

TOPIC INSPECTION PACK

NOISE

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1 Introduction

This document provides guidance for inspectors on the inspection of work activities involving risks from noise, and on enforcement of the Control of Noise at Work Regulations 2005. It is supplemented by supporting information in a series of appendices.

1.1 Noise-induced hearing loss

Exposure to high levels of noise causes gradual damage to hearing, which adds to the increasing deafness that is normal as people age. As noise-induced hearing loss (NIHL)

develops it can become disabling: conversation becomes difficult, people have difficulty using the telephone and cannot hear certain sounds in speech like 't', 'd' and 's'. Exposure to noise can also cause tinnitus, which is a sensation of noises in the ears such as ringing or buzzing. Tinnitus can occur in combination with hearing loss. To be aware of the impact hearing loss can have for an individual, you should listen to the audio demonstration of hearing loss on HSE's website at www.hse.gov.uk/noise/demonstration.htm.

Hearing damage can also be caused by sudden, extremely loud noises.

1.2 Scale of the problem

There are estimated to be more than a two million people in Great Britain exposed to noise at work above the lower exposure action value (see below) and more than one million exposed above the upper exposure action value. Noise-induced hearing loss is the second most common reason for occupational health-related employers' liability insurance claims.

2 The Control of Noise at Work Regulations 2005

2.1 Exposure action and limit values

The duties of employers under the Noise Regulations are dependent upon the daily personal noise exposure ($L_{EP,d}$)¹ or the peak sound exposure (L_{Cpeak})² of employees and, sometimes, upon other evidence of risk from noise. This Topic Inspection Pack deals mainly with daily personal noise exposure, except for section 7 (Enforcement Guidance), where guidance is given on Prohibition Notices in relation both to daily exposure and peak noise. Any concerns relating to the peak sound exposure should be discussed with a Noise and Vibration Specialist Inspector (see section 8).

Table 1: Exposure action and limit values (Control of Noise at Work Regulations 2005)

Lower exposure action values	$L_{EP,d}$ of 80 dB,	L_{Cpeak} of 135 dB
Upper exposure action values	$L_{EP,d}$ of 85 dB,	L_{Cpeak} of 137 dB
Exposure limit values	$L_{EP,d}$ of 87 dB,	L_{Cpeak} of 140 dB
Note: When assessing personal noise exposure or peak sound exposure, no account is taken of the protection afforded by any personal hearing protection which may be being worn. However, when assessing whether compliance with the exposure limit values is achieved, such protection can be taken into account.		

2.2 Duties of employers

HSE guidance on the Regulations can be found in Part 1 of publication L108.

Table 2: Summary of duties of employers (Control of Noise at Work Regulations 2005)

Requirement	Circumstances	Regulation
Risk assessment		

¹ Daily personal noise exposure ($L_{EP,d}$) is assessed based on A-weighted sound pressure levels and durations of exposure, and expressed in decibels (dB)

² Peak sound exposure (L_{Cpeak}) is assessed based on instantaneous C-weighted peak sound pressure, and expressed in decibels (dB)

Conduct noise risk assessment, assess likely exposure and identify means required for compliance.	Lower exposure action values liable to be exceeded	Reg 5(1) Reg 5(2) Reg 5(3)
Record significant findings of risk assessment and produce action plan for compliance with Regs 6, 7 and 10	As indicated by the risk assessment	Reg 5(6)
Control of risk and exposure		
Eliminate risk from noise exposure at source or reduce it to ALARP	Any level of exposure (but subject to reasonable practicability)	Reg 6(1)
Reduce noise exposure to ALARP (programme of organisational/technical measures, other than PPE)	Upper exposure action values likely to be exceeded	Reg 6(2)
Ensure employees are not exposed above the exposure limit values		Reg 6(4)
Personal hearing protection		
Make personal hearing protectors available on employees' request	Lower exposure action values likely to be exceeded	Reg 7(1) Reg 7(4)
Provide suitable personal hearing protection	Upper exposure action values likely to be exceeded	Reg 7(2), Reg 7(4)
Designate, mark and control hearing protection zones	Upper exposure action values likely to be exceeded	Reg 7(3)
Ensure personal hearing protectors are fully and properly used	Where hearing protectors supplied under Reg 7(2)	Reg 8(1)(a)
Ensure personal hearing protectors are maintained	Where hearing protectors supplied under Regs 7(1) or 7(2)	Reg 8(1)(b)
Other		
Ensure noise controls are fully and properly used and maintained	Where action is taken to comply with Reg 6	Reg 8(1)
Place employees under suitable health surveillance (including audiometry and keeping of health records). If hearing damage is found, ensure employee is informed, review risk assessment and review control measures.	There is a risk to health from noise (likely daily personal noise exposure frequently above upper exposure action value)	Reg 9
Provide information, instruction and training	Lower exposure action values likely to be exceeded	Reg 10

3 When to Focus on Noise

Where the daily personal noise exposure is likely to be above the upper exposure action value, the risk of serious ill-health is significant and you should treat noise as a matter of evident concern (see OC 18/12).

Where noise exposure is between the lower and upper exposure action values there is a lesser but still quantifiable risk, and employers should be encouraged to take action to reduce risks and exposures so far as is reasonably practicable.

Many of the activities listed in Appendix E will result in daily personal exposures above the upper exposure action value unless exposure times are very short.

The information in Section 4 below may help you decide if the upper exposure action value is likely to be exceeded.

