Australian National University

Procedure: Noise management

Purpose

The purpose of this procedure is to inform staff of noise and vibration management requirements within the Australian National University (ANU) to ensure compliance with the *Work Health and Safety Act 2011* (Cth), the *Work Health and Safety Regulations 2011* (Cth), and the University's Work Health & Safety (WHS) Management System.

Definitions

Control is anything that is implemented to eliminate or reduce the risk associated with a hazard.

Exposure occurs when a person interacts with a hazard.

Exposure standard for noise is defined as a LAeq, 8h of 85 dB(A) or an LC, peak of 140 dB(C). There are two parts to the exposure standard for noise because noise can either cause gradual hearing loss over a period of time or be so loud that it causes immediate hearing loss.

Hazardous noise in relation to hearing loss means noise that exceeds the exposure standard for noise in the workplace.

Hazard is a source or a situation with a potential for harm in terms of injury or ill-health, damage to property, damage to the environment, or a combination of these (e.g. noise above a certain level can have an impact on hearing).

Health hazard is anything that can cause illness or disease. Exposure can occur over a short or long period of time.

Local area is the relevant College/Research School/Service Division of the University.

Noise is all sound in the workplace, whether wanted or unwanted.

Ototoxic is damage to the hearing caused by a toxin - possibly a chemical or a prescribed medication.

PPE means personal protective equipment.

Risk is the likelihood and consequence of injury or harm occurring.

Temporary Threshold Shift (TSS) is an auditory fatigue after exposure to loud noises. Noise levels in excess of 70 dB (for frequencies between 1 - 4 kHz) can cause a temporary threshold shift.

Vibration refers to mechanical motion/oscillations of solid objects and structures. Vibration can be undesirable, wasting energy and creating unwanted sound or noise. Because sound is generated by vibrating structures, trying to reduce noise is often a problem when trying to reduce vibration.

WEG is the Work Environment Group.

WHS means work health and safety.

Workers is anyone who carries out work for the University and include staff, Visiting and Honorary Appointments (VaHA), volunteers, titleholders, affiliates, labour hiring workers, students gaining work experience and contractors of ANU. HDR students may be ANU workers depending on their role but they are covered under the scope of this procedure.

The Work Health and Safety Management System (WHSMS) Handbook provides practical guidance for University and its local areas on how to implement the University WHS Management System and defines the responsibilities and actions required by management and workers within the management system.

Procedure

Introduction

1. The University promotes a WHS risk management approach to minimise the risks to staff, students, contractors and visitors from noise sources associated with all tasks undertaken within the University.

2. This procedure also covers managing vibration associated with noise.

3. This procedure does not cover ultrasonic or infrasound. These frequencies need special assessment and consideration. Please contact Work Environment Group (WEG) for further information.

4. Noise associated with community events is managed through the Functions on Campus procedure.

5. This procedure is further explained in and supplemented by WHSMS Handbook Chapter 3.13 Noise and Lighting Safety Management.

Noise

6. Noise-induced hearing loss can result from a single exposure to a loud noise or from prolonged exposure to excessive noise in the workplace. Such loss is additional to that experienced through normal ageing. Noise-induced hearing loss is irreversible. It can cause difficulties in communicating, and tinnitus (ringing in the ears), leading to other conditions such as depression.

7. Noise also has non-auditory effects such as:

- increased stress levels;
- increased risk of accidents;
- when combined with certain chemicals, can lead to, or increase, ototoxic effects (see Table 1);
- interference with sleep and relaxation;
- prolonged constriction of blood vessels; and
- reduced work performance.

Table 1: Ototoxic agents

The table contains some common examples of agents known to increase the effects of noise on hearing. Refer to WHSMS Handbook Chapter 3.13 on the management of ototoxic chemicals in relation to noise exposure.

Enhance the effects of noise	**Increase temporary** threshold shift	
Carbon disulphide	Trichloroethylene Toluene	Ethanol Ethyl benzene
Carbon monoxide *	n-Butanol * Lead *	n-heptane n-hexane
Carbon tetrachloride	Mercury	Perchloroethylene
Styrene *	Manganese *	Solvent mixtures and fuels, Stoddard solvent
Xylene *	Arsenic	
Methyl ethyl ketone (MEK)	Organic tin	Acrylonitrile Hydrogen Cyanide
Methyl isobutyl ketone (MIBK)		Organophosphates Paraquat

* May also result in hearing loss

Vibration

8. Exposure to vibration in the workplace occurs through contact with various pieces of equipment such as tools, machinery and vehicles. Vibration exists as:

- whole body vibration, which transmits through the entire body, for example when driving a heavy vehicle. This can have negative health effects such as increased heart rate and digestive problems, through to pain and damage to the spine. These effects are dependent on the vibration's frequency.
- hand-arm vibration, which occurs though the hand and arm, for example when using hand operated tools. This can cause problems with blood circulation in the hand and forearm, and potentially damage nerves and tendons. ‘White finger syndrome' is one condition caused by excessive vibration to the hands.

