Safety Services Guidance

Occupational Noise

Key word(s):	Occupational noise, sound, hearing, decibel, noise induced hearing loss (NIHL), Noise at Work Regulations 2005
Target audience:	Managers and staff with responsibility to control noise within the workplace

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Introduction

1. Noise can be described as unwanted sound. Sounds and noise are an important part of everyday life; however, at high levels, they can cause health and hearing problems.

2. In an occupational setting, there is a legal duty on the employer to eliminate or reduce excessive noise to defined levels. See Table 1: Exposure action values and exposure limit values.

3. A decibel (dB) is a unit of sound pressure measured on a logarithmic scale from a base level taken to be the threshold of hearing (0 dB). To take into account the way the human ear responds to sound of different frequencies, an A-weighting is commonly applied. Noise measurements are therefore often expressed in dB(A).

4. The duration of exposure to sound is very important. Noise levels and length of exposure are calculated during an assessment to provide a daily personal limit (LED,d). The daily personal exposure limit is based on an 8 hour working day and is compared to the actual exposure to sound, which depends on how long an individual undertakes a certain activity, uses a piece of equipment or works in a certain location.

5. Sensitivity to sound differs from one individual to the next, but research shows that damage to hearing can start when noise levels are higher than 85 dB (A), which is about the loudness of heavy traffic. The parts of the ear that process high frequency sounds are usually the first to be affected. The degree of hearing loss depends on the loudness of the noise and the duration of exposure. Sudden explosive sounds, such as gunshots, can cause immediate damage.

6. Once hearing is damaged, it cannot be restored.

Exposure action values and exposure limit values

	Daily or weekly noise exposure	Peak sound pressure	Action required
Lower exposure action values	80dB (A weighted)	135dB (C-weighted)	If the noise levels are higher than this value – a) Suitable and sufficient information, instruction and training should be provided to

	Daily or weekly noise exposure	Peak sound pressure	Action required
			staff and students; b) Schools should provide hearing protection on request.
Upper exposure action values	85 dB (A-weighted)	137 dB (C-weighted)	If the noise levels are at or above this value – a) Schools should ensure as far as practicable that staff / students are wearing hearing protection; b) The area should have signage specifying hearing protection is mandatory and access to the area must be restricted as far as is practicable. If the noise levels exceed this value a programme of technical or organisation measures (or both) should be established to reduce exposure to as low as is reasonably practicable.
Exposure limit values	87 dB (A-weighted)	140 (C-weighted)	Staff or students must not be exposed to noise exceeding this value. If the noise levels exceed this value the School should ensure that action is taken to reduce the exposure limit to below this value.

Do you have a noise problem?

7. As a guide, potentially harmful noise levels are quite likely where staff / students

   (a) have to shout to be clearly heard by someone 2 metres away;
   (b) experience temporary dullness of hearing, or ringing in their ears after leaving the work space;

(c) are exposed to impulsive noises such as the sudden release of compressed air, or loud explosive noises from equipment such as cartridge-operated tools;
(d) are exposed to high-level impact noise from hammering on metal surfaces, or using chipping hammers; or
(e) work close to noisy machinery.

Risk assessment

8. When a school carries out work which is likely to expose its staff or students to noise, it must make a suitable and sufficient assessment of the risk to health and safety created by the noise at the workplace.

9. When conducting the risk assessment the competent person must assess the levels of noise to which workers are exposed to by:-

(f) observation
(g) reference to information on noise levels from manufacturers /suppliers of machinery or equipment
(h) if necessary by measurement of the level of noise to which a member of staff / student may be exposed

10. Schools must determine whether their staff or students will be likely to be exposed to noise at or above a lower action value, an upper action exposure level or an exposure limit value. In completing the risk assessment, consideration must be given to the following factors.

(a) Level, type and duration of exposure, including any exposure to peak sound pressure;
(b) The effects of exposure to noise on staff / students whose health is at particular risk from such exposure;
(c) So far as is practical, any effects on the health and safety of staff / students resulting from the interaction between noise and the use of toxic substances at work, or between noise and vibration;
(d) Indirect effects on the health and safety of staff and students resulting from the interaction between noise and audible warning signals or other sounds that need to be audible in order to reduce the risk at work;
(e) Information provided by manufacturers of work equipment;
(f) Availability of alternative equipment designed to reduce the emission of noise;
(g) Any extension of exposure to noise at the workplace beyond normal working hours, including exposure in rest facilities;

(h) Appropriate information obtained following health surveillance, including, where possible, published information;
(i) Availability of personal hearing protectors with adequate attenuation characteristics.

11. Using information from suppliers of equipment about sound levels, the risk assessor may be able to establish that none of the exposure action or limit values are likely to be exceeded or approached. If so this finding should be recorded with justification, and no further action is necessary.

12. If action or limit values are likely to be exceeded, or if the desktop assessment is inconclusive, the "hierarchy" of controls should be considered, and noise sources removed, replaced with quieter models or enclosed, if any of these steps are reasonably practicable.

13. If the noise source(s) cannot be removed or replaced, it may be necessary to carry out an occupational noise survey. This will require sound level measurements to be undertaken by a competent person. Measurements may need to be taken at different places and times throughout the working day or working night. The person carrying out the measurements must have sufficient training or knowledge in carrying out noise measurements and practical experience in using sound-measuring equipment.