As a **rough guide**, it is likely that the upper exposure action value ($L_{EP,d}$ of 85 dB) will be exceeded if:

- You have to raise your voice to talk to someone about 2 m away and employees are exposed to the noise for most of the working day;
- You have to raise your voice to talk to someone about 1 m away and employees are exposed to the noise for more than two hours;

4 Risk and Exposure Assessment

The employer's risk assessment should establish whether the lower or upper exposure action value is likely to be exceeded and, if this is the case, the risk assessment should result in an action plan for control of risk and compliance with the Noise Regulations. For most occupational noise exposures the $L_{EP,d}$ will be the measure of exposure of most importance.³

The absence of a suitable risk assessment should not preclude the taking of action on noise since the employer's risk assessment is only one piece of information that an inspector can use to form an opinion on whether an action value is likely to be exceeded. An inspector's own observations and knowledge, supplemented perhaps by sample noise measurements, can be used to form an opinion on whether there is a risk to be managed.

When estimating $L_{EP,d}$ you need information on the noise level or levels to which employees are exposed, and the duration of the exposure(s) during the working day. You can:

- refer to the employer's noise risk assessment, where $L_{EP,d}$ has been calculated or there is sufficient information to allow it to be calculated, and you are satisfied that the assessment reflects the working conditions;
- draw comparison with your experience of noise exposures and records of noise risk assessments in similar premises;

³ The peak noise level can be significant for some highly impulsive or impactive sources, such as explosives, firearms, drop forges and some punch presses. L108 Appendix 2 contains further information, but a Noise and Vibration Specialist Inspector should be consulted if enforcement action for peak noise is envisaged.

- use a sound level meter (measure the A-weighted L_{eq}), determine the typical exposure duration and estimate the exposure using the ready reckoner (<http://www.hse.gov.uk/noise/dailyexposure.pdf>) or calculator (<http://www.hse.gov.uk/noise/calculator.htm>) on the noise section of the HSE website; or
- use the 'rough guide' above to decide whether the upper exposure action value is likely to be exceeded.

Note that when determining daily personal noise exposures, for comparison with the upper and lower exposure action values, no account should be taken of the effect of any personal hearing protection.

The noise risk assessment (required by Regulation 5) is not an end in itself, but should result in an action plan to achieve compliance with the regulations. Where there is evidence of failure to comply with the Noise Regulations, formal enforcement of Regulation 5 alone will not usually be the appropriate action.

5 Control and Management of Risk

5.1 Control by organisational or technical measures

The noise controls described in the Tables in Appendix E have been established as good practice in the industries concerned and will often be reasonably practicable, depending on local circumstances (the list is not exhaustive). Inspectors should seek to secure compliance with Regs 6(1) and 6(2) through interventions to ensure that the employer adopts suitable controls to eliminate the risk from noise, or to make the exposure as low as is reasonably practicable (ALARP).

5.2 Personal hearing protection

Although personal hearing protection (earmuffs or ear plugs) are relied on extensively by employers, their use should only be relied on as a short-term measure until the noise has been controlled by technical or organisational means. Long-term use of hearing protection is appropriate to protect against the residual risk if the upper exposure action value is still likely to be exceeded after the exposures have been reduced to as low a level as is reasonably practicable (ALARP).

5.3 Health surveillance

A suitable health surveillance programme (audiometry) must be in place for employees who are at risk from noise (Regulation 9). HSE's guidance (L108) states that this is expected where exposures frequently exceed the upper exposure action value. The health surveillance should enable any new cases of hearing loss to be detected and existing cases to be monitored. The results (anonymised as appropriate) for groups of employees should be given to the employer to help monitor the effectiveness of the controls. A health record should be kept for each employee under health surveillance. The employer should also have a clear policy for the future management of affected employees.

Any concerns over:

- the quality of service provided by an occupational health provider or the feedback provided to the employer;

- an employer’s failure to take account of recommendations and/or information supplied by the health surveillance provider on management of affected employees; or
- inadequate health records,

should be referred to an Occupational Health Inspector.

6 Risk control indicator

The risk control indicator (RCI) used to assess an employer’s performance in managing risks from noise is reproduced from Operational Guidance in Table 3. Not all the elements of the risk control indicator will be relevant in all circumstances.

Table 3: Risk control indicator

Noise	Has exposure to noise been reduced to ALARP by organisational and technical means (or is a viable plan in place to achieve this); is any continuing and residual risk managed through providing suitable personal hearing protection, with systems to ensure full and proper use; are management arrangements in place including a positive purchasing policy for quiet equipment; is a suitable health surveillance programme in place?
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The risk control indicator assessment scale is reproduced in Table 4.

Table 4: Risk control indicator scale

Risk Control Indicators – Assessment Scale	
Each risk control indicator should be assessed against the following 1-6 scale.	
1	High standards. Some aspects meet best practice.
2	Good standards. Minimum legal requirements have been met.
3	One or more minor shortcomings. As these shortcomings are not serious, they can be dealt with informally with oral advice.
4	Standards are patchy. It is necessary to address one or more shortcomings by giving formal instructions for remedial action to be taken. Formal instructions may be implemented by, e.g., obtaining a verbal undertaking from the company to take specific action, sending a letter, or physical removal / disposal of items.
5	Standards generally unsatisfactory. Typically, there is at least one contravention that gives rise to a discernible risk gap.
6	Standards unacceptable. Unless applying the EMM identifies duty holder factors that provide strong mitigation, issuing a notice and / or prosecution is likely to be appropriate.

The aide-mémoire for noise topic inspection (Appendix A) may be used to ensure the necessary information is gathered to assess performance against the above indicator.

