Proceedings of the Institute of Acoustics

"CERTIFICATE OF COMPETENCE IN WORKPLACE NOISE ASSESSMENT" ITS OPERATION AT THE COLCHESTER INSTITUTE

D G Bull - Colchester Institute

1. INTRODUCTION

This certificate qualification has been devised by the education committee of Institute of Acoustics in response to the proposed new Noise at Work Regulations from the Health and Safety Commission [1]. These regulations specifically state the need for a competent person, and the guidance notes accompanying the regulations explain more fully the role of a competent person in carrying out noise exposure assessments. Hence the certificate course has been designed to meet the needs of personnel from a variety of backgrounds, notably health and safety staff, who need to acquire sufficient knowledge and experience to carry out such assessments.

The first courses were operated in May 1989, and subsequently in October 1989. This paper describes how the course has been developed and delivered at Colchester, on three occasions.

2. SYLLABUS BREAKDOWN

To deliver the course at Colchester the syllabus of the Institute of Acoustics has been broken down into sections for each day's work as shown by the summary given in Appendix I. These sections were drawn up to bring together related subject matter that can be presented as a coherent package for the day.

Great emphasis is placed on the need to have a very practical approach to the course. At Colchester this need has been met by:-

a) Building in as much demonstration work as possible during the lectures, to show live the principles involved (see examples later). This particularly applies to Day 4 where noise control techniques are presented as an almost continuous series of practical demonstrations, directly involving participation from the delegates.

b) Devoting one whole day to practical noise measurement and assessment exercises, in various workshop locations (Day 3).

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3. METHOD OF COURSE DELIVERY

Two modes of attendance have been operated:-

a) one day per week for 5 weeks
b) one week full time.

On each day of attendance, delegates are given a bound set of illustrated notes. These also include, progressively through the course, tutorial problem sheets, mock and previous examination papers, with guidance solutions at various stages.

DAY 1. Basic Concepts and Introduction to Instrumentation.

It was decided very positively from the start to carry out all dB manipulation work on hand calculators, rather than rely on a series of tables and charts. Hence 2 hours is spent introducing the background to, and methods of, calculation. Although initially some less knowledgeable candidates have been rather apprehensive at this approach, our experience has been that they are soon won over once they realise the potential of the small hand held calculator. In fact their enthusiasm for this approach once fully appreciated has been a very pleasant surprise.

Two other specialist staff (a physicist and an engineer) contribute to the delivery of the technical syllabus.

Practical demonstrations used include:-

Waves and their properties - spring models and computer simulations
Audio presentation of diffraction, standing waves and beats, frequency range, direct and reverberant sound
Sound in dB steps, and as used for demonstrating 'A' weighting;
Harmonic, periodic and broadband noise; octave filtering
L_{eq} and equal energy principle on meters and graphs.
Practical instrumentation: operation and performance including time weightings and alternative presentation of readings
Quick use of FFT analyser to show potential e.g. compare practical machine noise analysis by octaves, 1/3 octaves, and narrow band.

DAY. 2. Hearing Damage and Protection; H. & S. Regulations.

The regulations and their implications are covered by a lawyer who specialises in noise law.

Practical demonstrations and exercises include:-

Use of automatic audiometer
Live simulation of noise induced hearing loss, visual as well as aural (see during paper)
Video depicting hearing damage, its social consequences, and use of hearing protectors.
Evaluation of protection afforded by actual ear defenders
Discussion on the setting up of a hearing conservation programme
Rating of noise from machines, including the concept of sound power.

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DAY 3. Noise Measurement, Surveys, and Practical Assessments.

A typical programme for this very practical day is given as Appendix II.

There is a gradual progression from basic measurement exercises and the plotting of noise contours, to full survey/assessment procedures in practical workshop situation, with details recorded on suggested model forms.

Additional and wider experience is obtained by detailed discussion of some 14 case histories of typical workplace situations.

Day 4. Practical Systematic Approach to Noise Reduction.

The proposed regulations and guidance lay great emphasis on the need to reduce noise in the workplace. This day of the course aims to give an overall view of reducing noise, so that the competent person is in a position to give basic advice, and call in specialists as necessary.

The presentation moves logically from a basic understanding of noise sources, to obvious or common sense methods of reducing noise, to attenuating noise at machinery source, and finally to standard techniques of controlling noise in the transmission path.

The whole presentation is given as an almost continuous series of practical demonstrations, with the active participation of the delegates (a few typical examples will be shown).

Day 5. Revision, Practical Tests, and Final Examination.

Although a few extra noise control techniques are demonstrated on test rigs (e.g. anti-vibration mounts, resonance problems etc), most of the morning is devoted to revision and practical testing as required. The afternoon is taken up by the National Examination.

TUTORIAL WORK.

Since there is a national examination at the end of this relatively short course, individual assistance was considered to be essential. In the part time courses (over a period of five weeks) half hour periods are allowed at the end of days 2, 3, and 4 for tutorials as required.

The full time course is concentrated in a much shorter overall time, and therefore 2 hour tutorial periods are offered every evening (days 1,2,3 and 4) to give plenty of support in preparing for the examination.

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PRACTICAL TEST.

