FINAL REGULATORY IMPACT ASSESSMENT OF THE CONTROL OF NOISE AT WORK REGULATIONS 2005

ISSUE AND OBJECTIVES

1. The Regulations aim to protect workers from risks to their health arising from exposure to noise at work. They transpose into UK legislation European Directive 2003/10/EC. The Directive consolidates and repeals the existing EC Noise Directive 86/188/EEC, implemented in the UK by the Noise at Work Regulations 1989 (NAWR). The objective of the Directive is to ensure the health and safety of individual workers and to provide a minimum level of protection to workers across the European Union in order to avoid distortions of competition. The Regulations introduce exposure action values 5dB(A) lower than those in the current legislation (with the result that most actions by employers will have to be taken at a lower noise exposure), and a new exposure limit value.

Business sectors affected

2. HSE expects that organisations in the following sectors will be affected by the Regulations: agriculture, construction, quarrying, mining, transport, forestry, drinks and packaging, textiles, potteries, glass, rubber, printing, metalworking, woodworking, steel, entertainment, and the armed forces. There may be an effect on other non-industrial sectors such as education (teachers) and services (eg call centres).

PURPOSE AND INTENDED EFFECT

Risk assessment

3. The link between exposure to noise and hearing damage is well known and internationally accepted. Regular exposure to loud noise can lead to permanent hearing loss and/or tinnitus. There is good evidence of some hazard to hearing from prolonged exposure to noise at levels down to 85 dB(A) and a residual risk down to 82 dB(A) but the magnitude of the hazard increases rapidly above 90 dB(A). Research estimates that over 1.1 million people are exposed to noise levels above 85 dB(A) at work, with an estimated 170,000 suffering deafness, tinnitus or other ear conditions as a result. Association of British Insurers figures show that deafness accounts for approximately 80% of occupational disease claims up to 1997, though cases have fallen since then, probably because of the decline in heavy industry.

4. There is generally a long latency before the effects of damage due to noise exposure may be noticed. For example, continuous occupational exposure to noise at 90 dB(A) would result in about 5% of the population sustaining a 30 dB hearing loss (considered moderate disability) within 10 years, but this rises to approximately 50% over a working lifetime of exposure, though some of this hearing loss would be the result of the normal ageing process.

Number of people exposed to noise

5. An estimate of the number of people exposed to various levels of noise is given in Table 1. It is based on an adjustment of figures produced by HSE in 1995, which were drawn from an earlier HSE survey. The table takes account of subsequent changes in employment patterns. For the majority of the sectors affected there has been a decrease in the level of employment since 1995. A weighted average of -15% was used[1]. The figures take into account the Directive provision that exposures can be averaged over a week – many workers subject to occasional single-day noise exposure can therefore be omitted.

Table 1: Number of workers exposed to different noise levels[2]

80-85 dB(A)	85-90 dB(A)	90-95 Db(A)	95-100 dB(A)	100-110 dB(A)	>110 dB(A)
1,097,000	696,800	273,000	124,000	37,100	4,200

6. Note that dB(A) is the noise level averaged over a working day or week as appropriate and that the estimates do not take account of the effect of wearing hearing protection. Actual exposures may be less.

7. The new Regulations also introduce a peak acoustic pressure limit value of 200 Pa. This is likely to affect firms that also exceed the 8-hour or weekly criteria and so the impact of the proposed peak value should be minimal. In the calculations that follow, we assume that most firms exceeding the peak value will be included in the group exceeding the 8-hour or weekly criteria and so we do not expect the peak value to result in an increase in the numbers of exposed individuals.

Background

8. In Britain, the Government has issued guidance on noise at work since 1963, long before the existing Regulations came into force in 1989. Awareness of and compliance with these Regulations formed part of the HSE risk management campaign "Good Health is Good Business", and HSE continues to draw attention to the risks from noise exposure and enforce the Regulations. Noise is also specifically mentioned in the Supply of Machinery (Safety) Regulations 1992.

9. The NAWRegs specify measures to be taken when noise exposures reach the first or second action levels of 85 or 90 dB(A), or a peak action level of 200 Pa. Some health surveillance for noise-exposed workers is also required under the Management of Health and Safety at Work Regulations 1999. However, there will be large, long-term health and safety benefits from reducing noise exposure further and providing for greater health surveillance. Moreover, there are many established and effective techniques for reducing noise at source, and employers can limit exposure by controlling the time spent by individuals in noisy working conditions. If neither of these solutions is possible, a variety of hearing protection devices are available, many of them inexpensive.

---

[1] The weight was derived by taking an average of the percentage change in employment level for each of the broad sectors affected by the regulations from 1995 to 2000.

[2] The hospitality sector is not included in the figures due to a lack of information on employees' exposure levels.

Options

10. Clearly, the Regulations must implement the specific provisions of the Directive, but for some issues there are options as to how this is done. The following section gives details of the issues on which options were considered, with HSE's recommended options in each case indicated in italics.

Issue 1: Should weekly averaging of exposure be allowable in all or only specified circumstances?

11. In situations where daily noise exposure varies considerably, the Directive allows for exposure to be averaged over a week, as long as the weekly noise exposure doesn't exceed the exposure limit value and measures are taken to reduce risks to a minimum. There are a number of options for administering this provision:
Option 1a: Set up a formal system for granting permission to use weekly averaging (to individual employers, for specific processes or to specific sectors).
Option 1b: Prescribe the use of weekly averaging to specific sectors and/or work processes in the Regulations.
Option 1c: *Allow in the Regulations for employers to decide if they wish to use weekly averaging.*
Option 1d: *Describe in guidance typical situations in which weekly averaging might be appropriate.*
The effect of these options on benefits: There is no reason to believe that weekly averaging allowable on a permission basis will have any affect on the benefits, providing that employers properly perform their duties to ensure that weekly noise exposure does not exceed the ELV and take measures to reduce risks to a minimum.
The effect of these options on costs: HSE's preferred option is to allow employers to decide for themselves the appropriateness to their own circumstances of weekly averaging. Banning specified sectors from using weekly averaging is likely to prove cost neutral: The benefits that the firms in these specified sectors would have enjoyed from weekly averaging would be offset by increased cost and complexity of weekly averaging. Establishing a formal scheme for permitting the use of weekly averaging would create a cost for the applicant firms. Under HM Treasury rules, it is probable that HSE would charge applicants for the costs it incurs in dealing with applications. The cost per application can be estimated using the following assumptions:

- A health and safety manager takes two hours to make an application to HSE.
- An HSE officer equivalent to Executive Officer grade would spend an hour reading, processing and deciding on the application. The chargeable cost per hour is £34[3].
- An HSE officer equivalent to Higher Executive Officer grade would spend a quarter an hour verifying that the correct decision has been made. The chargeable cost per hour is £40.

The total cost per application would therefore be approximately £78. There is no indication of how many firms might apply for weekly averaging.

[3] This includes overheads and non-wage labour costs.

Issue 2: At what point should noise measurement be necessary as part of the risk assessment process?

12. There is a requirement in the Directive and in the implementing Regulations to quantify exposure as part of the risk assessment, but neither set out explicitly when it is necessary for measurement to be done. Measurement could be advised when:
Option 2a: assessment shows it is possible but not certain that noise exposure (including residual exposure after control measures have been introduced) might exceed the lower EAV.
Option 2b*: assessment shows it is possible but not certain that noise exposure might exceed the upper EAV.*
Option 2c*: assessment shows it is possible but not certain that noise exposure might exceed the ELV.*
The effect of these options on benefits: The risk of hearing loss is low around the lower EAV. Furthermore, HSE will provide "rules of thumb" to indicate when noise measurement is necessary. The benefits are therefore unlikely to be substantially affected by insisting on the triggering of noise measurement at the lower EAV.
The effect of these options on costs: HSE's preferred option is to advise noise measurement where assessment shows that it is possible but not certain that noise exposure might exceed the upper EAV. Advising noise measurements in cases of uncertainty between the upper and lower EAVs (option 2a) will introduce extra costs for employers. These costs can be estimated by making the following assumptions:

- 40% of assessments lead to noise measurements
- measurements and data recording take about 1hour 15 minutes per employee

The estimated incremental costs imposed by option 2a are:

- £8.2 million in the first year
- £21.0 million over ten years in present value terms
- £38.6 million over forty years in present value terms.