7 Enforcement guidance

When applying the Enforcement Management Model (EMM) to noise, the benchmark is set at ‘Nil/Negligible risk of serious health effect’ (see [Appendix B](#)). This benchmark is in line with HSE’s objective for the elimination of noise-induced hearing loss. Appendix B shows that the risk gap is ‘substantial’ for unprotected daily personal exposures above 80 dB and ‘extreme’

above 85 dB. The Initial Enforcement Expectation is an Improvement Notice requiring control of exposure where exposure exceeds the upper exposure action value **and** exposure is not ALARP (Reg 6(2)).

For exposures between the lower and upper exposure action values the Initial Enforcement Expectation is a letter where it is reasonably practicable to reduce the risk further (Reg 6(1)); and an Improvement Notice where a dutyholder has failed to provide hearing protection at any employee's request.

The current Noise Regulations were introduced in 2006, however there have been regulations on noise at work since 1990 and information and guidance on noise control has been available since many years before that. **Formal enforcement action should therefore be taken where non-compliance is encountered, unless there are strategic or duty holder factors indicating that this would not be appropriate.**

The emphasis for enforcement of the Noise Regulations should be to secure elimination of risk from noise, or reduction of exposure and risk to ALARP, by organisational and technical measures, where the exposures are likely to exceed the upper exposure action value. Enforcement of regulation 6(2) will usually be appropriate, together with enforcement of Regs 7 to 10 as required.

In many cases inspectors will find [Appendix E](#) helpful for identifying risk control measures appropriate to the work activity. Inspectors should look out for updates in the guidance in Appendix E, and for new industry-specific guidance, or should obtain advice from Noise and Vibration Specialist Inspectors.

Although the regulations provide for a limit on daily personal exposure to noise, it is not appropriate to concentrate formal enforcement solely on this aspect. Where the limit value is being exceeded it is preferable to secure a reduction in exposure to ALARP through enforcement of regulation 6(2) where applicable, and the immediate provision and use of hearing protection through regulations 7(2) and 8(1)(a). Where daily personal exposures appear to be very high (in the region of 100 dB or above) there may be some doubt as to whether personal hearing protection is capable of allowing the exposure limit value to be met, and inspectors should seek advice from a Noise & Vibration Specialist Inspector.

Prosecution should be considered where the extent of risk, and strategic and duty holder factors, indicate such action would meet the principles and expectations of the HSC enforcement policy statement. Furthermore, prosecution should be considered where the *Control of Noise at Work Regulations 2005* set a defined standard for risk control measures (i.e. where the duty is not qualified by "reasonably practicable"), and this standard has not been met. Examples of this include where suitable personal hearing protection has not been supplied to employees whose daily personal noise exposure is likely to be at or above the upper exposure action values, or where there has been a failure to maintain personal hearing protection or anything provided for the purposes of noise control. It is advised that a Noise and Vibration Specialist Inspector is consulted if prosecution is proposed.

7.1 Initial Enforcement Expectation

The following guidance to Initial Enforcement Expectations has been prepared on applying the EMM framework to health risks from noise. It refers to Initial Enforcement Expectations, prior to consideration of any dutyholder and strategic factors that may modify the enforcement decision.

Table 5: Initial enforcement expectation – Improvement Notices

	Situation	Initial Enforcement Expectation
1 (Control)	Exposure is likely to exceed the upper exposure action value ($L_{EP,d}$ of 85 dB) and it is reasonably practicable to reduce the exposure by organisational and/or technical measures. See L108 paras 65-69.	Improvement Notice HSWA S.2 Noise Regulations r.6(2) <i>Require a programme of work to reduce exposures to ALARP</i>
2 (Control)	Exposure is likely to exceed the lower exposure action value ($L_{EP,d}$ of 80 dB) but be below upper exposure action value ($L_{EP,d}$ of 85 dB) and it is reasonably practicable to eliminate or reduce the risk, e.g. by changing the work process. See L108 paras 65-66.	Letter HSWA S.2 Noise Regulations r.6(1) <i>Require the necessary changes</i>
3 (Control)	Exposure is above the exposure limit value ($L_{EP,d}$ of 87 dB). See L108 paras 78-80.	Consider whether exposure is ALARP – if not see item 1. If personal hearing protection has not been supplied, see item 5. If personal hearing protection has been supplied but is not being fully and properly used, see item 6. See also item 3 in Table 6 (Prohibition Notices)
4 (Hearing protection – supply of)	Exposure is likely to exceed the upper exposure action value ($L_{EP,d}$ of 85 dB) and no hearing protection provided or hearing protection is not suitable. See L108 paras 82-87.	Improvement Notice HSWA S.2 Noise Regulations r.7(2), 7(4) <i>Require provision of suitable hearing protection</i> Consider prosecution
5 (Hearing protection – supply of)	Exposure is likely to exceed the lower exposure action value ($L_{EP,d}$ of 80 dB) but be below upper exposure action value ($L_{EP,d}$ of 85 dB), and no personal hearing protection is provided. See L108 paras 82-87.	Letter (Improvement Notice if workers have requested hearing protection and it has not been provided). HSWA S.2 Noise Regulations r.7(1), 7(4) <i>Require personal hearing protection is supplied to employees who request it</i> Consider whether breach originates from a failure to provide II&T on availability of hearing protection, see item 11.