After careful consideration it was decided to conduct these tests in live workshop situations, rather than set up "artificial arrangements", for two reasons. The competent person should be able to deal with:-

a) the vagaries of a real life test; e.g. unexpected happenings and procedures.
b) the reaction and response of real workers

Three possible modes of operation have been offered:-

i) returning to college workshops after the main examination
ii) taking the test on the evening or morning prior to the examination
iii) taking the test at the candidates normal place of work, by special arrangement

The marking schedule for this test (Appendix III) shows the breakdown of the various tasks.

4. EXPERIENCE OF COURSE

So far 3 groups of delegates have attended the course:-

a) Part time group of 9, May 1989
b) Part time group of 8, October 1989
c) Full time group of 8, October 1989

The delegates have come from a very diverse range of backgrounds e.g. industries concerned with manufacturing and services, food processing, chemical plant, printing and automobile engineering. Also represented were the leisure and entertainment industries, and public bodies such as government departments, armed services, county councils, and local authorities.

In addition the level of knowledge of individual delegates also varied dramatically. There were those who were almost starting from scratch on acoustics, and a few who were already professionally qualified, with many levels of knowledge and experience in between these two extremes.

This diversity certainly influenced the way in which the course was developed and delivered. Individual help and assistance was imperative. Hence the tutorial work was integrated into the main programme, and was all the more important for the full time course, since the candidates are faced with a national examination and practical test after only approx. four days tuition. The opportunity to sort out individual problems was much appreciated by the delegates, and directly contributed to the good examination results. This type of assistance should be regarded as an essential element in the course.

The practical content always stimulated the most reaction, often initiating discussions which were much more informative than the more stereotyped question and answer sessions. Case histories of applied principles also created considerable interest, but the greatest comment invariably came from live demonstrations and "hands on" experience. Hence the practical content is seen as a vital part course which should be further developed to increase the national recognition of the course.

The practical assessment test is also seen as having a very significant role in determining the reputation of the course. Almost all the Colchester candidates elected to take the test at the college, only a very few requested testing in their own place of work. Whatever the venue of the test, the fact that a candidate has to carry out an assessment in a practical working situation adds to the credibility of the qualification.

The reaction to the course and subsequent feedback from the delegates has been very favourable indeed. The aim will be to build on this success and to further develop and refine the practical approach and methods, to better meet the very diverse needs of delegates from many different backgrounds.

5. REFERENCE

Noise at Work Regulations 1989; Health and Safety Commission, October 1989; H. M. S. O.

6. ACKNOWLEDGEMENTS

Sincere thanks are expressed to the following companies who have greatly assisted the running of the course by the generous loan of specialist instrumentation and audiology equipment.

Bruel & Kjaer (UK) Ltd, 92 Uxbridge Road, Harrow, Middlesex HA3 6BZ.
Tel. 01 954 2366

Lucas CEL Instruments Ltd, 35-37 Bury Mead Road, Hitchin, Herts SG5 1RT
Tel. 0462 422411

P.C. Werth Ltd, Audiology House, 45 Nightingale Lane, London SW12 8SP
Tel. 01 675 5151

APPENDIX 1

COLCHESTER INSTITUTE

SHEEPEN ROAD COLCHESTER, ESSEX CO3 3LL TELEPHONE: (0206) 761661 FAX: (0206) 763041

CERTIFICATE OF COMPETENCE IN WORK-PLACE NOISE ASSESSMENT

(INSTITUTE OF ACOUSTICS)

FIVE DAY COURSE

A) FRIDAYS 26 JANUARY → 23 FEBRUARY 1990 INC. 09:00 - 17:00
OR
B) 1 WEEK: 19 → 23 FEBRUARY 1990 INC. 09:00 - 17:00

SUMMARY OF COURSE CONTENT

DAY 1. BASIC ACOUSTIC CONCEPTS. Principles of sound generation and propagation properties of waves & fields; range of frequency and level (decibel scale usage + calculation); dB(A), L_{eq} and noise dosage, octave band analysis.

MEASUREMENT AND INSTRUMENTATION. Microphones and signal processing; Types of sound level meters; grades, functions, readouts; dose meters; usage & calibration; introduction to modern powerful signal analysers

DAY 2. HEARING AND ITS PROTECTION. Hearing mechanism; types of hearing loss including noise induced and live simulation. Audiometry. Personal hearing protection: types, performance and method of selection.

REGULATIONS AND THE LAW. Outline of Health & Safety at Work Act Health & Safety Policy Documents; E.E.C. Directive and H.S.E. regulations concerning the protection of hearing at work

DAY 3. NOISE SURVEYS AND ASSESSMENTS. Procedures and conduct of surveys; check lists & reports; practical industrial case studies; drawing up of noise contours. Supervised survey work in various practical workshop locations. (including some additional time on the following days).

DAY 4. PRACTICAL SYSTEMATIC APPROACH TO NOISE REDUCTION. Introduction to simple and standard methods of noise attenuation; principles of reduction at the source of noise, and in the energy transmission path; main types of equipment widely used. Continuous series of live demonstrations of practical techniques. Measurements of the effectiveness of noise control action. Role of engineering/technical staff in reducing noise.

DAY 5. REVISION OF PREVIOUS WORK. Extra tuition and practice as required; demonstrations and/or practical tests

AFTERNOON: NATIONAL WRITTEN EXAMINATION.