Issue 3: What should be the criteria for when exposure reassessments should be carried out?

13. The Directive and Regulations require that the risk assessment, which may include an assessment of noise exposure, should be updated when circumstances change ie when factors, which alter the level of exposure, are introduced. It will be important that reassessments take place sufficiently regularly to ensure that risks do not inadvertently increase. We could advise that:
Option 3a*: Reassessment should be part of an ongoing control programme, which should pick up changes as they occur.*
Options 3b: The risk assessment is formally reviewed on a regular, specified basis.
The effect of these options on benefits: Providing employers are adequately performing their current risk assessment duties, there is no reason to believe that a prescriptive approach that determines the exact frequency of reassessments will have any impact on the benefits.
The effect of these options on costs: HSE's preferred option is for reassessments to integrate into ongoing control programmes. The alternative - specifying a regular interval between reassessments - could impose additional costs on dutyholders, depending on the frequency. HSE has assumed that, on average, dutyholders would

conduct noise reassessments as part of their ongoing risk assessment programme once every five years (this is not meant to imply a regular assessment once every five years). For the purposes of comparison, the cost implications of conducting regular reassessments once every three years and once every seven years have been estimated below. Over forty years, insisting on a three year reassessment would increase costs by approximately £110.4 million, while a seven year reassessment period would reduce costs by approximately £55.9 million. Both estimates are measured in present value terms and are relative to HSE's preferred option.

Issue 4: When should health surveillance be required?

14. The Directive and Regulations require that:

a) Workers exposed above the upper EAVs shall have the right to have their hearing checked by a doctor or by another suitably qualified person under the responsibility of a doctor;
b) Preventive audiometric testing is made available for workers whose exposure exceeds the lower EAVs, where the assessment indicates a risk to health.

It is not immediately clear what the phrases "have the right to" or "shall be available" mean in practice, so that the following options arise:

Option 4a: Employers to provide health surveillance for all workers regularly exposed above the lower EAVs.

Option 4b*: Employers to provide health surveillance for all workers regularly exposed above the upper EAVs and only for especially vulnerable workers above the lower EAVs. HSE to provide guidance on what constitutes vulnerability in terms of noise exposure.*

Option 4c: Employers to provide health surveillance at some higher exposure value (akin to current HSE guidance), and only for vulnerable workers exposed above the lower EAVs. HSE to provide guidance on what constitutes vulnerability in terms of noise exposure.

The effect of these options on benefits: As noted above, the risk of hearing loss at noise exposures between the lower and upper EAV is low for most workers. Providing employers heed and act on HSE's advice on what constitutes a vulnerable worker, it is unlikely that providing health surveillance to the majority of workers between the lower and upper values will affect the benefits.

The effect of these options on costs: HSE's preferred option is for employers to provide health surveillance for all workers regularly exposed above the upper EAVs and only for especially vulnerable workers above the lower EAV. To aid this process, HSE intends to provide guidance on what constitutes vulnerability in terms of noise exposure. An alternative option is to insist that all workers are provided with health surveillance above the lower EAV. Figures suggest that around 1.1 million people in the UK are exposed to noise levels between the lower and upper EAVs. Bringing these workers into the scope of health surveillance would impose an additional cost of £45 million on employers, measured over ten years in present value terms. Another option is for employers to provide health surveillance to the majority of workers at some value higher than the upper EAV, while providing health surveillance to vulnerable workers at exposures above the lower EAV. This option is unlikely to prove less costly than the preferred option, though some of the costs may be transferred from health surveillance to more detailed risk assessments designed to identify more accurately those who are particularly vulnerable to noise exposure.

Issue 5: What should health surveillance for hearing involve?

15. The Directive suggests hierarchical differences between health surveillance, hearing checks and audiometric testing, with the implication that a "hearing check" conducted by a doctor is more rigorous than "audiometric testing". This may be the case in other Member States given different health systems and infrastructures, but it does not reflect the situation in the UK. Nevertheless, the following options arise:
Option 5a: To distinguish in Regulations between health surveillance, hearing checks and audiometric testing and define distinction in guidance.
Option 5b*: To continue with the view that health surveillance consists primarily of testing of the hearing function through audiometry.*
The effect of these options on benefits: There are no grounds to believe that any deviation from standard practice in the UK would result in greater health benefits.
The effect of these options on costs: HSE's preferred option is to continue with the view that health surveillance consists primarily of testing of the hearing function through audiometry. The alternative, which would involve making a distinction between health surveillance, hearing checks and audiometric testing, would have little meaning in the UK context and would have no cost implications.

Issue 6: What role should doctors have in health surveillance for hearing?

16. The Directive stipulates that the right to hearing checks at the upper EAVs should be conducted "by a doctor or by another suitably qualified person under the responsibility of a doctor, in accordance with national law and/or practice". Again, the wording has been influenced by different practices and systems amongst Member States. Options are:
Option 6a: All health surveillance to be under the supervision of a doctor.
Option 6b*: Referrals to doctors to be made on an "as needed" basis. HSE to provide guidance.*
The effect of these options on benefits: Providing that health surveillance is conducted by an individual who is trained to recognised standards and that the individual heeds the referral guidance provided by HSE, it is unlikely that the benefits will be affected by insisting that all health surveillance is conducted under the supervision of a doctor.
The effect of these options on costs: HSE's preference is for referrals to doctors to be made on an "as needed" basis (HSE would provide guidance). Insisting that all cases should be under the supervision of a doctor would add substantially to the costs of audiometric testing. This cost can be estimated assuming the following:

- One hour of a doctor's time has a marginal cost of approximately £36[4]
- Each audiometric test involves a quarter of an hour of a doctor's time
- None of the audiometric tests currently conducted are under the supervision of a doctor
- Approximately 540,000 audiometric are conducted per year
- 230,000 additional tests per year would be performed in response to the new Directive

Under these assumptions, the incremental costs would be:

- £6.9 million in the first year
- £19.7 million over ten years, measured in present value terms

[4] New Earnings Survey (2001) SOC 220, salary multiplied by 1.3 to account for non-wage labour costs.

- £66.6 million over forty years, measured in present value terms.

Issue 7: How should we implement the Regulations in the 'music and entertainment' sector?

17. The Directive and Regulations allow a transitional period of up to two years for the music and entertainment sector. Those covered by the transitional period would have a two-year reprieve from complying with the requirements of the Regulations, but would have to continue to comply with the Noise at Work Regulations 1989 in the interim. The are a number of options for administering this provision:
Option 7a: HSE to set up an administrative system to consider applications for transitional periods from individual employers within the music and entertainment sector and/or specific sub-sectors of the music and entertainment sector;
Option 7b*: A blanket transitional period to be provided in the regulations for the music and entertainment sector (subject to its clear definition).*
The effect of these options on benefits: If a blanket transitional period is granted, workers in establishments that otherwise could reasonably be expected to comply more or less immediately would suffer health disbenefits. However, there is no information on which to base an estimate of these disbenefits.
The effect of these options on costs**:** HSE prefers a blanket transition period to be provided in the regulations for the music and entertainment sector (subject to its clear definition). The alternative, which would involve the operation of a permissioning system, would create incremental costs similar to those considered under option 1a. The estimated cost per application is therefore £78. HSE has no information on the likely number of establishments that would apply for eligibility under the transition rules.

