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I. Objective

To minimize employee exposure to the hazards of high noise levels in or during the course of employment.

This program applies to all work places at York University;

a. where sound levels may be equal to or exceed 85 decibels A-weighted (dBA), and,

b. whenever employee noise exposures equal or exceed an 8-hour time-weighted\(^1\) average sound level of 85-dBA or equivalently, a dose of fifty percent.

II. Philosophy

York University employees may be subject to noise induced hearing loss when working in areas with noise levels above 85-dBA (8 hr TWA). Effective noise level measurements and screening allows management to take early preventative and control measures, and also alert employees to potential hearing damage.

III. Noise Standards and Legislation

Occupational noise exposure standards are established by the Ontario Ministry of Labour in the “Regulations for Industrial Establishments 851 Section 139 under the Occupational Health and Safety Act” (Appendix I).

The current legislation states that no worker in Ontario should be exposed to sound level above 115 decibels, and control measures shall be taken to reduce the sound level below 85 decibels.

IV. Noise Assessment and Exposure Monitoring

Noise sources capable of causing hearing damage can be identified by a noise survey of the area. Once noise sources are identified, exposure of employees working in these areas should be quantified. Sound level monitoring can help to determine if a potential noise problem exists and to what extent it may exist.

a) Monitoring Equipment

Sound level measurements can be obtained by using:

i) a sound level meter, which provides instantaneous sound level measurement of noise emitting from a noise source (a sound level meter can be equipped with an octave-band analyzer to determine where the noise energy lies in the frequency spectrum. This information will be useful for the design of engineering control).

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\(^1\) Time-weighted average is the average exposure of a worker to sound level within a specified time period, e.g. an 8-hour workday.
ii) **a noise dosimeter** or a noise-exposure monitor, which can be worn by the worker to measure the maximum sound level exposure; the equivalent sound level exposure; and the noise exposure pattern of the worker during the entire monitoring period.

Measurement of impact-type noise requires a more sophisticated instrument to determine the peak noise level e.g. equipment that is specified by the American Standard (ANSI S1.4, S1.25) that will automatically include impulsive or impact noise in the measurement. The Department of Occupational Health and Safety’s (DOHS) dosimeter meets such requirement considering e.g. measurement range (e.g. up to 140 dBA), crest factor, weighting etc.

All instruments must be calibrated before and after each testing to ensure measurement accuracy.

b) **Method of Noise Monitoring**

All sound level measurements should be made to ensure accurate readings of the employees’ working conditions.

i) **Area Measurement**

1. Using a Type 2 sound level meter (set at A-scale slow response), record the maximum and minimum noise level at the centre of each work area.

2. Identify on a floor plan those areas where either the maximum or the minimum noise level approaches or exceeds 85 decibels, and then perform a work station measurement on these locations.

ii) **Work Station Measurement**

For those locations in which the sound level approaches or exceeds 85 decibels, obtain measurements at each employee’s normal workstation. If the sound level at the workstation is not steady and varies on a regular basis, record both the maximum and the minimum level.

iii) **Exposure Duration**

At those workstations where the sound level approaches or exceeds 85 decibels, exposure duration of workers should be recorded.

For those workers who need to move from one location to another with different noise levels, the noise dosimeter can be worn by the worker during the work shift for measuring noise exposure.
c) **Frequency of Noise Monitoring**

Noise monitoring should be performed whenever:

- A noise source capable of causing hearing damage is suspected.
- A change in production, process, equipment or controls increases noise exposures to the extent that:
  
  (i) Additional employees may be exposed at or above the action level:
  or
  (ii) The attenuation provided by hearing protectors being used by employees may be rendered inadequate to limit the exposure to at least 8-hour time-weighted average of 85 decibels or below.
- Annually for known noise sources (upward deviations may provide early warning of need for maintenance/replacement).

d) **Request for Noise Testing**

A request for noise testing can be placed with the Department of Occupational Health and Safety by the area manager, supervisor, or by members of the Joint Health and Safety Committee. DOHS can also recommend noise testing for suspected noise areas.

e) **Notification and Noise Monitoring Report Distribution**

All noise sources in excess of 85-dBA will be posted with warning sign (Appendix II).

