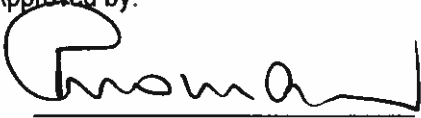
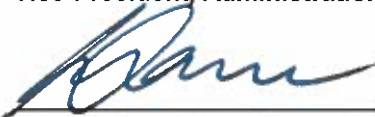


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| Complete Program Title: Noise Control and Hearing Program | Risk Management Manual (RMM) Number: 403 |
| Approved by:  Vice-President, Administration  President and Vice-Chancellor | Date of Most Recent Approval: May 2019 |
| Date of Original Approval: April 2002 | Supersedes/Amends Program dated: December 2015 |
| Responsible Executive: Vice-President, Administration | Enquiries: Environmental and Occupational Health Support Services (EOHSS) eoHSS@mcmaster.ca |
| DISCLAIMER: <i>If there is a discrepancy between this electronic program and the written copy held by the program owner, the written copy prevails.</i> | |

1 PURPOSE

1.1 To provide for protection from noise levels that may cause hearing loss, by ensuring that a hearing conservation program, which includes the following components is in place:

- Adoption by the University of a criterion level of 85 dBA and an exchange rate of 3 dBA for occupational exposure protection against workplace noise; where noise levels are in excess of 82dBA, the area shall be investigated to review opportunities to reduce the noise levels if possible and protect workers from exposure.
- Workplace sound level surveys;
- Noise reduction initiatives;
- Medical surveillance;
- Employee awareness through posting of warning signs and hearing protection training;
- Provide appropriate hearing protection; and
- Periodic audits of the effectiveness of the program.

- 2 To ensure compliance with the Occupational Health and Safety Act. O. Reg. 381/15, standards and applicable regulations as a best practice, SCOPE
- 2.1 All faculty, staff, students, visitors and contractors who may be exposed to hazardous noise levels.

3 Related Documents

- 3.1 Occupational Health and Safety Act and O. Reg. 381/15
- 3.2 CSA Standard Z94. 2-02, Hearing Protection Device.
- 3.3 CSA Standard Z107.56-06, Procedures for the Measurement of Occupational Noise Exposure.

4 DEFINITIONS

- 4.1 **Supervisor:** Person who has charge of a workplace or authority over a worker(s);
- 4.2 **Worker:** means any of the following, but does not include an inmate of a correctional institution or like institution or facility who participates inside the institution or facility in a work project or rehabilitation program:
1. A person who performs work or supplies services for monetary compensation.
 2. A secondary school student who performs work or supplies services for no monetary compensation under a work experience program authorized by the school board that operates the school in which the student is enrolled.
 3. A person who performs work or supplies services for no monetary compensation under a program approved by a college of applied arts and technology, university or other post-secondary institution.
 4. A person who receives training from an employer, but who, under the *Employment Standards Act, 2000*, is not an employee for the purposes of that Act because the conditions set out in subsection 1 (2) of that Act have been met.
 5. Such other persons as may be prescribed who perform work or supply services to an employer for no monetary compensation; ("travailleur");
- 4.3 **Amplitude:** The sound deviation pressure from ambient atmospheric pressure measured in decibels (dB);
- 4.4 **Attenuation:** The reduction in sound pressure (typically 10 to 60 dBA) effect on the ear due to the use of a hearing protector;
- 4.5 **Criterion Level:** The maximum sound level, expressed as a TWA that is permitted over an eight-hour day for a 40-hour week;
- 4.6 **Duration:** The time a sound is heard;
- 4.7 **Exchange Rate:** The dBA level by which a sound (noise) can be increased provided the exposure time is reduced by a factor of two;

- 4.8 **Frequency:** The rate at which cycles of high and low sound pressure are produced by a source of sound. Frequency (Hz) is heard as the pitch of the sound. The human ear hears 20 to 20,000 Hz. Verbal communication is in the range of 500 to 3,000 Hz;
- 4.9 **Hearing Loss:** Caused by noise exposure, aging and synergistic ototoxic effects of chemical exposures and therapeutic drugs;
- 4.10 **Hearing Protector:** A device that is worn to reduce the effect of noise on the auditory system;
- 4.11 **Impulse Noise:** A sudden loud burst of noise of short duration, e.g. a gunshot;
- 4.12 **Noise:** Unwanted sound that causes harm, e.g. hearing loss, stress or interferes with communication;
- 4.13 **Ototoxic:** Causing functional impairment of the ear e.g. hearing loss;
- 4.14 **Synergistic:** The combined effect of exposure to two or more chemicals, physical agents or surroundings (i.e. noise and stress), or drugs;
- 4.15 **Sound Pressure:** Fluctuations in air pressure caused by noise; the louder the noise the greater the changes in air pressure. These fluctuations cause the eardrum to vibrate; and