Issue 8: How should we define ' the music and entertainment' sector?

18. "Music and entertainment" has a wide application. It could cover orchestras, concert halls and theatres, pubs, nightclubs, discos, cinemas, restaurants, leisure centres/activities, sporting events, fairgrounds, theme parks etc. It could also incorporate music and entertainment performances in other sectors, such as by military bands. Hence, the "music and entertainment sector" can be taken to refer to:
Option 8a: people performing live music;
Option 8b: all venues where/occasions when live music is played (including in other sectors);
Option 8c*: all venues where/occasions when the main purpose is the performance or production of music (whether live or recorded).*
Option 8d: all entertainment venues (regardless of whether music is played, eg bingo halls).
The effect of these options on benefits: The same argument presented under "Issue 7" can be applied in this context.
The effect of these options on costs: The relevant Directive Articles were designed to respond to the concerns of the music and entertainment sector regardless of whether establishments play live music or not. HSE's recommended option is to include "all venues where/occasions when the main purpose is the performance or production of music (whether live or recorded)". The cost implications of the other options are currently impossible to estimate because of the lack of detailed information on the

number of establishments that fall under the various alternative definitions. Furthermore, without more information from the sector on the cost implications of complying with the Directive under the normal schedule as opposed to costs two years later, HSE could be justified in assuming that the only difference relates to the time value of money. The incremental cost would be the difference between costs in the current period and the same costs discounted to reflect their present value two years hence. This difference would be small.

19. To summarise, HSE's recommended options are that:

- the Regulations should allow employers to decide if they wish to use weekly averaging;
- measurement is conducted when assessment shows it is possible that noise exposure might exceed the upper exposure action values or the exposure limit values, rather than the lower exposure action values;
- reassessment should be part of an ongoing control programme which should pick up changes as they occur;
- employers should provide health surveillance for all workers regularly exposed above the upper exposure action values and only for especially vulnerable workers above the lower exposure action values;
- referrals to a doctor to be made on an "as needed" basis;
- the Regulations should provide a blanket transitional period for the music and entertainment sector as defined in the draft Regulations.

INFORMATION SOURCES AND BACKGROUND ASSUMPTIONS

20. Information for this RIA draws on HSE cost benefit assessments of the previous EC proposals, on the work carried out by the Institute of Sound and Vibration research at the University of Southampton[5] and, for the costs to industry, on IES, 1995[6]. For the small business litmus test, the impact of the original proposal for the Regulations was discussed with five small firms.

21. All costs are calculated in 2000/2001 prices over a ten year period[7]. The base year for appraisal is year 2000/2001. Details of the actual costings are described below.

BENEFITS

22. The benefits estimated in this RIA have changed compared to those in the partial RIA. This is for two reasons. Firstly, revised levels of hearing loss (described in table 4) better reflect internationally accepted data. Secondly, the estimation

[5] Occupational Hearing loss from Low-level Noise. Institute of Sound and Vibration Research. HSE Contract Research Report No. 68/1994

[6] The Costs and Benefits of the Noise at Work Regulations 1989. Institute for Employment Studies. HSE Contract Research Report No. 116/1996

[7] In arriving at ten year cost figures, earnings are assumed to rise by 1.8% per year in real terms – the observed increase for the whole economy over the past twenty-five years or so. Costs and benefits are discounted to present value using the Treasury recommended 3.5% discount rate. However, health benefits are also assumed to increase in value by 2% per year in line with the average annual increase in real GDP per capita.

method now tries to reflect the view that avoiding hearing loss is likely to be valued more highly at higher levels of hearing impairment. The effects on the balance between costs and benefits of these changes is discussed later in the document but the changes do not fundamentally alter the policy conclusions.

Health and safety benefits

23. Estimating benefits involves estimating the number of individuals who will be saved from hearing loss and by how much, and then valuing the monetary worth of these estimates.

Quantification

24. Table 1 presented estimates of the number of employees exposed to various noise levels, not taking account of hearing protection. Actual exposures, particularly at higher noise levels, will be less. Hearing protection would have to be made available to workers when exposed to noise levels of between 80 and 85 dB(A) but they would not be obliged to wear it. Above 85 dB(A) all workers will need to wear hearing protection. Some workers will already be wearing hearing protection, as this is currently advised by HSE as good practice. IES (1995), reports that 86% of establishments with employees exposed above 85 dB(A) are providing hearing protection. We assume above 90 dB(A) hearing protection 'wear rates' of 90% and between 85 dB(A) and 90 dB(A) 'wear rates' of 75%[8]. Table 2 shows adjusted estimates of numbers exposed. It has also been assumed that hearing protection reduces an employee's exposure to noise by one noise band, although in some cases the effects will be more than this.

Table 2: Number of workers exposed to different noise levels (adjusted)[9]

80-85 dB (A)	85-90 dB (A)	90-95 dB (A)	95-100 dB (A)	100-110 dB (A)	>110 dB (A)
1,619,600	419,900	138,900	45,790	7,490	420

Relationship between hearing loss and noise exposure

25. Table 3 estimates the median hearing loss at different noise levels, assuming 10 years and 40 years exposure to noise. The figures come from the International Organisation for Standardisation, ISO1999[10], adjusted to equate with noise bands in Table 2. Average hearing threshold losses of 46 dB(A) over 10 years and above 50 dB(A) over 40 years have been assumed for the very small number of workers exposed above 110 dB(A).

---

[8] We are making the assumption that since 1995 the situation has improved and more establishments than 86% will be providing PPE. Above 90 dB it seemed reasonable to assume more workers will be 'wearing' PPE ie 90%. In the 85-90 dB range, we assume 75% would already be wearing PPE (ie, less than 86% as not all who are supplied will wear it).

[9] These figures have also been adjusted (reduced by 3%) to allow for the effect of introducing weekly averaging of exposure.

[10] Source: "Acoustics-Determination of occupational noise exposure and estimation of noise induced hearing impairment", ISO, 1999.

Table 3: Median hearing threshold loss by noise levels over 10 and 40 years

	75-80	80-85	85-90	90-95	95-100	100-110	>110
10 years	3.9	4.4	6	9.1	14.1	25	46
40 years	15.7	16.5	18.9	23.6	31.7	50	>50

Valuation

26. We have adopted the 'Quality Adjusted Life Years' (QALY) approach. This ranks different states of injury and ill health according to their impact on the quantity and quality of life. Combined with information from the DSS which equates hearing loss in relation to total disability, this approach best reflects the actual value of the detriment of hearing loss to the individuals concerned. In the QALY approach, an index is used where 0 equates to death and 1 to full health. Many aspects are included in estimating 'welfare loss', for example the level and duration of pain, whether there is a need for hospital treatment or restrictions to certain social and work activities.