(i) **Area Monitoring**

The area manager or supervisor shall post or make available to workers in the area the report of area noise monitoring, in the area where the test was conducted.

(ii) **Personnel Monitoring**

Each employee monitored shall be notified of the results.

Noise monitoring report should be distributed to:
- the area manager or supervisor, and
- the appropriate Joint Health and Safety Committee.
Audiometric Testing

Audiometric testing measures the individual’s hearing ability and acuity. It can identify hearing threshold shifts in exposed employees during the course of their employment. Also, it can be used to determine the effectiveness of noise control measures by the hearing threshold of exposed employees.

A qualified individual, using accepted testing procedures should administer the screening test. This may be arranged through DOHS.

a) Selection of Workers

It is the responsibility of the supervisor or manager to notify DOHS of the following:

i) Workers whose 8-hour time weighted average noise exposure equals or exceeds 85-dBA time weighted average.

ii) Workers being hired or moved into jobs where noise exposure is known to exceed 85-dBA time weighted average.

iii) When worker terminates his/her job in the noisy area.

b) Frequency of Testing

Annual re-testing will be performed for persons (enrolled in Hearing Conservation Program) over 40 years of age, and once every two years for persons less than 40 years of age.

c) Procedure for Audiometric Testing

See Appendix III.

d) Record Keeping

Audiometric testing records will be kept for 40 years from the time such records were first made; or a period of 20 years from the time the last of such records were made, whichever is longer. These records are stored and maintained confidentially at DOHS.

VI Roles and Responsibilities

Department of Occupational Health and Safety (DOHS)

Director

The Director of DOHS advises and consults with all members of the community on issues related to occupational health and safety.

Occupational Hygienists
The Occupational Hygienists will assess, monitor and provide advice on control measures. They will also respond to noise exposure incidents.

**Occupational Hygienist-Chemical Control Officer**

The OH-Chemical Control Officer organizes hearing conservation training, audiometric testing and counselling regarding hearing loss. Also, the OH Chemical-Control Officer will direct employees who have experienced a hearing loss during the course of employment to the Employee Well Being Office (EWO).

**Joint Health and Safety Committee (JHSC)**

Any member of the JHSC may report noise hazards to the area supervisor and request a noise testing. A JHSC member may suggest/recommend that a worker receive an audiometric testing. Worker member has the right to be present at the time of the testing to ensure that the test methods are valid.

The JHSC receives noise area testing reports forwarded by DOHS.

**Health and Safety Officers (HSO)**

HSOs are responsible for:
- Identifying changes in process or equipment that may increase noise exposure
- Recognizing and reporting presence of suspected noise sources to DOHS
- Notifying DOHS and supervisor if arrangement for audiometric testing is needed
- Receiving and reviewing noise monitoring/exposure reports
- Taking corrective action as required

**Supervisors**

Supervisors are responsible for:
- Identifying and reporting excessive noise levels to DOHS
- Notifying employees of a hazardous noise area
- Providing hearing protection and ensure appropriate usage
- Receiving and reviewing noise monitoring/exposure reports
- Taking corrective action as required
- Scheduling workers for audiometric testing

**Workers**

- Workers must wear the protective devices required by the University.
- Workers exposed to noise levels in excess of 85-dBA should receive hearing conservation training and audiometric testing.
Workers are required to report all noise hazards to their supervisors.

VII. Noise Control Measures

Under this program, noise control measures should be taken to reduce occupational sound exposure level to below 85-dBA by the following measures:

a. Engineering Controls

Engineering controls should be the first noise reduction measure to be considered. The sound level can be reduced at the source, along the noise path, or within the hearing zone of the worker.