Legislative requirements

9. Under the *Work Health and Safety Act 2011* (Cth) and the *Work Health and Safety Regulations 2011* (Cth), to conserve hearing the University manages hazardous noise level (i.e. 85 dB(A) LAeq 8h, and 140 dB(C) peak exposure level). For further information on vibration exposure standards contact WEG at https://services.anu.edu.au/human-resources/health-safety.

10. Excessive ambient noise levels in offices and computer rooms can cause discomfort. University office and computer-based work environments are ideally:

- less than 50 dB(A) where work is being carried out that requires continual high concentration; and
- less than 70 dB(A) where more routine work is carried out that requires speed, attentiveness, or sustained conversations.

Responsibilities

11. Each Dean or Director, or their nominated representative, is responsible for ensuring:

- suitable facilities and resources are available to create a safe and healthy workplace;
- workplace inspections are completed to identify noise, vibration and other hazards;
- workers and students are not exposed to noise level that exceeds the exposure standard (i.e. 85 dB(A) LAeq 8h, and 140 dB(C) peak exposure level);

- that workplace noise and vibration issues are highlighted at induction and that proper training of skills to manage noise and vibration is conducted;
- that all workers who are required to wear hearing protections frequently as a control measure for noise that exceeds the exposure standards are identified in the Health Monitoring Plan; are provided with audiometric testing as soon as possible within 90 days of them commencing work; and are frequently retested. This is performed using WHSMS Handbook Chapter 3.13 Section 3.13.2.4 requirements;
- plant and equipment is purchased that do not exceed the general 80dB(A) or 130 dB(C) peak noise or 50 dB(A) for office and computing equipment; and
- plant and equipment purchased does not expose workers vibration where possible, or if not possible, exposure is kept minimal; and
- any other responsibilities as prescribed by WHSMS Handbook Chapter 3.13 for Directors and Deans.

12. Managers and Supervisors are responsible for:

- ensuring any incidents, exposures, or hazards are reported via Figtree;
- ensuring any WHS concerns, complaints or issues are recorded in Figtree in accordance with WHSMS Handbook Chapter 3.17 processes;
- ensuring job descriptions accurately reflect potential noise and vibration exposure;
- ensuring workers and students are not exposed to noise level that exceeds the exposure standard (i.e. 85 dB(A) LAeq 8h, and 140 dB(C) peak exposure level);
- conducting an initial noise hazard identification and conduct a full risk assessment, as required, on noise in accordance with WHSMS Handbook Chapter 3.13 Section 3.13.2.2 processes.
- managing noise hazards and risks by implementing effective controls to immediately reduce exposure to hazardous noise or if not possible, cease the activity and engage a competent person (e.g. a sound hygienist) to conduct a full noise assessment. See WHSMS Handbook Chapter 3.13 Section 3.13.2.2 and 3.13.2.3 for details;
- ensuring noise, and if applicable vibration, is discussed in detail using the Tier 3 High Risk Area WHS Induction template as included in WHSMS Handbook Chapter 3.2;

- identifying noisy areas or hearing protection zones in consultation with the WHS Officers or equivalent, including actively looking for the signs of noise and vibration hazards;
- providing appropriate hearing protectors (as required) in accordance with Appendix D WHSMS Handbook Chapter 3.13 and the supplies for maintaining them See: Personal Protective Equipment (PPE) Procedure;
- providing specific training during Tier 3 High Risk Area WHS Induction on the appropriate fit, use, storage, maintenance and disposal of hearing protectors;
- ensuring equipment is properly maintained to reduce noise and vibration;
- ensuring controls to reduce vibration exposure are in place and enforced, for example operating equipment at a speed recommended by manufacturer; and
- any other responsibilities and actions prescribed by WHSMS Handbook Chapter 3.13 Noise and Lighting Safety Management.