4.16 **Acronyms:**

- ACGIH:** American Conference of Governmental and Industrial Hygienists
- CSA:** Canadian Standards Association
- dB:** Decibel, a logarithmic measurement of sound pressure, 0 dB is defined as the faintest sound a person with normal hearing can hear.
- dBA:** Decibel A scale; a measurement of sound pressure that has been modified to take into account that the ear is not equally sensitive to all frequencies of sound.
- EOHSS:** Environmental and Occupational Health Support Services
- EHS:** Employee Health Services
- FHS:** Faculty of Health Sciences
- Hz:** Hertz the unit of frequency, i.e. one cycle per second.
- JHSC:** Joint Health and Safety Committee.
- Leq:** Average equivalent noise level; an average of noise calculated from measurements of noise that varies over time.
- NIOSH:** National Institute of Occupational Safety and Health
- TLV:** Threshold Limit Value; refers to sound pressure levels and duration of exposure that represent conditions under which nearly all workers may be repeatedly exposed day after day without adverse health effects on their ability to hear normal speech.

TWA: Time Weighted Average; a measure of the total noise exposure over a specified period of time.

5 RESPONSIBILITIES

5.1 Role of Senior Management: (Deans/Directors/Chairs/Managers):

Senior Managers shall:

- provide the resources and support necessary to implement and maintain hearing conservation or noise reduction programs within their area of responsibility.

5.2 Role of Supervisors (Academic and Administrative):

Supervisors shall:

- identify areas where noise levels are perceived to be potentially harmful;
- arrange through EOHSS or FHS Safety Office to conduct a sound level survey in the designated area;
- initiate noise reduction and control strategies as recommended by EOHSS or FHS in which engineering controls need to be considered initially;
- initiate and maintain hearing conservation programs as recommended by EOHSS or FHS;
- provide hearing protection equipment as necessary;
- post "Hearing Protection Required" areas and supervise the compulsory use of hearing protection in such areas;
- ensure that people working with portable machinery that has been identified as producing noise above the criterion levels, wear the hearing protection provided;
- arrange for persons required to wear hearing protection on an ongoing basis to enroll themselves in an audiometric testing program coordinated by EHS and
- provide instruction on the use, fit, care and limitations of the Hearing Protection, to persons required to wear such equipment.

5.3 Role of Authorized Person (Worker/Student/Visitor):

People authorized to work in hearing protection required areas shall:

- wear hearing protection while working in posted "Hearing Protection Required" areas or with portable equipment or machinery that has been identified as requiring such protection to operate;
- participate in Noise Awareness training;
- enroll in an audiometric testing program as required by this program; and participate in the Hearing Conservation Training Program, where applicable.

5.4 **Role of Central Joint Health and Safety Committee:**

The CJHSC shall:

- Review the Noise Control and Hearing Program on a scheduled basis.

5.5 **Role of Joint Health and Safety Committees (JHSC's)**

The Joint Health and Safety Committees shall:

- review and provide comment on Hearing Conservation Programs;
- assign a member to participate in workplace noise surveys where legally entitled under the OHSA;
- include "Hearing Protection Required" areas in joint health and safety audits of the workplace; and
- report on the effectiveness of such programs.

5.5 **Role of EOHSS and FHS Safety Office:**

The EOHSS/FHS Safety Office shall:

- conduct sound level surveys as required;
- consult on noise reduction and control strategies;
- arrange for annual audiometric testing of persons who are required to work in posted "Hearing Protection Required" areas or with designated portable equipment or machinery which produce hazardous noise levels; and
- provide hearing conservation training.

6 **Procedures**

6.1 **General Procedures**

6.1.1 **Noise Level Surveys:** Shall be arranged by the workplace supervisor in consultation with EOHSS/FHS Safety Office and the JHSC;

6.1.2 **Noise Reduction and Control:** Workplace noise levels shall be minimized by design, engineering controls at the source and / or documented administrative controls;

6.1.3 **Designation and Posting of Hearing Conservation Areas:** When noise reduction efforts fail to reduce the eight-hour TWA below 85dBA, the area will be posted with a sign, which reads *Hearing protection required in this area*. Such signs, and their locations, will be reviewed by EOHSS or FHS;

6.1.4 **Personal Protective Equipment:** The wearing of appropriate hearing protection is compulsory in *Designated hearing protection required areas*. NB. EOHSS or FHS Safety Office to provide consultation on hearing protection where necessary;

- 6.1.5 **Audiometric Testing:** Identified persons required to work in designated hearing conservation areas shall enroll in an audiometric testing program coordinated by EHS;
- 6.1.6 **New Machinery and Equipment:** Noise factors will be considered and identified when ordering new machinery and equipment. When appropriate suppliers will be required to provide noise level data for the equipment being considered; and
- 6.1.7 **Training:** All persons required to work in a designated Hearing Protection area or with machinery and/or equipment that has been designated as requiring the use of hearing protection shall receive training as prescribed by EOHSS or FHS.