	Situation	Initial Enforcement Expectation
6 (Hearing protection – use of)	Personal hearing protection is not being fully or properly used where it has been supplied under r.7(2). <i>See L108 para 98.</i>	Improvement Notice HSWA S.2 Noise Regulations r.8(1)(a) <i>Require full and proper use of personal hearing protection</i> Consider whether breach originates from a failure to provide II&T on use etc. of hearing protection, see item 11, and the need for hearing protection zones, see item 7. Consider prosecution
7 (Hearing protection zones)	Hearing protection zones (HPZ) are not designated or adequately signed, i.e. in areas of the workplace where work is going on during which particular employees must use hearing protection (r.7(2)) or areas of the workplace where the upper exposure action values would be likely to be exceeded if personnel spent a significant portion of their working day within them. <i>See L108 para 89.</i>	Letter HSWA S.2 Noise Regulations r.7(3) <i>Require clearly marked hearing protection zones and management of access</i> Improvement Notice if of the opinion that lack of HPZ is likely to lead to unprotected daily noise exposure above upper exposure action value, but consider whether action under r.7(2) or r.8(1), see items 4 and 6, is (more) appropriate.
8 (Hearing protection zones)	The use of personal hearing protection within designated hearing protection zones (HPZ) is not being observed and/or access to zones is not restricted where practicable. <i>See L108 para 91.</i>	Improvement Notice HSWA S.2 Noise Regulations r.7(3) (likely also that action under r.7(2) or r.8(1) is appropriate, see items 4 and 6) <i>Require that access to HPZ is restricted and no employee enters zone unless wearing personal hearing protectors</i>

	Situation	Initial Enforcement Expectation
9 (Maintenance and use of equipment)	Noise control equipment provided (e.g. enclosures, silencers) is not fully and properly used and/or is not adequately maintained; Personal hearing protection provided is not adequately maintained. <i>See L108 paras 95-101.</i> (for full and proper use of personal hearing protection, see item 6)	Improvement Notice HSWA S.2 Noise Regulations r.8(1) <i>Require full and proper use and/or maintenance of noise control equipment provided, and maintenance of hearing protection provided, as relevant</i> Consider whether breach of failure to use noise control equipment originates from a failure to provide relevant II&T, see item 11. Consider prosecution where risk gap is extreme, i.e. exposure likely to exceed 85 dB.
10 (Health surveillance)	Exposure frequently is likely to exceed the upper exposure action value ($L_{EP,d}$ of 85 dB), or employees are otherwise at risk, and; (i) there is no health surveillance, or health surveillance systems inadequate; or (ii) the employer is failing to act on the results. <i>See L108 paras 105-106.</i>	Improvement Notice Noise Regulations r.9(1) or 9(4) <i>Require a suitable system of health surveillance or require appropriate action in the event of identifiable hearing damage</i> Consider whether breach originates from a failure to provide II&T on noise risks/health surveillance (e.g. employees not attending appointments), see item 11. Inspectors are advised to consult an OHI if considering enforcement action under 9(1) where the adequacy of health surveillance is the issue, or under r.9(4)
11 (Information, instruction & training)	Exposure is likely to exceed the lower exposure action value ($L_{EP,d}$ of 80 dB), employees have not been provided with suitable and sufficient information, instruction and training. <i>See L108 paras 115-119.</i>	Letter (Improvement Notice if lack of II&T is implicated in breaches of r.7(1), 8(1) or 9, see items 5, 6, 9 and 10) HSWA S.2 Noise Regulations r.10 <i>Require suitable and sufficient information, instruction and training</i>
12 (Risk assessment)	Exposure appears significant (e.g. <i>Rough guide, see section 3</i>). No risk assessment or risk assessment is not suitable and sufficient and employer taking no action.	Improvement Notice HSWA S.2 Noise Regulations r.5 It will usually be appropriate also to enforce other regs within the Noise Regulations.

Table 6: Initial enforcement expectation – Prohibition Notices

	Situation	Initial Enforcement Expectation
1	Exposure is likely to exceed upper exposure action value ($L_{EP,d}$ of 85 dB) (demonstrating risk), and HSE sector has agreed with the industry that the work method is no longer acceptable and will be prohibited where seen.	Prohibition Notice HSWA S.2 Noise Regulations r.6(1)
2	Transient site (e.g. construction). Exposure is likely to exceed the upper exposure action value ($L_{EP,d}$ of 85 dB) and no personal hearing protection is provided.	Prohibition Notice HSWA S.2 Noise Regulations r.7(2)
3	Exposure is above the exposure limit value ($L_{EP,d}$ of 87 dB, L_{Cpeak} of 140 dB), dutyholder cannot supply personal hearing protection for immediate control of risk, and work likely to continue under these conditions unless inspector intervenes.	Prohibition Notice HSWA S.2 Noise Regulations r.6(4) <i>Inspectors are advised to consult a Noise & Vibration Specialist Inspector if considering issuing a Prohibition Notice in this situation</i>

8 Specialist Support

Specialist advice and support for inspectors is available and you should always ask for advice if in doubt.

Noise and Vibration Specialist Inspectors can:

- advise on reasonably practicable control measures, particularly in complex or novel situations, but also whenever advice is required;
- provide evidence of daily personal noise exposure ($L_{EP,d}$), particularly where there are highly variable exposure patterns, and evidence of high peak noise exposure (in some situations this will be provided by HSL staff⁴);
- advise on compliance with the Noise Regulations; and
- provide expert evidence.

Occupational Health Inspectors, Medical Inspectors and scientists in Central Medical Unit can:

- advise on the quality and suitability of health surveillance services;
- provide clarification on the requirements of the Noise Regulations relating to health surveillance; and
- advise on the appropriate management of employees diagnosed with NIHL or otherwise at particular risk from noise.

Occupational Health Inspectors and Medical Inspectors can also provide expert evidence.