13. Workers of the University are responsible for:

- reporting all incidents, injuries, hazards, near misses to immediate supervisors in accordance with WHSMS Handbook Chapter 3.16 requirements;
- contributing to and complying with safe work procedures and guidelines to ensure not only their safety, but also that of fellow staff, students, contractors and visitors;
- adopting safe work practices that minimise noise and vibration and their effects;
- using suitable facilities and resources to ensure a safe and healthy work environment;
- notifying supervision as soon as practicable when they become aware of any defect or concerns in noise or vibration control equipment;
- correctly wearing appropriate hearing protection in designated areas or during the processes in accordance with the risk assessment decisions See: Personal Protective Equipment (PPE) Procedure;
- inspecting hearing protection regularly and reporting any damage or deterioration in accordance with frequency specified in the local area's Local WHS Plan;
- following instructions provided and maintaining their reusable hearing protection by cleaning and storing it correctly;
- actively taking part in any training identified in the WHS Local Training Plan;

- contributing to ongoing monitoring and evaluation of noise control measures; and
- where relevant, participating in the University's health monitoring program at the defined frequency in accordance with WHSMS Handbook Chapter 3.13 Section 3.13.2.4 requirements.

Managing noise at ANU

Purchasing

14. Before buying any new equipment, consider the effects of noise and vibration on the equipment operators and the workplace. Refer to University Plant (equipment) hazard management procedure for further information.

15. Where possible, buy goods that have low noise emission. In cases where noise from the equipment is likely to exceed the University's general 80 dB(A) limit, or 55dB(A) for office and computing equipment, the manufacturer or supplier provides acoustic treatment that reduces the noise to acceptable levels.

16. Consider how to reduce noise when planning areas that contain noisy plant and equipment and conduct a risk assessment on the plant/equipment or area, taking into account all hazards including the noise hazards.

17. Consider buying new, quieter, smoother equipment to replace out-dated, noisy or vibrating equipment as elimination or substitution controls.

Design

18. If the work requires designing a plant/equipment, noise reduction is considered in the planning stages of areas that contain noisy plant and equipment. Seek professional advice from your local WHS Officers or WEG WHS Consultants or acoustic engineers during the planning stage on engineering and structural solutions or equipment purchase.

19. When designing or building plant or equipment, consider how to minimise noise and vibration. Also consider how new equipment adds to the overall level of noise and vibration.

20. Information is provided to users about plant and equipment noise emissions.

Identification of noisy areas

21. Local area workplace inspections and audits may be used to identify potential hazardous noise exposure.

22. Managers and supervisors adhere to WHSMS Handbook Chapter 3.13 Section 3.13.2.2 Implementation – Hazard Management requirements.

23. Some signs of a potentially noisy environment of concern include:

- noting whether personnel a metre away from each other can communicate clearly without raising their voices; or
- staff concerns or complaints about noisy equipment reducing concentration and performance.

24. If any concerns of noise hazard is identified in the Hazard Identification (Appendix B WHSMS Handbook Chapter 3.13), develop controls to immediately reduce exposure or control the hazard. Where not possible, the work is ceased and the local area engages a competent person (e.g. a sound hygienist) to conduct a full noise assessment and to prepare a noise management plan in accordance with WHSMS Handbook Chapter 3.13 Section 3.13.2.2

25. Re-assess noise levels or the risk assessment in an area if there is:

- a change of plant/equipment;
- a change in workload or equipment operating conditions;
- a change in building structure;
- a changed work arrangement causing employees to spend more time in noisy areas; or
- a request by a WHS committee member or worker.

26. Areas where people may be exposed to hazardous noise (i.e. 85 dB(A) LAeq, 8h or 140 dB(C) LCpeak) are sign-posted as hearing protector areas and the boundaries of these areas are clearly defined.

27. Signage is clear, unambiguous and placed where it can be seen clearly and is adhered to. See Appendix D WHSMS Handbook Chapter 3.13 for details of the signage.

28. Noisy equipment (such as chainsaws, workshop equipment or powered hand tools) has labels which remind workers of the need for hearing protection. The requirement for hearing protection is included in the local area training for these items and induction for the hearing protector areas.

Managing WHS risk

29. Noise and vibration hazards is managed in the same way as other hazards, by conducting a hazard and risk assessment and implementing appropriate controls.

30. Workers are provided information, instruction and training on the risks and required controls such as during induction, training, regular meetings (for example toolbox talks) and any other communication channels before performing the tasks or working in a hearing protector area.