7 TRAINING

Persons required to work in designated hearing conservation areas or with machinery or equipment that has been designated to require hearing protection, shall receive training which includes but is not limited to the following:

- Noise Control and Hearing Protection definitions (See Section 4);
- Responsibilities (See Section 5);
- General Procedures (See Section 6);
- Regulatory requirements (See Appendix A);
- The care and use of hearing protection device, including its limitations, proper fitting, inspection and maintenance and, if applicable, the cleaning and disinfection of the device;
- Hearing Protection Guidelines (See Appendix B); and
- Medical Surveillance (See Appendix B).

8 RECORDS

- 8.1 **Retention:** To facilitate external audits by regulatory agencies and investigation of employee claims for hearing loss, records of noise level surveys and the names of persons registered in audiometric testing programs shall be retained indefinitely.
- 8.2 **Filing:** Copies of these records will be maintained by the supervisor and EOHSS/FHS Safety Office.

Appendix A:

Ontario Regulation 381/15

<https://www.ontario.ca/laws/regulation/150381>

Appendix B

Guidelines:

Hearing loss is one of the most prevalent health problems because noise is present everywhere. Once hearing has been damaged it cannot be restored. Hearing conservation cannot be perceived only as a workplace initiative, it is a lifestyle choice, similar to cardiovascular fitness. Understanding the risk must translate into a personal commitment to protect ones hearing both on and off the job.

The decibel levels of some common noise sources are:

| | | | |
|-------------------|-----------|----------------|---------|
| breathing | 10 dBA | food blender | 90 dBA |
| whisper | 20 dBA | passing train | 100 dBA |
| conversation | 30-60 dBA | chain saw | 110 dBA |
| typing | 70 dBA | jet engine | 120 dBA |
| rush hour traffic | 80 dBA | shot gun blast | 140 dBA |

**NIOSH – Recommended Exposure Limit
 Unprotected Occupational Exposure**

Table of Equivalent Noise Exposures

| Steady Sound Level (dBA) | Duration |
|--------------------------|---------------|
| 82 | 16 hours |
| 85 | 8 hours |
| 88 | 4 hours |
| 91 | 2 hours |
| 94 | 1 hours |
| 97 | 30 minutes |
| 100 | 15 minutes |
| 103 | 7.5 minutes |
| 106 | 3.75 minutes |
| 109 | 1.88 minutes |
| 112 | 0.94 minutes |
| 115 | 28.12 seconds |

Sound Level Surveys

The noise level must first be identified and quantified. Measurements are done with a sound level meter to identify locations of concern and those persons at risk. Risk is proportional to sound level amplitude and duration. If the preliminary survey indicates a TWA over 82 dBA, noise dosimetry (i.e. measurements of Leq) in the workplace may be warranted. EOHSS or FHS Safety Office will arrange for such surveys when indicated by the preliminary survey.

Medical Surveillance:

An annual audiometric testing program is offered to all persons exposed to TWA noise levels over 85 dBA. Pre-placement testing is mandatory for persons assigned to work in such areas. EHS will arrange for such testing.

Noise Exposure Reduction

Noise exposure reduction initiatives are approached on the basis of "can the noise source be eliminated or reduced to an acceptable level". New equipment should be specified to meet noise pollution standards; engineering controls (e.g. insulated enclosures) can be applied to a source that cannot be replaced; noise sources might be physically isolated from occupied areas; administrative controls can restrict the number of persons exposed and the duration of exposure. Individuals can be provided hearing protection that meets CSA standards.

Information Training and Warnings

All persons entering the workplace shall be informed about health effects of noise exposure, exposure limits for hearing conservation and the proper selection, fit, care use and limitations of hearing protectors. Warning signs shall be posted at every approach to an area in the workplace and on equipment as necessary to maintain awareness where the sound level measured regularly exceeds 85 dBA.

Hearing Protectors

Hearing protection devices can be divided into three categories; earplugs; semi-aural devices (hearing bands held against the ear canal by a head band) and; ear muffs (which fit over the ears). Hearing protectors are rated according to CSA Standard Z94.2 as Class A, Class B, or Class C protection based on the following values.

| Maximum Equivalent Noise Level (Leq) | Recommended Hearing Protector |
|---|---|
| < 85 dBA | No protection required |
| 85-90 dBA | Class C |
| 89-95 dBA | Class B |
| 95-100 dBA | Class A plug + Class A or Class B muff |
| 105-110 dBA | Class A plug + Class A or Class B muff and limited exposure |

EOHSS/FHS Safety Office can arrange for each situation to be assessed individually and can provide direction as to the Class of and type of hearing protection required in the circumstance. In general, reusable earplugs should be replaced at least every six months,

(or when they lose their elasticity and overall shape) and earmuff cushions should be replaced at least every year.