Engineering controls may include:

- noise source enclosure or enclosure of receiver, for example, construction of a sound proof booth
- substitution with less noisy equipment
- acoustical treatment of walls, ceilings and floor
- process changes

b. Administrative Controls

Administrative controls to reduce workers’ noise exposure may include: changing job schedule such that workers’ exposure to the noise source is within the legislative permissible level and duration; selecting/specifying a lower noise source when purchasing process equipment; ensuring that workers wear their hearing protectors.

c. Hearing Protectors

Where workers are exposed to an 8-hour time weighted average of 85-dBA or equivalently a dose of 50%, hearing protection (which includes ear plugs and/or ear muffs) must be worn by the workers. The hearing protector so provided must attenuate employee exposure to below 85-dBA for an 8-hour time weighted average.

As requested, the Occupational Hygienist-Chemical Control Officer will:

- Provide assistance/advise on selecting various types of hearing protectors
- Arrange for training on the use and care of hearing protectors
- Provide with proper initial fitting of hearing protectors through scheduled documented training sessions (available through the Department of Occupational Health and Safety).
d. Signage

Clearly visible warning signs shall be posted at an area in the workplace where the sound level measured regularly exceeds 85- dBA.

i.) Location of Posting

- If the sound level in the entire room exceeds 85-dBA, the sign shall be posted at the door.
- If only the sound level of a process or equipment exceeds 85-dBA, the sign shall be posted at the approach to the area, and where practicable, on the equipment or in the immediate vicinity.

ii.) Content

a) The warning sign for an area with a sound level equal to or exceeding 85-dBA may include but is not limited to:
   - the tested sound level,
   - the duration of exposure permitted by the Ontario Ministry of Labour for the particular sound level,
   - date of testing,
   - a statement indicating that hearing protection is recommended,
   - requirement for hearing protection.

A sample sign is included in Appendix II, Fig. 1.

e. Training

Where workers may be exposed to an 8-hour time weighted average sound level of 85-dBA, Hearing Conservation training shall be provided by the Department of Occupational Health and Safety.

i. Procedure for Hearing Conservation Training

a) HSO and supervisor identifies employees who require training and contact DOHS.

b) Occupational Hygienist-Chemical Control Officer at DOHS will schedule training sessions.

ii. Frequency

Training for an individual or group will be repeated on the request of the supervisor or the Joint Health and Safety Committee.
VIII Program Review

a. Workplace Audit

Workplace inspectors of the JHSC and DOHS may check for compliance with the Hearing Conservation Program. Where a noise source is identified, the audit/inspection will focus on the posting of signage, the implementation of engineering controls or the provision of hearing protection. The audit will focus on compliance with all aspects of the noise control program, and the results of the audits will be provided to the JHSCs.

b. Hearing Conservation Program Review

Program will be reviewed every 2 years jointly with the JHSCs and H&S representative(s).
APPENDIX I

ONTARIO

REGULATIONS FOR INDUSTRIAL ESTABLISHMENTS

REG. 851, SECTION 139
Ontario Regulations for Industrial Establishments

Regulation 851, Section 139


Note: On July 1, 2007, section 139 following was amended:

139. (1) In this section,

“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;

“decibel” means a unit of measurement of sound pressure level that is equal to 20 times the logarithm to the base 10 of the ratio of the pressure of a sound, divided by the reference pressure of 20 micropascals;

“equivalent sound exposure level” is the steady sound level in dBA which, if present in a workplace for eight hours in a day, would contain the same total energy as that generated by the actual and varying sound levels to which a worker is exposed in his or her total work day, determined in accordance with the formula set out in subsection (2). O. Reg. 565/06, s. 2.

(2) The formula for determining the equivalent sound exposure level is as follows:

\[ L_{ex,8} = 10 \log_{10} \left( \frac{\sum_{i=1}^{n} \left( t_i \times 10^{0.1 \cdot SPL_i} \right)}{8} \right) \]

where,

\( L_{ex,8} \) is the equivalent sound exposure level in 8 hours,

\( \sum \) is the sum of the values in the enclosed expression for all activities from \( i = 1 \) to \( i = n \),

\( t_i \) is a discrete activity of a worker exposed to a sound level,

\( t_i \) is the duration in hours of \( i \),

\( SPL_i \) is the sound level of \( i \) in dBA,

\( n \) is the total number of discrete activities in the worker’s total workday.
(3) Every employer shall take all measures reasonably necessary in the circumstances to protect workers from exposure to hazardous sound levels. O. Reg. 565/06, s. 2.