31. Hazard registers are reviewed after any significant changes that affect noise levels, or at least annually as a minimum. Risk assessments are reviewed in accordance with WHSMS Handbook Chapter 3.1 requirements.

32. Safe Work Procedures include instructions to work safely with noise and vibration exposure risks and appropriate controls, including PPE requirements.

33. Where equipment exceeds noise exposure standards, the best approach is to remove noise at the source by following the Hierarchy of Control. Below are some examples of controls that can ld be considered:

- eliminating the source of the noise: buying new, quieter equipment to replace old noisy equipment;
- substituting or modifying the hazard: replacing it with another process or quieter equipment;
- isolating noisy equipment by physically removing it from the general work area;
- engineering methods and structural solutions: for example, enclosing the noisy equipment or the operator; applying absorbent gaskets, mufflers and cladding to reduce vibration and noise levels; regularly maintaining equipment; modifying processes if possible; reducing impact noise during handling processes; and using sound absorbing materials in the room, or in partitions, to separate the noisy area; and
- administrative controls such as limiting work time on noisy equipment, rotating employees, putting signage in high noise areas, using noisy equipment when fewer employees are present and providing quiet areas for rest breaks.

34. PPE are used in combination with other measures implemented and are not a sole measure that are relied on.

35. Workers may still need hearing protectors to reduce residual noise level and increase comfort level.

36. Additional control measures can be applied to reduce specific workplace noise and vibration in the workplace. See WHSMS Chapter 3.13 Appendix A for further examples or Contact WEG at whs@anu.edu.au for advice.

Health monitoring

37. The University offers health monitoring to all staff exposed to hazardous noise requiring frequent wearing of hearing protections as a control measure. Monitoring includes a baseline assessment as soon as an employee commences work, or before commencing work if possible. The frequency of the retest depends on the nature of the exposure in accordance with WHSMS Handbook Chapter 3.13 Section 3.13.2.4 requirements.

See: Health surveillance procedure

38. The University recognises that PPE (hearing protectors) are required as part of noise management, particularly:

- as an interim measure until alternate noise reduction measures are effective; or
- where the equipment or task still exceeds the allowed noise level even after applying reasonable noise control measures; or
- where the combined hazards of noise and ototoxic agents increases the risk of hearing damage (see Table 1). This risk is reduced in part by wearing hearing protection.

39. The maintenance of hearing protectors includes the following requirements:

- hearing protectors, like all personal protective equipment, are cared for and maintained according to manufacturers' instructions;
- cleaning is recommended prior to each use. A wipe with warm soapy water is all that is required once a day. Commercial wipes are also available;
- the protector is stored in a clean, dry environment;
- the protector is inspected for defects and damage; and
- any worn or damaged parts are reported to a supervisor so the protectors can be repaired or replaced.

40. Hearing protection is specifically prescribed according to noise levels and working conditions. Refer to WHSMS Handbook Chapter 3.13 Appendix D for details of Personal Hearing Protector selection.

41. Where helmets or face shields are worn, hearing protection, if required, is incorporated into the head gear.

42. Visitors to hearing protection zones are provided with hearing protection to use while in the zone.

43. Employees are given instructions on use, fit, care, maintenance and storage of their personal hearing protectors (see paragraph 42).

Warning Ear-phones/buds and headphones are not hearing protection - listening to loud music through these devices can actually increase hearing loss. These entertainment items are never used as control measures for preventing exposure hazardous noise nor in the hearing protector areas.

44. The use of (or consideration of the use of) PPE (for example gloves) for the control of vibration are a risk assessment decision. You may wish to seek professional advice from WHS Officers or WEG WHS Consultants.

Training

45. The University provides noise and vibration training to workers in at-risk areas, including managers and supervisors, health and safety representatives and staff responsible for buying plant and equipment. Training is included in the Workshop and trade safety course but can be arranged as necessary and are included in local area training plan.

46. Noise management training and awareness covers:

- awareness of the effects of noise on the ear and hearing;
- University requirements for noise management;
- workplace noise assessment and monitoring;
- reducing noise;
- all aspects of personal protective equipment; and
- the role of health monitoring (i.e. audiometry).

47. Vibration management training and awareness covers:

- awareness of the effects of vibration on the body; and
- control measures for vibration.

This procedure is further explained in and supplemented by WHSMS Handbook Chapter 3.13 Noise and Lighting Safety Management.

Document information

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