CERTIFICATE OF COMPETENCE IN WORKPLACE NOISE ASSESSMENT COURSE DELIVERY AND INDUSTRIAL APPLICATION

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INTRODUCTION AND BACKGROUND TO COURSE

The Noise at Work Regulations 1989, set out the need for making competent noise assessments in the place of work. From its professional viewpoint the Institute of Acoustics immediately recognised the need for the proper training of competent persons to carry out such assessments.

The Institute therefore set up a strong group comprising health and safety specialists, industrial noise control engineers, practical acousticians, and training professionals, to devise, develop, and oversee the operation of a properly recognised course of education and training. After carefully considering all the requirements, including the guidance as issued by the Health & Safety Executive, the basic needs for competency were drawn up, and from these the course objectives were set out and the course content developed, both of which are detailed in Ref. [1].

To ensure good quality standards, centres offering the course must be accredited by the Institute of Acoustics. After much deliberation the development committee recommended a course of 5 days. Feedback from various approved centres operating the course around the country has confirmed that this duration is about right.

Rigorous course assessment is considered to be very important in setting up a national qualification which is to have recognised standards and widely accepted credibility. Hence there is a national written examination with a high pass mark, and a practical test to verify the actual doing and reporting of a typical noise assessment procedure. The whole emphasis of the course is on a practical approach so that after successful completion, as well as receiving a recognised certificate with the backing of a professional organisation, the delegate has the confidence to carry out proper noise measurements and assessments.

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COURSE DELIVERY AT COLCHESTER

To meet the very variable needs of potential customers in a wide variety of occupations and industries, an early decision was made at Colchester to offer both full-time and part-time modes of study. The latter, was particularly aimed at those who would appreciate the extra time to assimilate all the necessary information and required practical techniques. It operates as one day per week attendance, the last examination day coinciding with the end of the full time one week course.

At Colchester the following records relate to the 3 years of operation of the course:-

EXAMINATION SITTINGS	10	
COURSES OPERATED	17	9 FULL-TIME 8 PART-TIME
DELEGATES ATTENDED	153	78 " 75 "

(Approx. 46 from East Anglia, 75 London & S.E., 18 Midlands, 14 North)

RESULTS (Exam & Practical Test)	146	CLEAR PASSES (95%)
	4	RESIT EXAM AND PASS
	3	FAIL (1 LEFT UK; 1 RETIRED FROM WORK)

At the Professional Training Centre (PTC) of the Colchester Institute we are also concerned about course quality, in particular the way the course is delivered. Bearing in mind that there were no specific entry requirements, and delegates could come from a very wide range of backgrounds, two essential approaches were built into the method of delivery:-

1) Very Practical approach to all aspects
2) Individual tutorial work whenever possible.

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1) PRACTICAL APPROACH

The Colchester Institute has developed a very practical approach to a range of courses in Acoustics, Noise and Vibration Control. This has a proven record for quality of learning which has been well received by a wide range of delegates from the very inexperienced to professional acousticians. Every delegate receives a fresh set of illustrated and bound notes on each day of the course. Lectures given around these notes are illustrated with live practical demonstrations. Typical examples are listed below under the main headings of the course content.

TYPICAL PRACTICAL DEMONSTRATIONS

A) BASIC ACOUSTIC CONCEPTS.
Wave properties, particularly diffraction and interference
Audio & visual dB steps of loudness, leading on to 'A' weighted simulation
Individual perception of audio frequency range
Octave division of white noise and fan noise

B) MEASUREMENT AND INSTRUMENTATION.
Range of meters with analogue and digital outputs
RMS and Peak response, and clipping of signal (overloading)
Dose meter logging report
Briefly, potential of RTA and FFT instruments

C) HEARING AND ITS PROTECTION
Audio and visual live simulation of damage to hearing
Demonstration and individual audiometric testing
Wide range and quality of muffs and plugs; fitting methods

D) NOISE SURVEYS AND ASSESSMENTS
Brief distinction between sound pressure and power
Measuring and plotting noise contours in laboratory
Measuring and assessing people in four different college workshop situations (mixture of steady and impulsive noise)
Measuring and assessing workers on large industrial printing presses; and presenting a written assessment of noise exposure dosage according to the regulations.

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E) REDUCTION OF NOISE [2]
Basic sources: Vibration, Impact, Fluid Disturbance
Reduction at source:- Force Excitation; magnitude and rate of change
Machine Structures; damping, reducing and isolating radiating surfaces
Reduction in Transmission path:-
Absorbers and screens
Acoustic enclosures (full & partial)
Silencers & anti-vibration mountings
Complete noise control treatments for a compressor installation.

Such practical approaches stimulate interest especially if the delegates become involved in demonstration work and try out tests for themselves. Case histories have shown that action learning techniques generate an enthusiasm to apply the knowledge gained in the practical workplace. Delegates are certainly made aware that they are not noise control experts. However they are able to give basic advice to management, and discuss ways forward with consultants. They are much more aware of their own limitations.

2) TUTORIAL WORK

At the outset it was decided that all calculation work (dB manipulation and equal energy dosage etc.) as required by the regulations should be done by calculator and not by the various graphical and nomogram methods. (Better appreciation of the significance of the dB scale and ultimately ease of use and convenience, as well and accuracy, were the reasons for this choice).

A very variable intake of delegates would almost certainly mean individual help would be required with such calculations, and so tutorial periods were built into the course programmes. Periods were allowed at the end of the part time days, and evening sessions were provided with the full time 1 week course.