⁴ Inspectors wishing to call on support from HSL on matters relating to noise should in the first instance contact a Noise & Vibration Specialist Inspector, who will act as Technical Customer for any such work, see Science and Innovation Programme - Guide to Procedures - Chapter 4 - Procedures for commissioning support (http://intranet/science/mainstream_st_proc/chapter4.htm).

Lists of people providing specialist support to inspectors can be found via the “Specialist Support” link on the HSE Intranet home page.

Appendix A - Intervention aide-mémoire

Table A1 Topics to consider during noise inspections, and applicable legislation and guidance

Issue	Legislation	Expectation	References and related guidance
Noise risk management system	HSWA S.2 Noise Regulations r.6 Noise Regulations r.8	Does the employer demonstrate a commitment to minimising risks from noise by (as appropriate): <ul style="list-style-type: none"> • allocating responsibility to a senior manager; • a suitable and sufficient risk assessment and action plan (see below); • an appropriate procurement policy, considering noise when selecting machinery and work equipment (see below); • ensuring full and proper use of noise control equipment (silencers, noise enclosures, refuges, etc.) and personal hearing protection; • a system for preventive and reactive maintenance of noisy machinery and work equipment; • a system for preventive and reactive maintenance of noise control equipment (silencers, noise enclosures, refuges, etc.); • provision of appropriate information, instruction and training (see below); 	
Risk assessment and action plan	HSWA S.2 Noise Regulations r.5	Has the employer made a suitable and sufficient risk assessment, i.e.: <ul style="list-style-type: none"> • identified employees at risk from noise; • made a valid estimate of their exposures, compared with the lower and upper exposure action values and (taking account of any hearing protection) the exposure limit value; • identified the important sources of noise and considered the available and appropriate options for controlling risk; • produced a suitable action plan to control the risk (and comply with Regs 6 – 10) with clear priorities and timescales; • made arrangements to monitor progress against the action plan; • demonstrated that noise risks are considered at the design and specification stage for new processes and projects; • made suitable arrangements for review of the assessment and action plan. 	L108 Part 2 L108 Appendix 1 INDG62(rev1)

Issue	Legislation	Expectation	References and related guidance
Noise exposure control	HSWA S2 Noise Regulations r.6(1) Noise Regulations r.6(2) Noise Regulations r.6(3) Noise Regulations r.6(4)	<p>Where exposure is likely to exceed the upper exposure action value, has the employer reduced exposure and risk to ALARP by:</p> <ul style="list-style-type: none"> • identifying and adopting reasonably practicable measures for eliminating or reducing noise exposures using technical or organisational means (see general guidance and sector-specific good practice in Appendix E to judge reasonable practicability); • or have they plans to do so, with an appropriate timescale. <p>Has the employer taken action, if required, to ensure that the exposure limit value is not exceeded? (Note: compliance with the exposure limit value can be achieved with personal hearing protection but the requirement to reduce noise exposure to ALARP by technical and organisational means remains if compliance with the limit is achieved only through hearing protection)</p>	L108 Parts 3 and 4 Appendix E
Workplace design for reduced noise exposure	HSWA S2 Noise Regulations r.6(1) Noise Regulations r.6(2) Noise Regulations r.6(3)	<p>In addition to these measures outlined in Appendix E, in general there will always be benefits to be gained in considering and applying general principles of workplace design for reducing noise exposure. For example:</p> <ul style="list-style-type: none"> • appropriate use of acoustic absorption within buildings can reduce or limit the effects of reflected sound (specialist help will be needed to put this in to effect); • careful planning could segregate noisy machines from other areas where quiet operations are carried out; • the number of employees working in noisy areas should be kept to a minimum; • screens, barriers or walls can be placed between the source of the noise and the people to stop or reduce the direct sound; • noise refuges can be a practical solution in situations where noise control is very difficult, or where only occasional attendance in noisy areas is necessary; • increasing the distance between a person and the noise source can reduce noise exposure considerably. 	<p>Workplace design (L108 paragraphs 198-200, 212-219, 234) <i>(http://www.hse.gov.uk/noise/goodpractice/workplacedesign.htm)</i></p> <p>Example: Coating pans <i>(http://www.hse.gov.uk/noise/casestudies/coatingpans.htm)</i></p> <p>Example: Flexible acoustic screening material, Sound Solutions #4 <i>(http://www.hse.gov.uk/noise/casestudies/soundsolutions/)</i></p> <p>Example: Acoustic refuges, Sound Solutions #11 <i>(http://www.hse.gov.uk/noise/casestudies/soundsolutions/)</i></p> <p>Example: Use of absorption in a noise control programme, Sound Solutions #46 <i>(http://www.hse.gov.uk/noise/casestudies/soundsolutions/)</i></p>