14. Measurements taken will generally include sampling to accurately represent the daily exposure of a member of staff / student to the noise being assessed. Measurements must also take account of the particular characteristics of the noise to be measured, the length of time of exposed, any exposure to impulsive noise and other ambient factors. The characteristic of the measuring apparatus also has to be considered, including the meter's response time and its design specification. Meters must be calibrated each time it is used, and in accordance with the manufacturer's recommendations.

15. Any uncertainties in an assessment of exposure to noise can arise from variability in the level of noise and the duration of exposure. If the exposure value is close to an exposure action level then it is practical to proceed as if the exposure action value has been exceeded, or ensure that the assessment is sufficiently precise to demonstrate that exposure is below the exposure action value.

16. Consultation with the workforce is a legal requirement and enables staff / students to be made aware of any safety procedures and improvements before they are introduced.

17. Schools must maintain records of all results of noise surveys and any checks carried out on staff or students hearing. However, within the Control of Noise Regulations 2005, there is nothing specific to indicate the length of maintaining records. Risk assessments must be kept for five years.

18. Hearing impairment is a disability. A demonstration of what it sounds like is at http://www.hse.gov.uk/noise/demonstration.htm Noise induced hearing loss is cumulative over many years, and may not become apparent to the affected person for many years. All noise survey data, together with the associated risk assessment and names of those exposed, should be sent to Safety Services for retention for forty years.

19. Safety Services can provide occupational noise surveys and advice, on request.

Monitoring & Health Surveillance

20. Schools should regularly check that the measures in place to prevent or control noise are working effectively.

21. If the risk assessment concludes that anyone is likely to be regularly exposed above the upper exposure action values, or is at risk for any reason (e.g. they already suffer from hearing loss or are particularly sensitive to damage), the individuals should be referred to Occupational Health for health surveillance (hearing checks).

22. The risk assessment should be reviewed regularly and if there is reason to suspect that the risk assessment is no longer valid; or there has been a significant change in the work to which the assessment relates. For instance:-

    (a) installation or removal of machinery;
    (b) substantial changes in workload, work pattern or machine speeds;
    (c) changes to the building structure or machine layout;
    (d) experience machine wear or general deterioration;
    (e) making modifications to machinery or introduce automation; and
    (f) make changes to any noise control programme; or
    (g) every two years.

Changes to the risk assessment

23. Where, as a result of the review, changes to the risk assessment is required, the member of staff or student concerned or their representative should be consulted on the assessment of risk. The employer must record the

(i) significant findings of the risk assessment as soon as practicable after the risk assessment is made or changed; and
(j) measures which he has taken and which he intends to take to meet the requirements of regulations.

Practical options for controlling noise exposure

24. Eliminate sources of noise. The removal of a source of noise is the most effective way to prevent risks to workers, and should always be considered when new work equipment or workplaces are planned. Schools should consider adopting a low noise procurement policy.

25. Control noise at source. The reduction of noise, either at its source or along the path between source and exposed person(s), is considered to be the most effective method to manage the risk of noise exposure. Schools should consider all noise generating equipment and its maintenance in addition to the design / layout of the workplace. A range of engineering controls can achieve this, including

(k) Isolation of the source by enclosing the noise generating machinery or vibration damping;
(l) Insulation through reduction at the source or in the path by installing enclosures or barriers, mufflers or silencers or by reducing machine speeds;
(m) Absorption when noise passes through materials (eg foam, mineral, wool etc) some of its energy is absorbed.
(n) Damping through conversion of mechanical vibration into heat (e.g. metal / plastic / metal panels)
(o) Silencing through the installation of silencers e.g. engine silencers

Personal Hearing Protection

26. As with all types of personal protective equipment, this is always the last control measure to be considered. It should only be considered where other controls are not reasonably practicable. All types of personal ear protection should carry a CE marking.

27. The purpose of personal hearing protection is to protect the user from any adverse effects on hearing caused by exposure to high levels of noise. All hearing protection must be capable of reducing exposure to below the upper exposure action value i.e. 85 dB (A)

28. Application and limitations of various types

Earmuffs 1. Banded 2. Helmet mounted 3. Communication muffs	**Advantages** • Worn on the outside of the ears so less chance of infection. • Clearly visible therefore easy to monitor • Can be integrated into other forms of PPE e.g. head gear.	**Limitations** • Can be uncomfortable when worn for long periods. • Incompatibility with other forms of PPE. • Effectiveness may be compromised by long hair, spectacles • Requires correct storage facilities and regular maintenance.
Ear Plugs 1. Pre-moulded 2. User formable 3. Custom moulded 4. Banded plugs	**Advantages** • Easy to use and store- but must be inserted correctly. • Available in many materials and designs, disposable. • Relatively lightweight and comfortable. Can be worn for long periods. • Cheap	**Limitations** • They are subject to hygiene problems unless care is taken to keep them clean. • Correct size may be required. Should be determined by a competent person. • Interferes with communication. • Worn inside the ear, difficult to monitor.

29. Any PPE is only effective if it is the right protection for the risk, it is in good condition and repair and it is worn properly. Schools should set up monitoring checks on the condition of PPE and whether it is actually being worn in accordance with the risk assessment and training.

30. The HSE noise microsite provides a lot of useful information, http://www.hse.gov.uk/noise/index.htm

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