PRACTICAL TEST. Normally this must be carried out within three weeks of the written examination. It is usually performed at this Institute but can be carried out at the work-place of the candidate by special arrangement. He/she will be expected to demonstrate an authoritative understanding of noise assessment procedure by planning, executing, and reporting on a short practical exercise.

APPENDIX II

CERTIFICATE OF COMPETENCE IN WORK-PLACE NOISE ASSESSMENT

(INSTITUTE OF ACOUSTICS)

DAY 3. PROGRAMME

ROOM A28 - TECHNOLOGY BLOCK — Page No.

09:00 - 09:45	Basic rules of making measurements - SLM usage and good practice methods (DB)	1
09:45 - 10:45	Measurement exercise - plotting noise contours in Laboratory A28 (DB and AT)	3
10:45 - 11:00	Break - Coffee/Tea - Abbeygate Room	
11:00 - 11:30	Noise survey procedures and records (DB)	8
11:30 - 12:30	Practical survey work - various college workshops, as in notes. (DB and RM) 1) Metalworking Machine Shop 2) Car Body Shop	15
12:30 - 13:30	LUNCH - Abbeygate Room	
13:30 - 14:00	Discussion of given case studies (14 OFF) PRACTICAL TEST:- 1) Guidelines - see DAY 2 notes (DB) 2) Assessment/Marking Sheet	27 30
14:00 - 15:15	Practical survey work - college workshops. (DB and AT) Group 1 Fabrication/Welding Shop Group 2 Woodworking Machine Shop	31
15:15 - 15:30	Tea break - Abbeygate Room	
15:30 - 16:30	Practical survey work (continued) - college workshops (DB and RM) Groups 1 and 2 change over.	31
16:30 - 17:00	Discussions, and tutorials as required. (DB and AT)	

PLEASE NOTE:- Included at the back of these notes are:-

a) An additional example of a long examination question, with solution — 43

b) The previous examination paper of May 1989, inc. the formula/data sheets which are provided with the exam paper. TRY OUT THE QUESTIONS !!!??? — 47

APPENDIX III

COLCHESTER INSTITUTE

SHEEPEN ROAD, COLCHESTER, ESSEX CO3 3LL TELEPHONE: (0206) 761660 FAX: (0206) 763041

ACOUSTICS, NOISE AND VIBRATION CONTROL SECTION DGB 10/89

CERTIFICATE OF COMPETENCE IN WORKPLACE NOISE ASSESSMENT (INSTITUTE OF ACOUSTICS)

ASSESSMENT/MARKING SHEET FOR PRACTICAL TEST

CANDIDATE'S NAME _____ No. _____

TEST SITE _____

	MARKS MAX.	AWARDED
A) PRACTICAL PART OF TEST		
1) Correct setting up, checking and calibration, and operation of measurement equipment/instrumentation.	5	
2) Selection of appropriate measurement positions and and measurement times	10	
3) Accuracy of the noise measurements	10	
4) The collection of information about noise exposure patterns of work, and machine/equipment operating conditions	15	
5) Approx. estimate of daily exposure level and satisfactory verbal report	15	
B) WRITTEN REPORT		
1) Details, of noise measuring equipment, and checks and calibration procedures	5	
2) Noise readings together with details of microphone positions and measurement times (inc. layout plan of workshop, room etc.)	10	
3) Estimates of daily noise exposure levels	16	
4) Types of noise sources (machines) and their operating conditions	7	
5) Comments and observations e.g. designation of area, wearing of hearing protection, use of dose meter, recommendations for re-arrangements of area, replacement with quieter machines, noise control treatments, etc., etc.	7	
TOTALS	100	

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THE BACKGROUND TO THE NOISE AT WORK REGULATIONS 1989

Alan Dove, Health and Safety Executive, London

ACTIVITY BEFORE 1972

1 Over 250 years ago the hearing damage caused by noisy work was recognized and ways of minimizing it were urged [1]. In succeeding years periodic reports appeared, and in 1907 the Committee on Compensation for Industrial Diseases accepted that shipbuilding and boilermaking caused hearing damage, but recommended that compensation should not be paid because the damage did not prevent a man from continuing his trade. Until well into this century despite occasional attempts at noise control [2] the prevailing view among those with first hand experience of the problem in industry appeared to be that it was generally known that in some trades hearing would be damaged, but that "Men are apt to regard the deafness as inevitable" [3]. Ear plugs were recommended as much for their welfare and productivity benefits as for prevention of deafness [4 5], and in the generally less hygienic conditions of the time it was understandable that a note of caution should be expressed about their possible hazards to the wearer [6].

2 Scientific concern during the first half of this century was mainly focussed on nuisance to the public, and the impact on efficiency at work [7]. If hearing loss was mentioned it was apt to be described as likely only at around 100 dB above hearing threshold [8] or in extremely noisy activities such as boilermaking and firing big guns [9].

3 Following the Second World War there was a steady growth in scientific interest. A committee appointed by the Minister for Science to consider the whole range of problems created by noise thought it likely, in 1963, that "a hazardous noise environment exists in many industries" and recommended steps to disseminate existing knowledge and advice industry, but considered knowledge of the problem did not provide a sufficient basis for legislation [10]. The Ministry of Labour responded by publishing a booklet on how to recognize hazardous conditions and recommending both personal protection and noise reduction [11].