27. Assumptions:

- Using the road safety estimate of the value of preventing a fatality (VPF) as a base, yields a value of around £42,000 per life year in QALY terms. Note that the DETR VPF includes loss of output as well as an allowance for pain and suffering;
- 10% reduction in QALY for 50 dB hearing loss, 5% for a 30 dB loss, 2.5% for a 20-30 dB loss, 1% for a 15-20 dB loss, 0.25% for a 10-15 dB loss, nil below 10 dB[11];

Table 4: Monetary values for different levels of hearing loss

Reduction in QALY		Value
10 %	50 dB Hearing loss	£4,200
5 %	30 dB Hearing loss	£2,100
2.5 %	20-30 dB Hearing loss	£1,050
1 %	15-20 dB Hearing loss	£ 420
0.25%	10-15 dB Hearing loss	£ 105
0	<10 dB Hearing loss	£ 0

- 40 years assumed life after 10 years of noise exposure;
- 10 years assumed life after 40 years of noise exposure;

28. These values are discounted over the relevant number of years for ten year and forty year exposures. Available information only gives the extent of hearing loss *after* 10 years and 40 years exposure (table 3). This means that we are very limited in the

[11] Applying 10% and 5% to £42,000 gives monetary values of £4,200 per year and £2,100 per year respectively. These values are extended over the period during which the hearing loss state is expected to occur and discounted to present value. Experiencing a hearing loss of over 50 dB over a period of 40 years yields a present value of around £96,000. For hearing loss of between 30 dB and 50 dB, the value is half this. However, the ISVR research suggests that very few employees will experience such levels of hearing loss after only 10 years' exposure. Hearing loss associated with exposures of between 85 dB(A) and 100 dB(A) are typically between 10 dB and 20 dB. For levels of hearing loss below 30 dB, a sliding scale of values has been used.

degree to which we can model the accumulation of hearing loss prior to the full forty years of exposure. However, knowing the level of hearing loss after 10 years, we have therefore at least been able to incorporate this into our estimates[12].

Baseline cost of hearing loss

29. Our analysis starts by estimating the current total cost to society of hearing loss caused by occupational exposure (ie before the proposed interventions to reduce exposure). The following table estimates the cost of hearing loss over 10 and 40 years[13].

Table 5: Baseline cost of hearing loss (£ million)

	80-85dB	85-90dB	90-95dB	95-100dB	100-110dB	>110dB	Total
10 years	0.0	0.0	0.0	125.8	205.8	46.2	377.7
40 years	3,509.7	909.9	752.6	597.2	327.5	46.2	6,143.0

Benefits (lower hearing loss) from the regulation

30. Having established the baseline hearing loss cost to society, the next step is to estimate the cost to society of hearing loss once the regulation is in place. The net benefit of the intervention can then be estimated by subtracting the ex post estimate from the ex ante estimate.

31. Assumptions:

- Noise reduction at source
  - 15% of workers exposed above 85 dB(A) will benefit in the first year.
  - noise reductions of either two or three noise bands.
- Hearing protection
  - 30% of workers exposed between 80 and 85 dB(A) take up the offer of hearing protection.
  - 25% of workers exposed between 85 and 90 dB(A) who currently do not wear hearing protection start wearing it.
  - 10% of workers exposed over 90 dB(A) who currently do not wear hearing protection start wearing it.
  - The benefit of hearing protection is to move employees down a sufficient number of bands to meet the requirements of the proposal (87 dB). For workers already below this threshold, we assume the number who benefit (those that start wearing PPE) move down 1 band only.

[12] In effect, this means assuming a lower level of hearing loss over years 10 to 40, and then adding this to a higher level of hearing loss over years 40 to 50.

[13] The figures are estimated by combining information in tables 2,3 and 4, and then discounting the results over the relevant periods.

Net benefits from regulation

32. Table 6 presents the adjusted number of people exposed to different noise levels when the regulation is in place. The steps taken to derive these figures are as follows. Firstly, taking figures from table 1, 15% of employees are moved down either two or three exposure bands (table 1 was used because the Directive calls for action to be taken based on exposure levels at source that have not been adjusted for hearing protection). Using the assumptions given above, we then accounted for existing hearing protection. Finally, using the assumptions that the regulations encourage more people to wear protection, we made a final adjustment to the figures.

Table 6: Adjusted number of people exposed following the regulation

	80-85dB	85-90dB	90-95dB	95-100dB	100-110dB	>110dB
2 bands	1,224,316	343,663	117,997	38,595	6,303	353
3 bands	1,197,193	336,168	116,937	38,532	6,303	353

33. Costs to society of hearing loss are estimated following a similar aproach to the baseline. Net benefits of the regulation are then derived by comparing baseline hearing loss costs with regulation hearing loss costs.

Table 7: Associated cost to society of hearing loss if workers move down 2 exposure bands after the regulations are implemented (£ million)

	80-85dB	85-90dB	90-95dB	95-100dB	100-110dB	>110dB	Total	Net benefit
10 years exposure	0.0	0.0	0.0	106.0	173.2	38.8	318.0	59.7
40 years exposure	2,653.1	744.7	639.3	503.3	275.6	38.8	4,854.9	1,288.1

Table 8: Associated cost to society of hearing loss if workers move down 3 exposure bands after the regulations are implemented (£ million)

	80-85dB	85-90dB	90-95dB	95-100dB	100-110dB	>110dB	Total	Net benefit
10 years exposure	0.0	0.0	0.0	105.8	173.2	38.8	317.8	59.9
40 years exposure	2,594.3	728.5	633.6	502.5	275.6	38.8	4,773.3	1,369.7

34. Net benefits:

- 10 year benefits of £60 million in present value terms;
- 40 year benefits of between £1,288 million and £1,370 million, in present value terms.

Savings in the treatment of hearing loss

35. This includes both supplying hearing aids to those suffering from noise-induced hearing loss (NIHL), and the cost of staff time involved in diagnosing and treating affected individuals.

36. Assumptions:

- Hearing loss of more than 45dB requires NHS treatment[14];
- Typical treatment consists of the fitting of hearing aid and counselling (£139) and the issue of a standard hearing aid (£59), followed by a drop in clinic for hearing aid repairs every five years (£84). Thus the 40-year cost of a case of NIHL greater than 45dB is £710 in present value terms[15];
- Detailed information is available only for the profile of individuals experiencing NIHL of more than 30dB and more than 50dB. In this analysis it is assumed that only those individuals experiencing NIHL of greater than 50dB require NHS treatment. Note that treatment costs are therefore an underestimate as they exclude individuals with hearing loss of between 45dB and 50dB;
- Population with NIHL of 50dB after 10 years is 420 individuals (tables 2 and 3). Population with more than 50dB hearing loss after 40 years is 55,756 (tables 2 and 9). Over a forty year period we assume that incidence of 50dB hearing loss rises at an increasing rate i.e. 420 cases after 10 years, a further 13,834 after 20 years and again after 30 years, and finally around 27,668 cases between 30 and 40 years;
- The number of cases of NIHL prevented depends on the impact of employers reducing noise at source ie the proportion of employees moving down 2 or 3 bands and therefore not requiring treatment is 15% after the first year, 30% after year 10 and 75% after 40 years.

Table 9: Hearing loss of 50db over 40 years as percentage of the population[16]

Noise level dB (A)	77	82	87	92	97	102	115
% 50dB htl of population	0%	1%	4%	9%	17%	29%	73%

37. Benefits:

- 10 year benefits of £12.4 million and 40 year benefits of £23.4 million in present value terms.

Other Benefits

38. *Productivity* may be affected by the regulation. Reductions in discomfort and annoyance and increases in efficiency due to working in a quieter environment can be expected. It is however not possible to quantify these effects as they greatly vary with employees' initial level of exposure and the type of the task undertaken.

39. *Tinnitus* is a debilitating condition of noises 'in the ears' and/or 'in the head' and is a symptom generated within a person's own auditory pathways. Experiences of tinnitus are very common following exposure to loud noise. Data from the SWI95

[14] Browning GG Clinical Otology and Audiology, Butterworth and Co. 2nd ed 1998

[15] http://www.doh.gov.uk/nhsexec/REFCOSTS/refcosts2002app.pdf

[16] Source: Contract Research Report 2, 1988 (CRR2/88), Health and Safety Executive.

suggests that at least 25% of those people who report NIHL also report having tinnitus. A further 10% reported tinnitus in the absence of hearing loss. Most of these were severe cases, and more recent research suggests that the overall prevalence of tinnitus may be double that of NIHL. As a result of the Regulations, it is likely that a very large number of tinnitus cases will be prevented. It is not possible to objectively grade the severity of tinnitus in the same way that NIHL can be quantified, or to attribute a monetary value to this benefit. However there can be no doubt of the practical benefit of preventing this potentially disabling condition.

