NRR rating. This rating is determined through ANSI standardized testing. There are two methods currently in use; ANSI Standard S3.19-1974 (Method A) and Standard S12.6-1997 (Method B). The older standard, method A, determines the NRR with tests that are conducted under “laboratory conditions” and must be de-rated to more accurately reflect the actual noise attenuation that the end user would experience. The newer standard, method B, tests sound attenuation under “real world” (subject fit (SF)) conditions which reveals a protection level that is much less by comparison, and is a more realistic representation of the actual attenuation the end user would obtain.

When selecting hearing protectors with an NRR based on ANSI Standard S3.19-1974 (Method A), NIOSH recommends de-rating hearing protectors by a factor that corresponds to the available “real-world” (subject fit) data.

For De-rated NRR based on C-weighted data, de-rated NRR is calculated by subtracting a percentage from the manufacturer’s labeled NRR:

Earmuffs – Subtract 25%

Formable earplugs – Subtract 50%

All other earplugs – Subtract 70%

For A-weighted data, a correction factor of 7 dB is added.

Example calculation for formable earplugs:

Unprotected TWA noise exposure – $(\text{labeled NRR} \times 0.5) / 2 = \text{Protected TWA noise exposure}$

Where a worker’s TWA noise exposure without HPD (unprotected) = 93 dBA and the NRR label on a package of formable earplugs = 29 dB, what is worker’s expected TWA noise exposure when the HDP is properly worn?

$93 \text{ dBA} - ((29 - 7) \div 2) = 82 \text{ dBA}$

For dual hearing protection, (i.e. earplugs and earmuffs worn together), add five decibels of protection to the device with the higher NRR.

Appendix F:

Training will include information as follows:

- LKDSB Hearing Loss Prevention Program;
- Results of noise surveys/dosimetry monitoring;
- Effects of noise on hearing;
- Warning signs of noise problem in workplace;
- Care and Use of Hearing Protection Devices, including limitations, proper fitting, inspection and maintenance, cleaning and disinfection.

Appendix G:**Resources**

- Ministry of Labour Guidelines, *Amendments to Noise Requirements for Industrial Establishments and Oil and Gas Off Shore*,
http://www.labour.gov.on.ca/english/hs/pubs/noise/gl_noise_1.php
- CCOHS Guide, *Noise Control in Industry: A Basic Guide*,
http://www.ccohs.ca/products/publications/noisecontrol_toc.html
- *Hearing for Life, A guide to Noise Control and Hearing Conservation*, WSIB Ontario
- *Hearing Conservation*, Health and Safety Ontario,
http://www.wsps.ca/WSPS/media/Site/Resources/Downloads/HearingConservation_Final.pdf?ext=.pdf