THE 1972 CODE OF PRACTICE

4 Following publication of the results of a major study on noise and hearing loss carried out under the leadership of Burns and Robinson [12] the Industrial Health Advisory Committee produced a code of practice for industry [13].

5 This was notable not only for its advice on hazardous levels of noise and action that should be taken to control the risk, but because it was the first official publication to recommend a single measure of noise (L_{eq}) for all kinds of noise (earlier systems had left considerable scope for doubt about how exposures combining, for example, steady, intermittent and impulsive noise were to be assessed against the recommended standard). This quickly lead to the introduction of integrating meters capable of making the required measurements under virtually all industrial conditions. The code has remained the basis for assessment of industrial conditions, but will finally be laid to rest on 1 January 1900, superseded by the new Noise at Work Regulations 1989.

6 The code was originally written as a voluntary guide for industry. However, following introduction of the Health and Safety at Work etc Act 1974 it was used by Inspectors of Health and Safety as a guide to the action that could reasonably be expected to comply with the general duties imposed by the Act. Although they aimed to achieve compliance with the code by voluntary means, it was inevitable that sometimes enforcement action would be needed. For the most part this took the form of an enforcement notice, which generally achieved the required effect. In a few cases it was necessary to prosecute firms, resulting in fines of up to £1,800.

THE NEED FOR NEW LEGISLATION

7 The Health and Safety Commission (HSC) has for some time thought that the law on noise needs to be reinforced. In 1981 it published draft regulations and guidance [14], but they were not developed because shortly afterwards the European Commission proposed a Directive to establish a common European basis for law on noise at work. The Directive was adopted in 1986 [15] and in December 1987 the HSC published a fresh consultation document (CD) [16] asking for comments on draft proposals for satisfying the Directive in Great Britain. In October 1989 the government, after having received the final HSC's final proposals, introduced the Noise at Work Regulation 1989.

Objectives of legislation

8 Hearing damage is only one of the deleterious effects attributed to noise at work. However, its irreversible nature and the now solid body of evidence on the dose/effect relationship have meant that in recent years there has been little question that this aspect should have priority. Both the European Directive and the 1989 regulations are firmly directed at this problem.

9 Use of the wealth of literature to help establish a rational approach to control of the hazard has, however, remained difficult. Administrators who have to decide between conflicting advice on what should be done ask simple questions, such as "What effect will this limit have on the number of deaf people in twenty or thirty years time?", but the answers are far from simple.

THE BACKGROUND TO THE NOISE AT WORK REGULATIONS

Over the years there has been much discussion of the number of people who will be made "deaf" if any given noise "limit" is enforced, with attendant difficulties over how deafness is to be defined, and the precise significance of any legal limit (eg is it to be a noise level never to be exceeded, or is it a value above which some degree of effort will be applied to prevent further exposure?).

10 Sutton has pointed out that most of the hearing impairment among people exposed to noise at the 85 and 90 dB(A) levels would in fact be due to the normal hazards of life rather than the noise [17]. This is to be expected because a comparatively small degree of noise-induced loss added to the loss expected in a typical industrial population, even without noise exposure, can move a substantial number of persons over any 'fence' arbitrarily defining significant hearing impairment. However, concentration on the number of significantly impaired people can also divert attention from the impact noise has on the state of hearing of the noise-exposed population as a whole. Not only does noise increase the number of "deaf" people, but it reduces the number who will retain good hearing into old age - individuals whose hearing has been degraded from very good to merely average have also lost something. Figure 1, for example, illustrates the impact on the proportion of a typical industrial population with better than 15 dB and worse than 30 dB htl (values chosen arbitrarily for the purpose of illustration) at 60 years of age after a lifetime's noisy work.

11 A further complication when choosing sensible and realistic values for action in industry is translating scientific data on the risk created by long term exposure to any forecast of the industrial consequences of limiting exposure on a short term basis. The European Directive, like the British 1972 code of practice, sets action levels of noise based on exposure over a single day. This tends towards greater safety than would be forecast from the simplistic assumption that substantial numbers will receive a lifetime's exposure at whatever value is set for the action level. If action levels are made genuinely effective the normal tendency for control measures to reduce actual exposures to a few dBs less than the legally established values, combined with the effects of changes in work over the years should mean that few if any workers receive a lifetime average exposure equal to the action levels. The magnitude of these effects however remains uncertain.

12 Other problems include how far to emphasize personal protection as the most immediately effective way of preventing further damage, or noise reduction as the most reliable in the long term, and whether measures such as routine audiometry can be demonstrated to have a sufficiently direct impact as a means of prevention to justify making them a legal requirement.

THE 1987 CONSULTATION DOCUMENT AND THE 1989 REGULATIONS

13 The 1987 proposals, like the Directive, followed the general approach taken in the 1972 code. Although a number of changes were made following

consultation, the 1989 Regulations (summarized in Table 1) were substantially unchanged from the proposals. Basic guidance on the regulations was published on 16 November, together with a free leaflet introducing the requirements. More detailed technical guidance will be published towards the end of the year.

WHERE NEXT?