Issue	Legislation	Expectation	References and related guidance
Selection of tools and machinery	HSWA S2 Noise Regulations r.6(1) Noise Regulations r.6(2) Noise Regulations r.6(3)	<p>Employers should demonstrate a positive purchasing policy which makes sure noise is taken into account when selecting machinery.</p> <p>For many types of equipment there will be models designed to be less noisy. When selecting equipment to buy or hire, besides ensuring that the tool or equipment is generally suitable for the job, employers should:</p> <ul style="list-style-type: none"> • ask about likely noise levels for the intended use(s); • check that manufacturers' noise data is representative of likely noise levels for the intended use(s); • use the noise information to compare machines before making the final choice; • look for warnings in the instruction book to see if particular uses of the tool or machines are likely to cause unusually high noise; • be aware that even where manufacturers declare that their tools or machines produce less than 70 dB, levels may sometimes be much greater in your workplace. 	<p>Low noise machines (L108 paragraphs 72-74, 201-202) (http://www.hse.gov.uk/noise/goodpractice/lownoisemachines.htm)</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>L108 Part 4: Selecting Quieter Tools and Machinery</p>
Limiting exposure duration	HSWA S2 Noise Regulations r.6(1) Noise Regulations r.6(2) Noise Regulations r.6(3)	<p>Restriction of the time spent in noisy areas, or doing noisy tasks, can be effective in reducing noise exposures, as can ensuring that noisy devices are only used when they are actually needed.</p> <p>Where some employees do noisy jobs all day or week, and others do quieter ones, job rotation should be considered. This might need you to train employees to carry out other jobs. This system will reduce the noise exposure of some employees while increasing that of others, so care and judgement is needed. Employees will need to be rotated away from noisy jobs for a significant proportion of time to make an appreciable difference to their daily exposure.</p> <p>The noise exposure ready-reckoner and exposure calculators can be used to indicate the reductions in exposure that can be achieved by reducing the duration of exposure to noise.</p>	<p>HSE Noise exposure ready-reckoner - http://www.hse.gov.uk/noise/dailyexposure.pdf</p> <p>HSE noise exposure calculators - http://www.hse.gov.uk/noise/calculator.htm</p>

Issue	Legislation	Expectation	References and related guidance
Health surveillance (audiometry)	<p>HSWA S2 Noise Regulations r.9</p> <p>HSWA S2 HSWA S36</p>	<p>Health surveillance (audiometry) (see also L108 Part 6 and Appendix 5) Where exposure is likely to exceed the upper exposure action value (on a frequent basis), or where employees are otherwise at risk (e.g. people who are particularly susceptible, such as those with an existing hearing condition or a family history of deafness), has the employer put in place a suitable health surveillance scheme? The employer should:</p> <ul style="list-style-type: none"> • appoint a designated person to be in charge of the health surveillance programme who is conversant with the clinical and ethical aspects; • appoint a suitable person with training in performing audiometry; • arrange for a 'baseline' audiogram of employees likely to be exposed above the upper exposure action value, including those who will be exposed for the first time; • arrange regular audiometry, typically annually for the first two years, then every three years; • arrange for referral of employees with abnormal hearing to a medical practitioner for any necessary treatment; • encourage employees to cooperate and to consent to the release of clinical information; • keep health records; • use the results (anonymised group information) to review the risk assessment and controls, including hearing protection. <p>The person or organisation (e.g. occupational health service provider) carrying out the testing should:</p> <ul style="list-style-type: none"> • be able to follow the guidance on audiometric testing programmes in Appendix 5 to L108, applying quality control to ensure robustness of results, and refer to a medical practitioner where appropriate; • have access to the employer's noise risk assessment and action plan and familiarise themselves with the nature of the work, ideally by visiting the workplace; • explain the results of the test to individual employees and discuss with them the risks from noise and the need for full and proper use of hearing protection; • provide the employer with anonymised group information derived from the results of the audiometric testing, and provide information for inclusion in the employer's health records. 	<p>Health surveillance – http://www.hse.gov.uk/noise/healthsurveillance.htm</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>Protect your hearing or lose it (advice for employees) - http://www.hse.gov.uk/pubns/indg363.pdf</p> <p>L108 Part 6: Health Surveillance for Hearing Damage</p> <p>L108 Appendix 5</p>

Issue	Legislation	Expectation	References and related guidance
Hearing Protection	HSWA S2 Noise Regulations r.7	<p>(a) Where exposure to noise is likely to exceed the lower exposure action value (80 dB) but is below the upper exposure action value (85 dB):</p> <ul style="list-style-type: none"> • Are employees provided with suitable hearing protectors on their request? <p>(b) Where exposure to noise is likely to exceed the upper exposure action value (85 dB):</p> <ul style="list-style-type: none"> • Are employees provided with suitable hearing protectors? • Are they fully and properly used? Is supervision adequate? • Are hearing protection zones appropriately designated and signed and managed? • Are hearing protectors properly stored and adequately maintained? <p>Providing personal hearing protection should be one of the first considerations on discovering a risk to health due to noise. It should not be used as an alternative to controlling noise by technical and organisational means, but for tackling the immediate risk while other control measures are being developed. In the longer term, it should be used where there is a need to provide additional protection beyond what has been achieved through noise control.</p> <p>Personal hearing protection use should be targeted at particular noisy jobs and activities. It must be supplied by the employer to any employee whose daily personal noise exposure is likely to exceed 85 dB, or who is likely to be exposed to peak sound pressure levels above 137 dB. The employee must use the protection provided. The employer should ensure that, through the use of hearing protection, the employee's effective noise exposure is reduced at least to below the upper exposure action values (85 dB for daily exposure, 137 dB for peak noise).</p> <p>Important factors to consider in the selection and use of hearing protection include:</p> <ul style="list-style-type: none"> • Types of protector, and suitability for the work being carried out; • Noise reduction (attenuation) offered by the protector, including taking account of 'real-world' factors, and also ensuring that not too much protection is provided; • Compatibility with other safety equipment; • Pattern of the noise exposure; • The need to communicate and hear warning sounds; • Environmental factors such as heat, humidity, dust and dirt; • Cost of maintenance or replacement; • Comfort and user preference; • Medical disorders suffered by the wearer. <p>The use of personal hearing protection should be managed through the provision of appropriate information, instruction and training for employees, supervision and the use of appropriately defined and demarcated Hearing Protection Zones.</p>	<p>L108 Part 5</p> <p>L108 Appendix 3</p> <p>Hearing protection – general advice - http://www.hse.gov.uk/noise/hearingprotection.htm</p> <p>HSE hearing protection calculator - http://www.hse.gov.uk/noise/hearingcalc.xls</p> <p>Hearing protection – Over-protection (L108 paragraphs 287 – 288) (http://www.hse.gov.uk/noise/goodpractice/hearingoverprotect.htm)</p> <p>Hearing protection – real-world factors (L108 paragraphs 282 – 286) (http://www.hse.gov.uk/noise/goodpractice/hearingrealworld.htm)</p> <p>Hearing protection – advice on issuing (L108 paragraphs 301 – 305) (http://www.hse.gov.uk/noise/goodpractice/hearingadvice.htm)</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>Protect your hearing or lose it (advice for employees) - http://www.hse.gov.uk/pubns/indg363.pdf</p>