40. Other possible benefits include reduced Department of Social Security administration costs as fewer individuals claim disability benefit for NIHL. These benefits are unquantified.

Health surveillance

41. The requirement is for audiometric testing to be available at 80 dB(A) where there is a risk to health, and a right to hearing checks above 85 dB(A). Essentially these requirements do not add to what is already required by the Framework Directive and the 1986 Noise Directive, but fresh consideration will need to be given to when and what health surveillance is appropriate. The benefits of health surveillance will be captured by the benefits of action taken to reduce noise at source and provide appropriate hearing protection for exposed workers.

Total benefits to society

42. The total quantifiable health benefits to society over ten years are estimated at between £72.1 million and £72.3 million in net present value terms. Over forty years, total health benefits will be between £1.31 billion and £1.39 billion in net present value terms.

COSTS

Compliance costs to business

43. The Regulations introduce some new duties on employers as well as ensuring that some existing requirements will have to be fulfilled at lower noise levels. Annual undiscounted costs are given for the first 10 years in Table 10, together with costs in present value terms over ten and forty years. HSE's preferred options for implementing the Directive form the baseline for the costs.

Costs of familiarisation

44. An estimate of total familiarisation costs requires an estimate of the number of firms and other organisations that will be affected by the Regulations. Unfortunately, the only reliable information at HSE's disposal relates to the potential number of affected employees rather than employers. This makes an estimate of familiarisation costs very uncertain. However, in order to derive an estimate, HSE has assumed that between 30 and 50% of employees in potentially "noisy" establishments are exposed to noise exceeding 80 dB(A). Working from statistics provided by DTI's Small Business Service for 2001, HSE estimates that the average size of businesses in

"noisy" sectors is between 17 and 18[17] employees. HSE also estimates that approximately 2,200,000 workers are exposed to noise above 80 dB(A). Using these figures, HSE estimates that the total number of affected firms is between 240,000 and 430,000[18].

45. If a manager costing £17 per hour from each affected company spends on average one hour familiarising him/herself with the new Regulations, the total cost of familiarisation will lie between £4.2 and £7.4 million.

Noise assessments

Between 80 and 85 dB(A)

46. Requirement. Assessment is required where there is likely to be a risk to health; measurement is only required if necessary. The risk assessment has to be recorded and the measurement data preserved.

47. Assumptions:

- assessments undertaken on average once every five years;
- in-house assessments take ½ hour of a technician/health and safety manager's time for each worker;
- a technician's time costs £13 per hour[19] and a health and safety manager's time costs £17 per hour. Who will carry out the assessment will depend on the size of firm. We assume an average £15 per hour (including non-wage labour costs) for in-house assessments;
- an external consultant costs on average £60 per hour;
- a rough assessment is carried out for 80% of employees;
- outside consultants are brought in for the remaining 20% of cases;
- monitoring would take 1/4 hour for a technician per worker per year.

48. Costs:

- first year costs of £19.7 million;
- 10 year costs of £75.1 million in present value terms;
- 40 year costs of £159.3 million in present value terms.

Above 85 dB(A)

49. Requirement. The NAWRegs already require assessments and record keeping. However the IES (1995) reports that in 1995 only 50% of employers with noisy workplaces carried out assessments. It is assumed that there has been an improvement in compliance over the years.

50. Assumptions:

- 30% of employers are not carrying out assessments now and will incur costs;

[17] The average for all sectors is 17.2 employees, whereas, the combined average for firms in agriculture, forestry, fisheries, mining, quarrying, energy, water, manufacturing and construction is 18.0. Calculations excluded the self employed.

[18] (2,200,000 x 100/30)/17.2

[19] Based on New Earnings Survey (2000) including 30% non-wage labour costs

- Of this 30%, two fifths of the assessments indicate the need for measurement
- Measurements and data recording take on average 1 and a quarter hours
- Otherwise same as above.

51. Costs:
- first year costs of £22.6 million;
- 10 year costs of £83.1 million in present value terms;
- 40 year costs of £174.9 million in present value terms.

Information and training for workers

Risks to hearing between 80 and 85 dB(A)

52. Requirement. Workers exposed above 80 dB(A) will have to be informed about risks to hearing. There is already a duty to inform workers exposed above 85 dB(A).

53. Assumptions:
- talks to new recruits, followed up by a periodic issue of leaflets;
- workers spend 15 minutes per year reading or listening to the information.

54. Costs:
- based on average hourly manual wages, first year costs of £3.1 million;
- 10 year costs of £226.5 million, in present value terms;
- 40 year costs of £64.7 million, in present value terms.

Above 85 dB(A)

55. Requirement. There is already a duty to inform workers exposed above 85 dB(A). However, the IES (1995) reports that above 85 dB(A) about 33% of employers with noisy workplaces are not carrying out any training. Again, we assume that for 2000, this figure is lower.

56. Assumptions:
- 20% of employers are not providing any training now and will incur costs;
- Same as above.

57. Costs:
- based on average hourly manual wages, first year costs of £0.5 million;
- 10 year costs of £4.5 million, in present value terms;
- 40 year costs of £11.1 million, in present value terms.

Programme of control measures above 85 dB(A)

58. Requirement. At 85 dB(A) employers will have to establish a programme of control measures and, implicitly, keep a record to show to safety representatives and workers. Where the noise level reaches 90 dB(A), the NAWRegs already require employers to reduce noise as far as reasonably practicable. Employers should already be taking action. Costs would vary according to size of firm. Small firms and those

with few noise exposed workers might be relatively hard hit, as many might have to hire specialists.

59. Assumptions:
- employers identify noise sources and outline control programmes;
- employers discuss programme with workers;
- taking programmes affecting 50 employees as the average, it would take:
  - three days' work by a technician of at least HNC standard to prepare the programme, plus about 2 hours of a manager's time to approve it;
  - half a day and 1 hour respectively per year thereafter keeping it up to date;
- entirely new programmes needed every 5 years;
- outside specialists are hired by a third of firms, at £60 per hour for 3 days;
- deduct half of the initial and continuing costs for the estimated 438,000 workers above 90 dB(A) to take account of existing requirements. (IES 1995 reports that, overall, despite having noisy environments, relatively few respondents had taken preventive actions, with between 37 and 48 per cent of the weighted respondents indicating that they had not carried out any changes to reduce noise in noisy establishments).

60. Costs:
- first year costs of £13.3 million;
- 10 year costs of £42 million, in present value terms;
- 40 years costs of £84.1 million, in present value terms.

Noise reduction

61. Requirement. The Directive requires noise reduction programmes to reduce levels at 85 dB(A) instead of the current 90 dB(A). Costs are uncertain as noise would be reduced to an undefined minimum. IES 1995 reports that: 'most 'good practice' organisations had a purchasing policy which included noise levels in the specifications. Usually this was on the lines that no operator should be exposed to noise levels greater than 85 dB(A). There was some evidence that, in practice, these policies were flexible and that noisier plant was purchased'.

62. Assumptions:
- employers reduce noise levels for
  i. 15% of employees in the first year
  ii. 30% after 10 years
  iii. 75% after 40 years;
- average cost to reduce noise per worker of between £200 to £800. These are lower than the estimates in the cost benefit assessment carried out in 1995. This is to reflect the lower figures in the IES report, which in turn may be indicative of incomplete compliance with the NAWRegs;
- recurring costs (eg maintenance) 20% of the initial costs ie between £10 and £40 per worker per year.