14 Inspectors of Health and Safety will be enforcing the regulations from January, but if they are to be effective a great deal of work will be needed to help industry by continuing the process of removing the mystery from noise, which was one of the aims of the 1972 code of practice. Acousticians and the IOA can play a useful role here. Makers and suppliers of machinery in particular will need to pay more attention to noise, not only to meet the requirement for provision of information at 85 dB(A) but to meet more the more demanding requirement for information at 70 dB(A) to be introduced by the end of 1992 under a recent directive on machinery [18]. Demands for information and noise control built into machinery will steadily increase over the next few years and there are obvious commercial as well as legal hazards for suppliers who ignore this trend.

15 The present regulations are by no means the end of the story. The European Directive is due for review in 1994 "with a view to reducing the risks", and in preparation for this the HSE has commissioned reviews of the state of knowledge of the synergistic effects of noise and other agents, and of the non-auditory effects. The first of these will be published by the end of the year [19] and the second should be available during 1990. HSE will also be assessing the reaction of industry to the regulations, and when doing so will pay attention to matters that should be dealt with in the European review.

16 An issue that will need further consideration before the review is the role that compulsory audiometry might play in the future. It is not required by the regulations, although some specialists in the field think it should have been. It is not easy to establish how far compulsory audiometry would contribute to prevention of hearing damage. On the one hand, many firms already have voluntary schemes fitting their arrangements for occupational health surveillance, which they find beneficial. However, it is uncertain how far the benefits would be made general if the procedure were made universally compulsory, perhaps in firms where use of the information would be difficult (eg because of high labour turnover), or even exactly what the benefits would be.

17 A study of some voluntary schemes commissioned by the HSE [20] found that at the moment their main roles are protection for the employer against future civil litigation and education of workers (which was generally welcomed by them). Comments on the proposals in the HSC's 1987 CD included a variety of views. Those disagreeing with compulsion often mentioned doubts about feasi-

bility and utility in particular circumstances, including small firms, and the construction, agricultural and quarrying industries. Those favouring a duty referred mainly to its value in providing early warnings, protecting employers against bogus claims for hearing damage, its contribution to education of noise exposed workers, and a belief that it ought to be introduced in any case to satisfy the Directive.

18 During the period leading to the review particular attention will need to be paid to what use should be made of the results of audiometry, how results are to be used in difficult cases, and what benefits can be demonstrated to flow from the procedure. It is to be hoped that by the time discussion begins answers to these points will be more available than they are now.

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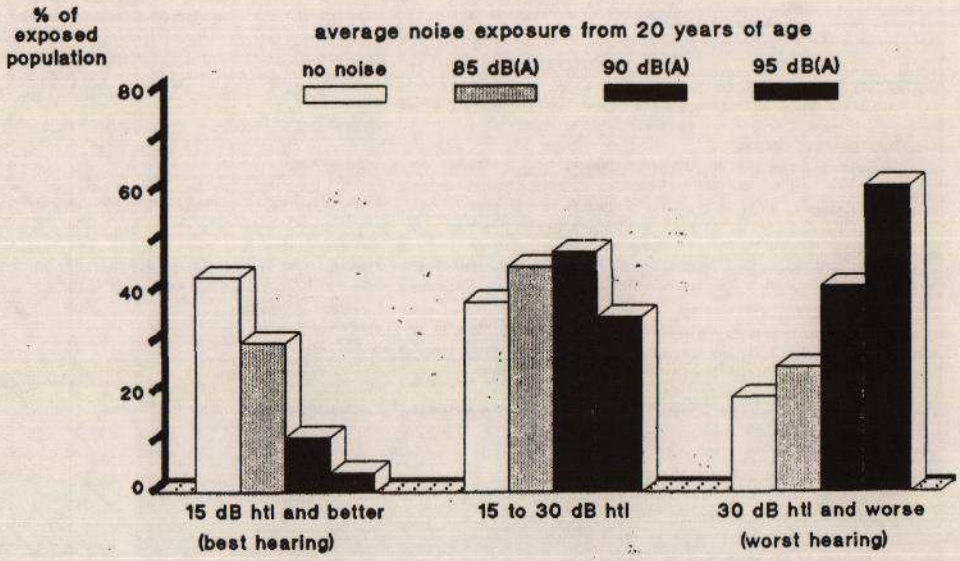

FIG 1: EFFECT OF NOISE ON DISTRIBUTION OF GOOD AND POOR HEARING IN A TYPICAL 60 YEAR OLD INDUSTRIAL POPULATION

NOTES

Data obtained from tables by D W Robinson, published in HSE Contract Research Report 2/1988

Hearing threshold levels (htl) are averages of 1, 2 and 3 kHz

Value for 15 dB htl and better/95 dB(A) is extrapolated from Robinson's tables

The population is assumed to have equal numbers of males and females working at the given levels of daily personal noise exposure from 20 to 60 years of age