Issue	Legislation	Expectation	References and related guidance
Information, instruction and training	HSWA S2 Noise Regulations r.6(3)(d) Noise Regulations r.10 HSWA S7	<p>Has the employer provided employees at risk from noise with adequate information, instruction and training on:</p> <ul style="list-style-type: none"> • the likely noise exposure and the risks to their hearing; • the importance of correct operation and maintenance of any noise control measures (e.g. silencers, machine enclosures); • how and where to obtain hearing protection, how to use it properly (especially ear plugs), the need to use it at all times during specified activities and when in a HP zone and how to look after it; • other steps they can take to reduce risk; • the employees' duties under the Noise Regulations and HSWA; • arrangements for health surveillance and their duty to cooperate. <p>This information should be given in a way the employee can be expected to understand (for example special arrangements might need to be made if the employee does not understand English or cannot read). To establish whether information, instruction and training has been carried out effectively, look for evidence that personal hearing protection is being fully and properly used, that noise control equipment is being used, and that procedures for low noise working are being followed.</p>	<p>What do I need to tell my employees? - http://www.hse.gov.uk/noise/tell.htm</p> <p>Employee and safety representatives - http://www.hse.gov.uk/noise/safetyrep.htm</p> <p>Noise at work – advice for employers - http://www.hse.gov.uk/pubns/indg362.pdf</p> <p>Protect your hearing or lose it (advice for employees) - http://www.hse.gov.uk/pubns/indg363.pdf</p>

Appendix B - Enforcement Management Model (EMM) - Application to noise

Introduction

1. This Appendix to the Noise Topic Pack provides guidance to inspectors on applying the EMM to health risks from noise. It supersedes and replaces OC 246/33. General guidance on applying the EMM principles to health risks, including occupational health descriptors is in [OC 130/5](#).

2. Noise-induced hearing loss (NIHL) is a permanent, irreversible condition, the effects of which are compounded by age-related loss. A 25 dB hearing loss averaged over the frequencies 1, 2 and 3 kHz can be considered as a level at which the onset of hearing disability occurs. Evidence has shown that at this level of hearing loss there is a definite interference with social function (Medical Research Council National Hearing Survey, 1989). This level of hearing loss therefore represents a **serious health effect**.

3. Permanent damage to structures of the inner ear, and/or rupture of the ear drum (acute trauma), which can occur in response to single exposures to very loud noise, is also a serious health effect. However, from the available evidence the peak noise exposures which may result in possible, probable or remote likelihood of a serious health effect cannot be accurately predicted. It is therefore not currently possible to apply the EMM to acoustic trauma caused by high peak sound pressures.

Benchmark

4. The benchmark for exposure to noise is set at a '**nil/negligible**' risk of a **serious health effect** caused by occupational exposure. The serious health effect, in this case, is that hearing loss reaches a disabling severity (25 dB or greater loss averaged over 1, 2 and 3 kHz) before retirement age. This benchmark standard is considered to be met if there is full compliance with the Noise Regulations.

Risk matrix

5. The extent of noise-induced hearing loss is affected by both the level of noise and the duration of exposure. HSE Contract Research Report 2/1988 provides tables for the estimation of hearing impairment due to noise as a function of age and duration of exposure. This is an 'interpretive' standard. Reference to these tables has been undertaken to determine percentages of the population experiencing a 25 dB or greater hearing loss (averaged over both ears and frequencies 1, 2 and 3 kHz) at the age of 60 with different levels of noise exposure. In developing the risk matrix it has been assumed that individuals are exposed for up to 40 years throughout their working life and the levels of noise exposure do not take into consideration the effects of the use of personal hearing protection. As the effects of hearing loss caused by exposure to noise are compounded by normal age-related deterioration, the percentage of the population affected by a 25 dB or greater hearing loss incorporates the effect of aging. The data used relates to a normal unselected population.

6. At the age of 60, 25 - 30% of the population are likely to have a 25 dB or greater hearing loss from aging alone, and with a daily personal exposure ($L_{EP,d}$) of 80 dB this proportion is assumed not to increase. Exposure below the lower exposure action value of 80 dB therefore represents a '**nil/negligible**' risk of the serious health effect from occupational exposure. At a daily personal exposure of 85 dB (the upper exposure action value) approximately 35 - 40% of a population exposed for 40 years will have a 25 dB or greater loss. It is thus considered to be 'possible' that this level of occupational noise exposure will result in a serious health effect in a person who would not be expected to suffer the effect

due to aging alone⁵. At a daily personal exposure of 92 dB the proportion of people affected increases to 60 - 65%, leading to the conclusion that it is 'probable' that this level of occupational noise exposure will result in a serious health effect in a person who would not be expected to suffer the effect due to aging alone⁶.