63. Costs:
- first year costs of between £27.5 and £110.0 million for initial reduction;

- 10 year costs of between £65.2 and £260.8 million, in present value terms;
- 40 year costs of between £268 and £1 072 million, in present value terms.

Provision of hearing protection

64. Requirement. Hearing protection will have to be made available to workers when exposed to noise levels of between 80 and 85 dB(A) but they will not be obliged to wear it. Above 85 dB(A) all workers will need to wear hearing protection. This is an additional cost compared to the NAWRegs, according to which employers are required to provide hearing protection to all employees exposed to noise levels of 90 dB(A) or more. Some workers will already be wearing hearing protection, as this is advised by HSE as good practice. IES, 1995, reports that 86% of establishments with employees exposed above 85 dB(A) are providing hearing protection. Above 90 dB(A) we assume hearing protection 'wear rates' of 90%. Therefore 10% of employees exposed above 90 dB(A) will need to be supplied with equipment. Employers will also be responsible for maintenance. Employers will have to supply protectors, keep them in good condition, repair and replace defective equipment, and make sure the workers know how to use them.

65. Assumptions:
- information to workers about availability at a cost of £4 per year per worker;
- 30% of workers exposed between 80 dB(A) and 85 dB(A) are given hearing protection;
- 25% of workers exposed to noise levels between 85 dB(A) and 90 dB(A) will be provided with hearing protection. The rest is already wearing them;
- 90% of workers exposed to noise levels above 90 dB(A) are already wearing hearing protection, the remaining 10% will be supplied equipment;
- average cost of hearing protection estimated to be £26 per employee per year for workers exposed <110 dB(A). Workers exposed >110 dB(A) would use 'better quality' hearing protection estimated at £120 per employee per year.

66. Costs:
- first year costs of £21.2million (including £8.3 million for providing information);
- 10 year costs of £169.0million (including £65.8 million for information), in present value terms;
- 40 year costs of £348.1million (including £135.7 million for information), in present value terms.

Signage costs

67. Requirement: Employers are required to delimit areas where workers are likely to be exposed to noise levels exceeding 85 dB(A), by marking them with signs and restricting access. This is already required under NAWRegs for levels of noise above 90 dB(A).

68. Assumptions:

- Each company where workers are exposed to levels of noise between 85 dB(A) and 90 dB(A) spends an average of £200, one-off costs, to delimit the noisy areas;
- There are on average 50 employees per firm;
- Maintenance costs are minimal, about 1% per year.

69. Costs:

- first year costs of £2.8 million;
- 10 year costs of £3.0 million, in present value terms;
- 40 year costs of £3.4 million, in present value terms.

Provision of health surveillance

70. Employers are required to provide audiometric (hearing) tests if a worker is shown to be at risk of hearing loss following the noise assessment. The IES report 'The Costs and Benefits of the Noise at Work Regulations' (1996) showed that 25.7% of firms provide audiometry in establishments with noise levels over 85dB(A). However the level of provision varied substantially between different sizes of firms eg 67.6% of firms with over 300 employees provided audiometry while only 19% of firms with 5-24 employees did.

71. Assumptions:

- This existing profile of audiometry provision has been weighted according to the proportion of workers in small, medium or large firms in each of the top five industries for noise exposure[20]. Weighting indicates that about 45% of exposed workers currently receive audiometric testing. Given the assumption (paragraph 47) that 70% of employers are carrying out noise exposure assessments now, it can be further assumed that, of workers receiving noise exposure assessments, about 2/3 go on to receive hearing tests. Therefore, of the workers in the remaining 30% of firms that will now carry out assessments (340,530, see table 1), about 2/3 (230,000) will require audiometry;
- Given that assessments are assumed to take place once every 5 years, it is assumed that hearing tests will take place around twice as often – once every 3 years;
- The IES report suggests that the cost of an audiometry test is about £10. Uprated to 2002 prices the unit cost of a hearing test is assumed to be £11.

72. Costs:

- First year costs £2.5m;
- 10 year costs £9.4m in present value terms;
- 40 year costs £26.6m in present value terms.

[20] Agriculture, forestry and fishing; mining, quarrying, energy and water; manufacturing; construction; transport, storage and communication.

Total costs to employers

Table 10. Summary of costs to employers									
	1st year costs (£m)			10 year cost (present value) (£m)			40 year cost (present value) (£m)		
Familiarisation	4.2	To	7.4	4.2	To	7.4	4.2	To	7.4
Assessments	42.3			158.2			334.2		
Information	3.1			26.5			64.7		
Preparation of programme	13.3			42.0			84.1		
Reducing exposure	27.5	To	109.9	65.2	To	260.8	268.0	To	1071.9
Ear protection	21.2			169.0			348.1		
Signage	2.8			3.0			3.4		
Health surveillance	2.5			9.4			26.6		
Total	117.0	To	202.6	477.6	To	676.3	1133.2	To	1940.3

73. Table 10 summarises the costs to employers that would arise based on HSE's preferred options for implementation. The majority of the other options would add to the compliance costs. If all the most expensive options were implemented, an additional 40 year present value cost of £316 million would be borne by employers. Expressed as an annualised undiscounted sum[21], this is approximately £14.3 million extra per year.

74. In the first year, estimated implementation costs are between £59.9 and £63.0 million, while estimated policy costs are between £58.3 and £ 140.9 million. Over ten years measured in present value terms, estimated implementation costs are between £204.4 and £207.6 million, while estimated policy costs are between £283.4 and £478.9 million.

Costs to a typical business

75. Table 11 gives the costs to a "typical business". The firm is assumed to employ 17 workers, three of whom are exposed to noise between 80 and 85 dB(A) and a further two are exposed to noise between 85 and 90 dB(A). All other assumptions are the same as those under HSE's preferred options for implementation.

Table 11. Costs to a "typical" business								
	1st year costs (£)				10 year cost (present value) (£)			
Familiarisation	17				17			
Assessments	94				352			
Information	8				68			
Preparation of programme	14				36			
Reducing exposure	60	To	240		142	To	569	

[21] The undiscounted sum of costs over forty years, divided by forty.

Ear protection	55				437			
Signage	8				9			
Health surveillance	22				82			
Total	278	To	441		1143	To	1553	

Costs to HSE

76. HSE will incur costs in amending the NAWRegs to implement the Directive, in becoming familiar with the new requirements and disseminating the information to industry. These costs are not considered to be substantial. We also do not expect any significant cost in increased enforcement by HSE. We expect that ensuring compliance with the new requirements will be subsumed into current inspection activities. Costs to HSE of compiling and disseminating guidance are not expected to be significant.

Total costs to society

77. **The total costs to society are equal to the total costs to industry: £117.0 million to £202.6 million the first year, £477.6 million to £676.3 million over 10 years, in present value terms, and £1.13 billion to £1.94 billion over 40 years, in present value terms. The annualised, undiscounted cost is £55.5 to £78.6 million per year[22].**

IMPACT ON SMALL BUSINESS

78. Five small firms (with fewer than 50 employees) were contacted. One in the agriculture sector (the smallest one), three in metal working and one in engineering. All companies had employees exposed to levels of noise over 90 dB(A).

Current practice

79. Four firms regularly carry out assessments, by contracting consultants. The cost of a survey is about £10-13 per person. The frequency varies from every year for one firm to every five years for another one. The smallest firm works as a subcontractor; it does not carry out assessments nor audiometry testing but it faces PPE costs.

80. As far as health surveillance is concerned, employees seem on average to be tested every couple of years. In some cases, a small number of workers is tested annually. The tests are mostly carried out on site by a mobile unit. The costs are fairly low: from £5 to £15 per head.