TABLE 1

Action required where $L_{EP,d}$ is likely to be: - (see note 1 below)	below 85 dB(A)	85 dB(A) or more	90 dB(A) or more (2)
EMPLOYER'S DUTIES			
GENERAL DUTY TO REDUCE RISK			
Risk of hearing damage to be reduced to the lowest level reasonably practicable. (Reg 6.)	✓	✓	✓
ASSESSMENT OF NOISE EXPOSURE			
Noise assessments to be made by a Competent Person. (Reg 4)	-	✓	✓
Record of assessments to be kept until a new one is made. (Reg 5)	-	✓	✓
NOISE REDUCTION			
Reduce exposure by means other than ear protectors as far as reasonably practicable. (Reg 7)	-	-	✓
PROVISION OF INFORMATION TO WORKERS			
Provide adequate information, instruction and training about risks to hearing, what employees should to to minimise risk, how they can obtain ear protectors if they are exposed between 85 and 90 dB(A), and their obligations under the Regulations. (Reg 10(1)(a))	-	✓	✓
Mark ear protection zones with notices, so far as reasonably practicable. (Reg 10(1)(b))	-	-	✓
EAR PROTECTORS			
Ensure so far as is practicable that protectors are:-			
- provided to employees who ask for them (Reg 8(1))	-	✓	-
- provided to all exposed (Reg 8(2))	-	-	✓
- maintained and repaired (Reg 9(1)(b))	-	✓	✓
- used by all exposed (Reg 9(1)(a))	-	-	✓
Ensure so far as reasonably practicable that all who go into a marked ear protection zone use ear protectors. (Reg 10(b)(ii))	-	-	✓ (3)
MAINTENANCE AND USE OF EQUIPMENT			
Ensure so far as is practicable that:-			
- all equipment provided under the Regulations is used, except for the ear protectors provided between 85 and 90 dB(A). (Reg 9(1)(a))	-	✓	✓
- ensure all equipment is maintained. (Reg 9(1)(b)	-	✓	✓
EMPLOYEES DUTIES			
USE OF EQUIPMENT			
So far as is practicable:-			
- use ear protectors (Reg 9(2))	-	-	✓
- use any other protective equipment (Reg 9(2))	-	✓	✓
- report any defects discovered to his employer (Reg 9(2))	-	✓	✓
MACHINE MAKER'S AND SUPPLIERS DUTIES			
PROVISION OF INFORMATION			
Provide information on the noise likely to be generated (Reg 11)	-	✓	✓

NOTES: (1) The dB(A) action levels are values of daily personal exposure to noise ($L_{EP,d}$).
(2) All the actions indicated at 90 dB(A) are also required where the peak sound pressure is at or above 200 μPa (140 dB re 20 μPa).
(3) This requirement applies to all who enter the zones, even if they do not stay long enough to receive an exposure of 90 dB(A) $L_{EP,d}$.

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THE TRADE UNION RESPONSE TO THE NOISE AT WORK REGULATIONS

Steve Rabson

General Municipal Boilermakers and Allied Trades Union
Thorne House, Ruxley Ridge, Claygate, Esher, Surrey KT10 0TL

Noise, as we know, is probably the most widespread and underestimated of industrial hazards, with about 1 million workers exposed to levels above 90 dB(A), and 2 million workers exposed to levels above 84 dB(A).

We have no way of knowing what it must be like to suffer reduced hearing. We can simulate hearing loss and in so doing are made aware of the sensation of hearing loss, but we cannot possibly understand what it must be like to hear those muffled sounds all of the time. I can't begin to understand the misery of not being able to hear the conversation and the jokes of friends in the pub. What must it be like to cause arguments at home because you need the stereo or television turned up so loud, and what it must be like to be treated as stupid or ignorant when, in reality, they just can't hear what is going on?

While we cannot understand that suffering, we do know that it has affected a significant percentage of the estimated 2 million workers to which I have just referred. It can therefore be seen that we have a serious problem. I doubt that anybody would disagree with that. I suspect there would also be general agreement if I were to suggest that the problem has existed since the onset of the industrial revolution.

I would therefore like to ask a two part question. Part (a), 'Why has it taken until 1989 to introduce some sort of legislation to protect people from this hazard?' and Part (b), 'Would we now have even this legislation if it had not been for the 1986 European Directive?' Unfortunately time will not allow me to dwell on that question, and I will therefore leave it for you to ponder. In the meantime I will direct my attention to the content and effect of the Noise at Work Regulations 1989. In doing so I will restrict myself to the following points.

1. How acceptable are the Noise at Work Regulations 1989? and

2. How effectively will these regulations be introduced and policed?

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I will then briefly conclude by reflecting on the next move after their introduction in 1990.

First then, how acceptable is the legislation? And I believe we can only answer that question at this stage by making the assumption that they will be introduced fully and applied vigorously.

In my opinion, the best way of viewing the acceptability, or otherwise, of these regulations, is to put the most important of the regulations, one at a time, under close scrutiny. The first of these of any importance, is regulation 4.

This states that whenever there is the likelihood of employees being exposed to 85 dB(A) or above, or the peak action level of 200 pascals or above, then a competent person should carry out an assessment for the purposes of:

(a) identifying which of his employees are so exposed; and

(b) of providing him with certain information in order to comply with regulations 7, 8, 9 and 11.

This shall be reviewed when there is reason to suspect that the assessment is no longer valid, or there has been a significant change in the work to which the assessment relates. If the re-assessment brings new evidence to light which makes any current practises unlawful, then change would be required in order that the regulations once more apply.

An assessment can, of course, be extremely useful and I am pleased to see that the HSE have moved in that direction with recent legislation, but of itself the assessment does not reduce noise. It can highlight problems and is far better than waiting for deafness claims and then introducing ear muffs. But the point about assessments not reducing noise levels is still valid. This is also true of regulation 5, which talks of keeping records of the assessment. Once more an essential regulation, but one which again does not of itself reduce noise levels.