DESCRIPTOR	APPLICATION/ INTERPRETATION	LIKELIHOOD			
		PROBABLE	POSSIBLE	REMOTE	NIL/ NEGLIGIBLE
SERIOUS HEALTH EFFECT	NOISE-INDUCED HEARING LOSS 25 dB+	$L_{EP,d}$ of 92 dB and above	$L_{EP,d}$ of 85-91 dB	$L_{EP,d}$ of 80-84 dB	$L_{EP,d}$ below 80 dB

Risk Gap

7. The risk matrix, when used with Table 2.1 in the EMM, will indicate an **extreme** risk gap for any daily personal exposure above the upper exposure action value (85 dB). An Improvement Notice is therefore the Initial Enforcement Expectation where daily exposure is likely to exceed 85 dB **and** there is a breach of the Regulations (e.g. risk/exposure has not been reduced to ALARP, suitable hearing protection has not been provided). For enforcement guidance see section 8 of the main part of this Topic Inspection Pack.

8. For a daily exposure between the lower and upper exposure action values (80 to 85 dB) there is a **substantial** risk gap. As the matrix is based on an 'Interpretive' standard this should result in an Initial Enforcement Expectation of a letter/inspection form, where the Regulations have not been complied with (e.g. it is reasonably practicable to reduce risk further by straightforward and low cost actions).

9. The primary question when considering enforcement action is not only whether the exposure action values are exceeded but whether the exposure and risk are ALARP. When making decisions about the risk gap inspectors should consider formal enforcement action where information on likely exposures and established industry good practice for noise risk control (see Appendix E) suggests that the exposure is likely to be above the upper exposure action value and is not ALARP.

Relevant standards

10. The principal standards are:

Title	Authority
The Control of Noise at Work Regulations 2005	Defined
L108 'Controlling noise at work', Health and Safety Executive, 2005	Established
Risk matrix in HSE's Noise Topic Inspection Pack, Appendix B	Interpretive
Robinson DW (1988) Tables for the estimation of hearing impairment due to noise for otologically normal persons and for a typical unscreened population as a function of age and duration of exposure. HSE Contract Research Report No. 2/1988	Interpretive
Davies A (1989) Medical Research Council National Hearing Survey 1989	Interpretive

⁵ Approximately 10% of those in the exposed population who would not expect to achieve this level of hearing loss due to ageing alone will achieve it as a result of their occupational noise exposure.

⁶ Approximately 50% of those in the exposed population who would not expect to achieve this level of hearing loss due to ageing alone will achieve it as a result of their occupational noise exposure..

Appendix D - Further sources of guidance on noise

(Although some of these publications refer to the previous *Noise at Work Regulations 1989*, the practical guidance on controlling noise risks and noise exposures contained in them remains relevant).

Key publications

Main publications

SI 2005/No 1643 L 108	The Control of Noise at Work Regulations 2005 Reducing noise at work — The Control of Noise at Work Regulations 2005 - Guidance on Regulations
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General guidance

INDG362(rev1)	Noise at work: Guidance on the Control of Noise at Work Regulations 2005
INDG363(rev1)	Protect your hearing or lose it!
INDG 270	Supplying new machinery (not specifically for noise)
INDG 271	Buying new machinery (not specifically for noise)
GN PM 56	Noise from pneumatic systems
HSG 138	Sound Solutions - out of print, but available at www.hse.gov.uk/noise/casestudies/soundsolutions/

Operational Circulars

OC 633/10	Computer numerically controlled (CNC) punching
OC 634/8	Control of dust and noise exposure during direct pressure blasting
OC 668/22	Plasma cutting: Control of fume gases & noise
OC 668/25	Personal Protective Equipment for welding and allied processes: Practical guidance on assessment and selection
OC 668/30	Oxy fuel gas cutting: control of fume, gases and noise

HSE Guidance & Information Sheets and Sector guidance (not OCs)

Agriculture

AS 8 (rev 3)	Noise
MISC 165	Farmwise

Construction

HSG 150	Health and Safety in construction (section on noise)
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Engineering & Utilities

HSG 67	Health and Safety in Motor Vehicle Repair
HSG 129	Health and Safety in Engineering Workshops
Engineering sheet No 26	Noise in engineering
Engineering sheet No 27	Control of noise at metal cutting saws

Engineering sheet No 29 Control of noise at power presses
Engineering sheet No 39 Reducing noise from CNC punch presses

SIM 03/2001/14 Control of noise in heavy fabrication

Food and Drink

Food Sheet No 32 Reducing noise exposure in the food and drink industries
HSG232 Sound Solutions for the food and drink industries

Metals & Minerals

HSG 109 Control of noise in quarries
Foundries Sheet No 6 Hazards associated with foundry processes: fettling — noise hazards
Specialist Inspector report No 7 Noise in container glass manufacture
Specialist Inspector report No 33 The control of noise in the concrete industry
Information sheet (in production) — Noise in the concrete products industry

Music and Entertainment

Draft guidance website www.soundadvice.info (Final version due for publication February 2008)

Offshore

HSG182 Sound Solutions Offshore (out of print – consult HID Occupational Health Team)

Polymers and fibres

Paper and Board -Information sheet No 1 - Noise assessments in paper mills
Paper and Board -Information sheet No 2 - Noise mapping in paper mills
Noise in the plastics processing industry (out of print but the Knowledge Centre has copies)
ISBN 0 7176 1486 7 Printer's guide to health and safety

Woodworking

Woodworking sheet No 4 Noise reduction at band re-saws
Woodworking sheet No 13 Noise at woodworking machines

Appendix E - Established noise control methods for high-risk activities

[This Appendix is provided as a separate document](#)