81. On PPE, most firms rely on fairly inexpensive ear plugs (less than £5 per pair), whereas one firm currently spends £15 per pair on ear muffs. Another spends around £8 per pair of ear plugs, but it is now switching to more expensive (£12) ones.

[22] The undiscounted sum of costs over ten years, divided by ten.

82. One company had started reducing noise at source by using sound absorption boards, air silencers for machines and acoustic guarding.

Proposal implications

83. Two firms claimed that the Regulations will mean that existing measures of hearing protection will not be adequate and that they will have to buy more effective, expensive PPE (at a cost of £30-50 per pair), but warned that there might be less compliance among employees with wearing them. One firm maintained that investing in less noisy equipment was not an option since there is no available equipment which is less noisy. This firm would, therefore, not be able to reduce noise at source. The fourth firm will have to upgrade equipment to reduce noise below the action values, but could not quantify the costs yet.

84. To conclude, for some small firms reducing noise at source may not be a feasible option and compliance among employees might be an issue. The Small Business Service has been involved in the transposition of this directive since 2001. They have asked for it to note that firms spend a significant amount of time keeping up to date with revised and new regulations. The cost of this is likely to be proportionately higher for small firms than large ones. Also small firms, which have only a few workers exposed to noise, may be disproportionately affected as they are likely to need specialist assessments done to check they are working within the guidelines.

COMPETITION ASSESSMENT

85. The Regulations will affect many, diverse industrial sectors. Measuring the potential impact on competition in the numerous affected markets is difficult. In these circumstances, the Office of Fair Trading suggest selecting markets that exhibit a high degree of supplier concentration, in the knowledge that adverse competition impacts are much more likely to occur in such markets. HSE has selected the market for primary steel products as the most obvious case where supplier concentration exists. To complement this, HSE has also chosen to examine the market for venues playing loud music because of the controversy that the Directive has caused in this sector.

86. Defining the economic market for primary steel products is relatively straightforward. There are no substitutes for steel in its major applications and so the market is defined by geographical areas of supply and demand rather than by alternative products. Great Britain imports approximately 50% of its primary steel from sources as distant as the far east and Turkey, as well as from the EU. Global supply is highly competitive, and over-supply means that price is determined by the lowest supplier bid. In the British market, Corus controls 85 to 90% of domestically produced supplies. This high level of concentration might lead to concerns about the competition impact created by the Regulations. However, the costs to steel makers of complying with the Regulations will be a very small proportion of overall production costs. This means that, even though only domestic and EU suppliers will incur compliance costs, there will be no change in the structure of the market as a result of the introduction of the Regulations. Compliance costs to new suppliers based in the UK and wider EU will not be any different from those that already exist, and although suppliers elsewhere will not incur costs, the highly competitive nature of the world

market will mean that UK steel buyers (and ultimately consumers) will not be affected. Levels of innovation in steel making are very low and therefore unlikely to be affected by the Regulations. Steel makers' choices over the price, location, quality and range of their products will not be affected. Overall, the Regulations are expected to have an insignificant impact on competition.

87. The economic market for venues playing loud music is more difficult to define. Geographical substitution is likely to be limited – for instance, few customers in Manchester are likely to travel to London or further afield to enjoy a night out at a night club. However, it is not entirely clear whether consumers regard forms of entertainment that do not involve loud music as close substitutes to those that do. In the absence of any evidence on this, HSE is assuming that these other forms of entertainment are not close substitutes and therefore the economic market is served only by venues where live or recorded music is played. There is a very low level of concentration in the music and entertainment market, with few service providers controlling more than very small percentages of particular market segments. This suggests that the impact of the Regulations on competition within the market is likely to be small. For each venue, the Regulations are expected to create compliance costs that are in proportion to the number of employees. From this perspective, no venue is expected to suffer disproportionate costs relative to their competitors in the market. HSE has no evidence to suggest that the structure of the sector would change in response to compliance with the Regulations, and new entrants to the market would not face costs that are not incurred by existing firms, except in the two year transition period. Overall, the Regulations are not expected to affect competition in the music and entertainment market.

RESULTS OF PUBLIC CONSULTATION

88. The Health and Safety Commission published a consultative document on the proposed regulations on 5 April 2004. The consultation period ended on 25 June 2004. 124 responses were received from a range of stakeholders (individuals, trade unions, employers, employer representatives, occupational health professionals, audiometrists, consultants, acousticians and noise specialists, professional organisations).

89. Each of the issues considered in the option section was addressed by specific questions during the consultative exercise. Table 12 lists the questions relating to each issue and the number of yes/no responses obtained. It illustrates that there was broad agreement with all of HSE's recommended options, suggesting no major changes in the proposed approach to be necessary.

Table 12: Numbers of people responding yes/no to specific consultation questions (responses for each question do not necessarily add up to 124 because of incomplete returns)

Consultation question	**Yes**	**No**
Do you agree with the proposal to allow employers to decide whether weekly exposure is appropriate? (Issue 1)	72	10
Do you agree with our proposed approach to assessment and measurement? (Issue 2)	63	10
Do you agree with our proposed approach to reassessment? (Issue 3)	69	8
Do you agree with our proposed approach on when to introduce health surveillance? (Issue 4)	63	15
Do you agree that health surveillance can continue to be carried out by a suitably qualified audiometrist? (Issues 5 and 6)	80	5
Do you agree with having a blanket transitional period for the music and entertainment sector? (Issue 7)	38	16
Do you agree that the two-year transition period is applied to all venues where/occasions when music (whether live or recorded) is played? (Issue 8)	42	16

90. Nevertheless, comments relating to points of detail within the draft Regulations and guidance are being considered by HSE with a view to making both documents easier to understand and more helpful. Most points of clarification and further assistance related to new concepts which are not covered by the existing Regulations. For example:

- more specific guidance was requested on what constitutes “vulnerable individuals” for the purpose of health surveillance;
- more assistance on calculating weekly exposure was requested. HSE is considering including more specific examples in the guidance and will be introducing an interactive calculator on the HSE website for weekly exposures.

Most comments on the Regulations were about using, wherever possible, terminology and concepts familiar to employers under the existing Regulations rather than introducing new language merely for the sake of consistency with the EU Directive.

SECURING COMPLIANCE

91. As far as possible current compliance levels for the components of the proposal have been taken into account. These are made explicit in the assumptions sections. It is not known to what extent compliance will be changed as a result of the proposal, but it is envisaged that reducing noise at source is going to be a gradual process and that, therefore, compliance will improve over the years.

92. Depending on the industry sector concerned, the new regulations will be enforced by either the HSE or local authorities, as is the case with the existing NAWR. Nevertheless, compliance with the NAWR is by no means universal, and it is likely that compliance at the lower levels proposed will prove difficult in some areas. For example, it has been suggested (see Impact on Small Firms above) that workers may be less compliant with wearing more ‘heavy duty’ PPE.

93. Non-compliance will be identified by responding to queries raised, investigating accidents and incidents, and routine checks by inspectors. Where appropriate, proportionate enforcement action will be taken in accordance with the HSC Enforcement Policy Statement. The Health and Safety at Work Act 1974, section 33 (as amended) sets out the offences and maximum penalties under health and safety legislation.

ENVIRONMENTAL IMPACT

94. There are no environmental impacts other than the health effects already discussed.

BALANCE OF COSTS AND BENEFITS

95. The total estimated costs to society are the total costs to industry, £117.0 to £202.6 million the first year, £477.6 to £676.3million over 10 years, in present value terms, and £1.13 to £1.94 billion over 40 years, in present value terms. Ten year benefits are estimated to be between £72.1 million and £72.3 million, in present value terms, and forty year benefits are estimated to be between £1.31 billion and £1.39 billion in present value terms.