I hope that I have made the point clearly. There is nothing wrong with regulations 4 and 5. If they were not in the regulations, I would be arguing for their introduction, and would go so far as to argue that they are central to the rest of the regulation, for without an assessment, and without a

record of that assignment, it is difficult to progress very far with a campaign of noise reduction. However, the strength of the regulations, the levels that noise can be reduced to, are contained elsewhere.

Let us now turn to regulation 6. This states that "every employer shall reduce the risk of damage to the hearing of his employees from exposure to noise to the lowest level reasonably practicable". A fairly unambiguous regulation. It talks of reducing the risk of damage rather than reducing noise levels, and in so doing clearly suggests that the use of defenders is acceptable. This is cause for concern. We know that hearing loss occurs when workers are exposed to levels of less than 90 dB(A) or even 85 dB(A). We also know that defenders often do not do the job for which they are made. I believe GMB will therefore have to pursue future legal cases where employers have abided by regulation 6 and where my members still end up deaf. And that assumes that the regulation will be effective. My own view is that it will not, and certainly not in the near future.

Let us now turn to regulation 7 which states that:

"Every employer shall, when any of his employees is likely to be exposed to the second action level or above or to the peak action level or above, reduce, so far as is reasonably practicable (other than by the provision of personal ear protectors), the exposure to noise of that employee."

On first reading, I thought that this was the regulation that would force levels down to 90 dB(A), but that is clearly not what it says. What it does say is that if levels are above 90 dB(A) then you have a duty to reduce those levels to as low as is reasonably practicable. So an employer can carry out an assessment, discover levels in excess of 90 dB(A), conduct an extensive maintenance programme, write to manufacturers asking for relevant information, and all else that a reasonable employer would be expected to do, and perhaps even achieve a reduction in noise levels, but still to a level above 90 dB(A).

If this is the case then we need to ask whether or not the employer has achieved anything, and, I suppose, we would need to answer YES. But if we ask whether enough has been achieved, then what is the answer? In law the answer is presumably YES. In my eyes, the answer must be an emphatic NO. We need as a very minimum, an absolute duty to reduce to 90 dB(A) with a clause stating that the regulation will be waived where, for technical reasons 90 dB(A) is not possible, rather than this sort of get out clause.

I wonder how many of you are surprised by that? I wonder how many of you thought that our new regulations impose a definite 90 dB(A) limit? That certainly is the way that people have been talking. It is most certainly not the way that I believe the regulations read. In allowing for ear defenders to be issued for noise levels above 90 dB(A) or 200 pascals, regulation 8(2) clearly confirms that my reading of regulation 7 is correct.

It seems then that the main provisions of the regulations can be boiled down to this: If you **think** that the workplace is noisy, carry out an assessment. If the assessment shows some areas above 85 dB(A), then employers must provide ear defenders **if workers ask for them.** At 85 dB(A) there are also a number of duties concerning information and training and a number of reasonably practicable duties pulled from general health and safety legislation.

If there are also levels in excess of 90 dB(A), then there is a duty to provide ear defenders along with ear protection zones in which to wear them. Noise levels must previously have been reduced by means other than the use of ear defenders to as far as is reasonably practicable.

As a representative of 850,000 people, most of whom will be affected by these regulations, I hope you will excuse me if I appear not to be too excited at the prospect of their introduction. Over 100 years the GMB has waited for these regulations. We should be rejoicing. We should be contacting our activists and informing them that after a long and valiant battle against noise, we have won at last. In reality I am informing them that we have taken a very small first step on what now appears to be a much longer road than we thought. The regulations will, of course, lead to reduced noise levels in some workplaces and therefore the amount of suffering of some working people, but they will not do it by much, they certainly will not do it by enough, and they will not do it in those workplaces that really need reductions.

Those are the criticisms that I have of the regulations that we have got. Now I want to turn my attention to the regulations that I believe we ought to have. And here I will restrict my comments to the differences which exist between our regulations and the European Directive. Legislation which, in itself was clearly weakened by employer and government pressure. Firstly, I want to look at the difference between Section 11 of our regulations and Article 5 of the Directive.

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Article 5(2)(b) states that where levels exceed 90 dB(A)

"workers and their representatives ..... shall receive adequate information on the excess level and on the measures taken pursuant to subparagraph (a)"

where subparagraph (a) states that

"the reasons for the excess level shall be identified and the employer shall draw up and apply a programme of measures of a technical nature and/or of organisation of work with a view to reducing as far as reasonably practicable the exposure of workers to noise;"

The intention of this is clearly that workers should be fully informed about managerial decisions concerning the noise reduction programmes, both technically and organisationally.

Let us now look at Section 11 of our regulations. This states that if noise levels exceed 85 dB(A) or 200 pascals, then employers will need to be provided with adequate information, instruction and training on:

" (a) the risk of damage to that employee's hearing that such exposure may cause;

(b) what steps that employee can take to minimise that risk;

(c) the steps that that employee must take in order to obtain the personal ear protectors referred to in regulation 8(1); and

(d) that employee's obligations under these regulations."

The clear intention here is to tell workers that there is some hazard that they can get over by obeying company directives concerning ear defenders.

Let us take a look at those four points again. Firstly you have to tell employees of the risk of damage to their hearing that exposure to noise may cause, and secondly, you have to tell employees what steps they can take to minimise that risk. You must then tell them of the steps that they must take in order to obtain their ear protectors. Finally, you must inform them of their obligations under these regulations.