All these sessions have proved to be invaluable in helping with individual calculation problems (many delegates have gone away delighted at using a calculator properly for the first time) and sorting out practical measurement and assessment difficulties. We certainly see such tutorial sessions as a vital element in the quality of such a specialist course.

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PRACTICAL TESTING

Fitting in a series of individual practical tests at the end of the intensive course is very difficult. In addition it adds pressure to the delegates immediately prior to the final examination, so three possible modes of operation are offered:-

a)	at the end of the full time course	(12 delegates)
b)	booking to return to college	(115 delegates)
c)	agreed booking at place at work	(26 delegates)

In college testing usually involves assessing an operator with a very variable working day using 4 different wood cutting machines and doing some bench fitting (inc. hammering). The test is for about ½ hour, so the usual daily work periods must be obtained from the operator. Tests carried out at delegates' places of work have involved the drawing up of a similar type of scenario with the visiting tutor.

DELEGATE FEEDBACK

This has been consistently favourable, typically with comments such as "we did not appreciate the implications until we came here". The practical content and individual tutorial help have been the most appreciated aspects of the course. Later feedback from industry has confirmed the confidence of delegates after completion of the course, although my fellow author will now comment more fully on this aspect.

INDUSTRIAL APPLICATION

Group Lotus is a medium sized company with 1700 employees in three operating divisions in the U.K; Lotus Cars Ltd. manufacture the famous sports cars at a factory just outside Norwich; on the same site Lotus Engineering provides a consultancy service to many car makers throughout the world, whilst the Millbrook Proving Ground in Bedfordshire carries out special tests and vehicle durability testing.

During 1989 a major increase in facilities together with a total reorganisation of production took place in preparation for the introduction of the new Elan. Because of these changes and the impending introduction of the Noise at Work Regulations, it was decided that a noise survey of the complete facilities was required in order to properly prepare for the new Regulations.

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Since a specialist NVH (Noise, Vibration and Harshness) Group existed within Lotus Engineering it was decided to carry out the work 'in house'. However although the group was very experienced in automotive noise development, certain aspects of industrial noise measurement, and the interpretation of the regulations were outside our normal experience. It was also obvious that a good understanding of the Regulations would be essential in order to implement the requirements in full and not just pay lip service by carrying out a survey on its own. It was therefore considered prudent for the engineer responsible to attend a suitable training course.

CHOICE OF TRAINING COURSE

At that time several new courses were on offer in anticipation of the new regulations. Some courses were aimed primarily at noise control with only a passing reference to the Noise at Work Regulations while others ranged from 1 day seminars to 5 day intensive courses.

Although the Certificate of Competence course had only just started it did offer a number of advantages:

1. The course content was broad enough to cover all the areas of interest.

2. The 5 day duration meant that each topic would be covered in some depth.

3. A nationally recognised certificate would be awarded on successful completion of the course.

Following on from our successful experience of higher technician noise training at the Colchester Institute, a place was reserved on their second part time course. This conveniently coincided with the start of the noise survey work at Lotus. Here the part time attendance proved useful since there was an opportunity to ask questions arising from the survey.
Throughout the course the theoretical work was reinforced with practical exercises and demonstrations. One demonstration in particular brought home the real purpose of the Noise at Work regulations and all the effort required to meet them. Unless one is unfortunate enough to be suffering from noise induced hearing loss it is difficult to fully appreciate the extent of the handicap. However a suitable filter combined with a microphone and loudspeaker, and one course delegate reading a page from the notes as progressive levels of damage to hearing were simulated, quickly emphasised how serious the problem can be and the importance of prevention.

IMPLEMENTATION OF THE REGULATIONS

The survey started with a management briefing to supervisors so that they understood the importance of the work and knew what was required. One of the benefits of carrying out the work 'in house' was that it was possible to visit each area several times when different components were being produced. This was useful where batch production was involved. Also due to the relatively low volumes some activities only took place once or twice a week. The survey included measurements with a hand held noise meter, monitoring with a logging dosimeter and tape recording noises for octave analysis to aid selection of hearing protection. As each area was completed a formal report was issued that was also discussed with supervision so that appropriate recommendations could be implemented.

After analyzing the frequency content of the noise sources in designated Ear Protection Zones a range of suitable hearing protectors was identified. It was felt important to offer a choice to the operators so that they could select the most comfortable device. These hearing protectors together with spare parts for the muffs are available on free issue from the stores. In addition stocks of EAR plugs are kept in the Protection Zones.

It was clearly recognised by the company that carrying out the survey and acting on its findings was only the beginning of meeting the requirements of the Regulations. The decision was taken to train every member of the workforce including office staff. Here again the experience gained on the Certificate of Competence course proved useful, particularly the value of practical demonstrations. A multi-media training session lasting 45 minutes was prepared and presented to groups of about 40 employees at a time. This generally had a good reception and was a key factor in acceptance of the regulations by the workforce.

The Certificate of Competence course was an important factor in helping Lotus to set up it's policy to meet the Noise at Work Regulations and carry out the noise survey and subsequent work. For those companies that are affected, the training of a competent person in this way must be seen as a wise investment.

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REFERENCES

[1] David G Bull; "Meeting the Training Needs (for the Noise at Work Regulations): the Educational Role of the Institute of Acoustics";
Proceedings of one day meeting of Institute of Acoustics, 27 March 1991.

[2] David G Bull; "Quality Practical Education to Reduce Noise at Source";
Proceedings of INTERNOISE 1992, Toronto; International Institute of Noise Control Engineering, New York.