(4) The protective measures shall include the provision and use of engineering controls, work practices and, subject to subsection (7), personal protective equipment. O. Reg. 565/06, s. 2.

(5) Any measurement of sound levels in the workplace that is done in order to determine what protective measures are appropriate shall be done without regard to any use of personal protective equipment. O. Reg. 565/06, s. 2.

(6) Without limiting the generality of subsections (3) and (4), every employer shall ensure that no worker is exposed to a sound level greater than an equivalent sound exposure level of 85 dBA, $L_{\text{eq},8}$. O. Reg. 565/06, s. 2.

(7) Except in the circumstances set out in subsections (8) and (9), the employer shall protect workers from exposure to a sound level greater than the limit described in subsection (6) without requiring them to use and wear personal protective equipment. O. Reg. 565/06, s. 2.

(8) If this subsection applies, workers shall wear and use personal protective equipment appropriate in the circumstances to protect them from exposure to a sound level greater than the limit described in subsection (6). O. Reg. 565/06, s. 2.

(9) Subsection (8) applies if engineering controls are required by subsections (3) and (4) and,

(a) are not in existence or are not obtainable;
(b) are not reasonable or not 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;
(c) are rendered ineffective because of a temporary breakdown of such controls; or
(d) are ineffective to prevent, control or limit exposure because of an emergency. O. Reg. 565/06, s. 2.

(10) A clearly visible warning sign shall be posted at every approach to an area in the workplace where the sound level, measured as described in subsection (5), regularly exceeds 85 dBA. O. Reg. 565/06, s. 2.
APPENDIX II

SAMPLE NOISE WARNING SIGNS
Hazardous Sound Level

EQUIPMENT/AREA: ______________________________

MEASURED NOISE LEVEL: _______________ dBA

DATE OF TESTING:  _____________________

PERMISSIBLE EXPOSURE DURATION:  _______ HOUR

HEARING PROTECTION MUST BE WORN
APPENDIX III

AUDIOMETRIC TESTING PROCEDURE
# DEPARTMENT OF OCCUPATIONAL HEALTH AND SAFETY

## STANDARD OPERATING PROCEDURE

### AUDIOMETRIC TESTING

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Notify supervisor to schedule appointments for testing.</td>
<td>Occupational Hygienist-Chemical Control Officer</td>
</tr>
<tr>
<td>2. Identify employees requiring audiometric testing.</td>
<td>Supervisor/HSO</td>
</tr>
<tr>
<td>3. Inform related JHSC of the testing date/time/location</td>
<td>Occupational Hygienist-Chemical Control Officer</td>
</tr>
<tr>
<td>4. Day of test – turn Audiometer on and wait 15 minutes for warm-up.</td>
<td>Chemical Control Officer/Audiologist</td>
</tr>
<tr>
<td>5. Ensure equipment is functioning.</td>
<td>OH- Chemical Control Officer</td>
</tr>
<tr>
<td>6. Have employee complete questionnaire (see attached)</td>
<td>OH- Chemical Control Officer</td>
</tr>
<tr>
<td>6. Audiometric test completed and printout of results signed by operator.</td>
<td>Chemical Control Officer/Audiologist</td>
</tr>
<tr>
<td>7. Review questionnaire with employee.</td>
<td>Chemical Control Officer/Audiologist</td>
</tr>
<tr>
<td>8. Review results with employee and have employee sign the document stating that he has been informed of the results.</td>
<td>Chemical Control Officer/Audiologist</td>
</tr>
</tbody>
</table>
| 9. Provide copy of the test for employee’s doctor when test results indicate:  
  a) there is a significant hearing loss,  
  b) a repeat audiogram indicates a shift of 10-dBA average or more | Chemical Control Officer/Audiologist                |
| 10. Maintain record of results in DOHS employee’s personal file. Employee will have right of access to this file. An appointment must be made by the employee to access the file. | OH- Chemical Control Officer                        |
| 11. Arrange annual re-calibration of Audiometer through: AIM Instrumentation Inc, (905) 608-2169 | DOHS Administrative Assistant                      |
APPENDIX IV

HEARING TEST QUESTIONNAIRE
HEARING TEST QUESTIONNAIRE

The information in this questionnaire is collected by the Occupational Hygienist-Chemical Control Officer. All information will be kept in a confidential file located in the Department of Occupational Health and Safety (DOHS). It will not be shared with anyone outside DOHS without your written consent.