Allow me to translate this into the language of the average company:

You should be careful, its noisy out there. But don't worry, just wear a pair of ear defenders and you will be OK. You can get defenders from the stores. And by the way, if I catch you without them on, you will be for the high jump.

That may have sounded like a flip comment, but the difference between the intent of the European Directive and its interpretation into the Noise at Work Regulations is a perfect example of the contempt that government and business shows for its workforce.

A further and related point worthy of mention is Article 6(3) of the European Directive. This states that where the provision of ear defenders is necessary, the models should be chosen in association with the workers concerned. I assure you that you will not find a similar reference in our regulations.

I am forced to ask what it is that British industry could be so scared about. Are there stores managers and health and safety officers up and down the country witless with worry that the shop steward might find out where they buy their protective clothing and what standards that clothing meets before it comes into the workplace?

Has anyone ever costed the price to industry of all the materials in stores not worn by the workers because they were never consulted and as a result is unfit for the purposes for which it was bought? Which company hasn't had a long running debate over protective clothing, where the management purchase only to find that no one will wear the protective clothing, so that it is ultimately necessary to consult? What a waste of time, money and effort.

My second point with respect to the European Directive is cause for even greater concern. It centres around the cynical interpretation that the government have put on Article 7 of the Directive, which gives noise-exposed workers the right to hearing tests as part of a hearing conservation programme.

The Article states that:

"Where it is not reasonably practicable to reduce the daily personal noise exposure of a worker to below 85 dB(A), the worker exposed shall be able to have his hearing checked by a

doctor or, ... if judged necessary ..... by a specialist."

The directive has three other major points which can be summarised as ensuring that the tests are carried out so that hearing loss is properly diagnosed and future preservation of hearing is possible. Doctors or specialists should advise on preventative or protective measures that should, in future, be applied.

Annex II to the European Directive furthermore states that these checks should, where appropriate, comprise an initial examination, to be carried out before or at the beginning of exposure to noise, and regular examinations at intervals which are commensurate with the seriousness of the risk and are determined by the doctor.

I think this is impressive. I think it is a positive approach to the identification and eradication of noise and noise induced hearing loss. Our government's response has been to tell us that the NHS is capable of dealing with Article 7. This, of course, is nonsense. The NHS have the capacity to carry out 18,000 audiometric tests every year. To comply with Article 7. it will be necessary to test every new entrant to a potentially noisy industry. That figure alone, as well we know, is far higher than 18,000. It is then necessary to include every worker who is presently exposed to levels above 85 dB(A), and that is about 2 million. Even if audiometric tests are only carried out every five years, it can still be seen that we are not being expected to swallow a lie, a damn lie, or even a statistic, but rather a cynical abuse of government privilege.

Of course I have so far only dealt with the problems of numbers. It is also necessary to discuss the approach. Annex II talks of testing workers before they begin work in a noisy environment. I do not know if you are aware of the likely response of going to your GP and asking for a pre-employment audiometry test, but I can imagine that it will seldom be met positively, while the possibility of the NHS meeting preventive needs of this kind is well beyond the capability of the present system.

As I say, there is clearly no intention of abiding by the European Directive. In answer to my question "how acceptable are the Noise at Work Regulations?" I have to say that for me and my members they are not at all acceptable. And I am even forced to wonder whether they leave themselves open to a European legal challenge.

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The second point that I said I would address concerns the question of whether the regulations are likely to be introduced properly and effectively. You will not be surprised to hear that I think they will not.

The government have not promised any extra resources for these regulations even though noise is recognised as the most widespread workplace hazard; even though the HSE also have to deal with the implementation of COSHH as well as these new regulations, and even though they are already understaffed by 20% on a 1979 base.

Finally, I said I would look into the future. John Cullen, at the HSE press launch last month said that these regulations were a starting point, and that by 1994 the Europeans would want further legislation and that we would be looking to that legislation to see what further improvements we can make. At first I thought that this was a positive step. The present regulations might be problematic, but at least it would not be very long before we saw further progress.

But the more I thought about his comments, the less happy I became. Why, I wondered, are we not dictating the pace of European legislative change instead of waiting to be told what the next move will be? Why are we not saying that we demand a 5 dB(A) reduction on both action levels in 1994 and another 5 dB(A) by 1996 or 1997? And why are we not at the forefront of demanding a maximum general level and a maximum peak level above which no employee will be exposed except in certain highly regulated circumstances?

That effectively concludes my paper. At this stage if I were talking to a group of workers, I would be urging you to return to your workplaces and fight for the lowest achievable noise levels, and possibly suggest that you write to MPs and others so that the plight of those whose hearing is affected by noise at work is not forgotten.

But, of course, I have the ear not of those who may suffer noise at work, but of the opinion formers as far as noise is concerned. I know that in the course of the next two days you will hear papers arguing, among other things, that the attenuation levels of ear defenders are inaccurate, and that the way we calculate noise levels is flawed.

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These may be academic debates, but to my members the success of the more radical or challenging papers at this type of event could mean the difference between sharing the joke and being the brunt of it.

I urge you to make the HSE not only sit up and listen, but also to act in such a way that noise induced deafness can start to become a thing of the past in the immediately forseeable future, rather than at the end of a very long and very dim tunnel.

Thank you.