96. As noted in the benefits section, the basis of the benefits calculations has changed since the last version of this RIA was published. Previously, the ten year benefits had been estimated at between £265 million and £582 million, while forty year benefits had been estimated at £1.6 billion. The benefits in the current RIA have declined, largely because of the adoption of ISO hearing loss data, which give lower hearing losses at low noise exposures than did the data that had previously been used. Overall however, we do not believe that the changes alter the policy conclusions; over the longer appraisal period of forty years, the costs do not appear to be disproportionate to the benefits.

UNCERTAINTIES

97. There is great uncertainty in quantifying the benefits. On balance however, we believe that the benefit estimates probably understate the true picture. This is for two reasons: Firstly, benefits other than reductions in hearing loss, particularly those from reductions in tinnitus, have not been estimated. Secondly, we have little information on how hearing loss develops before the full forty years of exposure, and what information we have almost certainly leads to underestimated hearing loss. However, set against these points is the assumption that all employees stay exposed either in their current job or in jobs with similar noise levels for 40 years. In reality many employees will move to quieter jobs.

98. The benefits in terms of cost savings to the NHS are also subject to uncertainty. The benefits may be larger than estimated because they have been estimated in terms of the numbers experiencing more than 50dB hearing loss. In fact, individuals with hearing loss of between 45dB and 50dB will also require NHS treatment, but information was not available on people in this category. Also, the number of cases of ‘hearing loss requiring treatment’ prevented are calculated solely

in terms of the impact of reducing noise at source. Further cases may be prevented by wearing hearing protection, although there is likely to be significant overlap between these two areas. The assumption that full potential benefits of reducing noise at source are realised over 40 years should balance the absence of estimates of cases prevented due to wearing hearing protection.

99. There is also uncertainty on the costs faced by employers in reducing noise. This is reflected in the use of a range.

EVALUATION

100. Baseline data for Great Britain on numbers exposed to noise, levels of exposure and ill-health are available in the research reports used to compile this RIA. This data can be broken down by industry, occupation, age and sex. In order to evaluate the new regulations, it is proposed to collect comparable data in 2009/10 to reveal the impact of the new regulations, taking into account any structural changes such as reduction or expansion in particular industries and occupations. In addition, small-scale interim surveys will be conducted after the regulations are introduced to identify early trends, and whether any further action is needed to stimulate improvement.

101. The regulations may indirectly increase pressure on equipment manufacturers, through customer demand, to design and market less noisy equipment. There may be similar indirect pressure on manufacturers of hearing protection devices to develop and market specific designs of hearing protectors eg for the music and entertainment sector. We will seek to obtain data from manufacturers on the introduction of such new designs and their take up by employers, if it is available and they are willing to supply it.

SUMMARY AND RECOMMENDATION

102. The link between exposure to noise and hearing damage is well known and internationally accepted. Regular exposure to loud noise can lead to permanent hearing loss and/or tinnitus. Scientific evidence suggests that hearing can be damaged at exposure to noise levels lower than those at which employers must take action under current legislation. The proposed Regulations are expected to improve the control of risks from noise at work, by tightening up on existing legislation and ensuring that employers take action earlier.

103. The total estimated costs to society of these proposals are the total costs to industry, £117.0 million to £202.6 million the first year, £477.6 million to £676.3 million over 10 years, in present value terms, and £1.13 billion to £1.94 billion over 40 years, in present value terms. Ten year benefits are estimated to be between of £72.1 million and £72.3 million, in present value terms, and forty year benefits are estimated to be between £1.31 billion and £1.39 billion in present value terms. Both costs and benefits are subject to uncertainty and some benefits have not been estimated (eg tinnitus). However, on the basis of the assumptions made in the calculations, the costs do not appear to be grossly disproportionate to the benefits.

104. There will be large, long-term health and safety benefits from reducing noise exposure further and providing for greater health surveillance. Moreover, there are many established and effective techniques for reducing noise at source, and employers can limit exposure by controlling the time spent by individuals in noisy working conditions. If neither of these solutions is possible, a variety of hearing protection devices are available, many of them inexpensive.

105. The public consultation exercise revealed broad agreement with HSC's proposals, although HSE is currently considering comments received with a view to making the draft Regulations and guidance easier to understand and more user-friendly.

106. Member States must implement the specific provisions of the Directive, but for some issues there are options as to how this is done. HSE's recommended options, based on consideration of the potential costs and benefits, are that:

- the Regulations should allow employers to decide if they wish to use weekly averaging; Setting up a formal system for granting permission to use weekly averaging would create a cost for the applicant firms, which would thus offset the potential benefits of weekly averaging.
- measurement is conducted when assessment shows it is possible that noise exposure might exceed the upper exposure action values or the exposure limit values, rather than the lower exposure action values; Advising noise measurement in cases of uncertainty between the upper and lower exposure action value would introduce extra costs for employers. Those costs would amount to £8.2 million the first year, £21 million over ten years in present value terms and £38.6 million over forty years in present value terms. There would be insubstantial health benefits from introducing this requirement.
- reassessment should be part of an ongoing control programme which should pick up changes as they occur; Specifying a regular interval between reassessments would impose additional costs on dutyholders, depending on their frequency. HSE assumed that dutyholders will conduct reassessments every five years on average, as part as their risk assessment programme. Over forty years, three years reassessment would add £110.4 million in present value terms, while seven year reassessments would provide savings of £55.9 million in present value terms. There is no reason to believe that insisting on regular intervals would yield any additional health benefits.
- employers should provide health surveillance for all workers regularly exposed above the upper exposure action values and only for especially vulnerable workers above the lower exposure action values; while providing health surveillance to all workers would not affect the benefits, it would impose impose an additional cost of about £45 million over ten years in net present value terms. Furthermore making the distinction between health surveillance, hearing checks and audiometric testing would have little meaning in the UK.
- referrals to a doctor to be made on an "as needed" basis; Insisting that all cases should be under the supervision of a doctor would impose additional costs to the costs of audiometric testing. These costs would amount to £6.9 million the first year, £19.7 million over ten years in present value terms and £66.6 million over forty years in present value terms. HSE believes that its recommended health surveillance provisions are perfectly adequate, and that insisting on the involvement of a doctor would not have any positive effect on the health benefits.

- the Regulations should provide a blanket transitional period for the music and entertainment sector as defined in the draft Regulations. Operating a formal system for granting permisions would create costs for applicant firms. However, a blanket transitional period is likely to create health disbenefits to workers in establishments that could otherwise reasonably be expected to comply more or less immediately. Unfortunately HSE has not been provided with the information required to estimate the number of workers thus affected.

107. HSE's recommended options avoid the need for unwieldy bureaucratic systems for authorising certain provisions of the Directive. Being primarily risk-based means that they also allow employers some flexibility in meeting their duties without compromising the health and safety of workers, where a more prescriptive approach would be unduly onerous.

108. It is recommended that the Minister agrees with the conclusions of the Regulatory Impact Assessment, including the options described above, which the Health and Safety Commission believes are the right ones in terms of practicality, effectiveness and avoiding unnecessary costs to industry.

Ministerial Declaration

I have read the Regulatory Impact Assessment and I am satisfied that the benefits justify the costs.

Philip A Hunt

Parliamentary Under-Secretary of State for Work and Pensions

18th June 2005

Contact: Andrew Maxey
HSE Injuries Reduction Programme, Policy Group, IR4 Noise and Vibration Programme Unit.
Floor 8, North Wing, Rose Court, London, SE1 9HS
Telephone: 020 7717 6369
Email: andrew.maxey@hse.gsi.gov.uk