Name _____________________________  Department ________________________________

Occupation ______________________  Date Of Birth ( YR / MM/DD ) _______________

Have you ever worked with blasting materials?   □ Yes □ No
Have you ever been in the military?   □ Yes □ No

PERSONAL HISTORY

Are you currently over 40 years of age?*   □ Yes □ No
If not, will you be turning 40 years of age within the next 2 years?*   □ Yes □ No N/A: □
Are you hard of hearing?   □ Yes □ No
Have you ever had noises in your head or ears e.g. ringing sound?   □ Yes □ No
Suffered a head injury or dizziness?   □ Yes □ No
Had ear infections as an adult? As a child?   □ Yes □ No □ Yes □ No
Noticed discharge or running fluid from your ears?   □ Yes □ No
Consulted a doctor about ear problems?   □ Yes □ No
Ever taken quinine or streptomycin?   □ Yes □ No
Do you take aspirin as a regular medication?   □ Yes □ No
Have you ever had encephalitis or meningitis?   □ Yes □ No
Have you had mumps, measles or chickenpox as an adult?   □ Yes □ No
Are you claustrophobic (have fear of being in an enclosed space)?   □ Yes □ No
Do you wear hearing protection?   □ Yes □ No
What type? __________ Is it comfortable?   □ Yes □ No
History taken by_________________________

FAMILY HISTORY

Is anyone in your family deaf?   □ Yes □ No

HOBBIES AND RECREATION

Use firearms or hunt?   □ Yes □ No
Drive snowmobiles?   □ Yes □ No
Use power tools?   □ Yes □ No
Drive a tractor or heavy machinery?   □ Yes □ No
Drive stock cars/ motorcycles?   □ Yes □ No
Play in a rock band?   □ Yes □ No
Other hobby that generates loud noise?   □ Yes □ No

I have been advised of the results of my Hearing Test.
• Audiometric testing is recommended annually for persons 40 years of age and older. It is recommended that persons under 40 years of age undergo audiometric testing every 2 years.
APPENDIX V

AUDIOMETRIC TEST PROCEDURE
DEPARTMENT OF OCCUPATIONAL HEALTH AND SAFETY

AUDIOMETRIC TEST PROCEDURE
For Participants

The object of the audiometric testing program is to identify workers who are beginning to lose their hearing. Further remedial steps can be taken to intervene before the hearing loss becomes worse.

All information remains confidential.

PROCEDURE:

1. Please completed the QUESTIONAIRRE
2. There is no pass or fail.
3. This will test your hearing so there is no need to hold your breath
4. You will hear a series of sounds in your left and then right head at random intensities
5. Press the push button and release immediately once you hear the sound/tone
6. Do not speak during the test
7. The audiologist will inform you when the test is finished
APPENDIX VI

LETTER INFORMING EMPLOYEE’S PHYSICIAN

OF

HEARING LOSS
Date: ____________________

Dear ________________________,

The results of your recent hearing test you received at the Department of Occupational Health and Safety indicate your hearing ability suggests a need for further testing. Please ensure that you provide your family physician with copies of your Audiograms so that he/she is able to further investigate. I have enclosed a copy of your latest audiogram for your reference.

It is important to wear your hearing protection during those activities to eliminate high level of sounds from your exposure. Hearing devices are available from your supervisor and Central Stores.

If you would care to discuss the Hearing Conservation Program, or the University’s Occupational Health Program in general, please contact the Occupational Hygienist-Chemical Control Officer at 416-736-2100 ext 55949.

Sincerely,

________________________

Encl.