

Aims

The aims of the course are to:

- provide delegates with a basic knowledge of the methodology of environmental noise measurement including in particular the use and accuracy requirements of sound level meters and analysers.
- enable delegates to be aware of the significance of measurement data against the framework of standards and legislation for environmental noise.

Objectives

The course is intended for technical and scientific staff in local authorities, environmental consultancies and companies whose employment requires them to gain a working knowledge of noise measurement methodology and a basic appreciation of noise control methods.

After completing the course delegates should be able to:

- make reliable measurements of background noise and noise from a variety of sources, according to the requirements of the relevant British Standard or guidance document
- present and interpret measurement data in a form suitable for inclusion in a consultant's report
- demonstrate an ability to measure noise levels in a manner appropriate to established rating procedures, guidance documents and standards set by local authorities
- identify in outline the principle methods of noise control to mitigate the impact of noise on the community
- explain the measurement methodology, data and interpretation of reports and environmental appraisals and comment on proposals for noise impact mitigation

Syllabus

1. Basic Concepts and Noise Units (5 hours)

Sound pressure and sound power. Pure tones, frequency, the audible range, broadband noise octave and $1/3$ octave-band frequency analysis of noise.

Sound pressure level and sound power level and the decibel scale. The range of decibel levels and the significance of level changes (3dB, 10dB, 20dB etc.) in terms of energy content and loudness.

The procedure for combining and subtracting decibel levels including background levels. The variation of hearing sensitivity with frequency and the A-weighting scale. Steady and time-varying noise levels. L_{Aeq} , SEL, and exceedance levels L_{A10} , L_{A90} etc.

The effects of noise on people: hearing damage, annoyance, activity interference and sleep disturbance.

2. Instrumentation for Environmental Noise Measurement (4 hours)

Types of sound level meters for measurement of steady noise levels (BS EN 60651 : 1994).

Integrating averaging sound level meters (BS EN 60804 : 1994) for the measurement of time-varying noise, and environmental noise analysers for L_{A10} and L_{A90} measurements and frequency analysis.

Time weighting ('Fast', 'Slow', 'Impulse' and 'Peak' averaging times) and frequency weighting: A-weighting, C-weighting and Linear.

Types of microphone and their directionality. Accuracy of Types 1, 2 and 3 instruments. Field and laboratory calibration of sound level meters, including traceability. Electronic noise floor. Electrical interference.

Chart and tape recording of time-varying noise levels.

3. Noise Indices and Measurement Methodology for Environmental Noise Measurement (4 hours)

Standard methodology for the measurement of transportation, industrial, recreation and construction site noise and non-specific background noise levels, according to BS 7445.

Noise indices and specific measurement methodology, rating and assessment methods for:

- Industrial noise and BS 4142 : 1997. Method for Rating industrial noise affecting mixed industrial and residential areas.

- PPG 24, 'Planning and Noise' (Scottish Office, PAN 56, 'Planning and Noise' – Scotland only) for guidance on noise sensitive developments near existing noise sources, and new noise sources near noise sensitive property.

- Road traffic noise – the measurement method in 'Calculation of Road Traffic Noise' and the requirements for compensation under the Noise Insulation Regulations.

- An elementary introduction to:

- Construction site noise – BS 5228 : 1994 guidance on prediction and control of noise

- Aircraft noise and railway noise and appropriate sound insulation schemes

- Control of noise at surface mineral workings, Planning guidance MPG 11 (Pan 50 Annex: A Scotland only)

- Noise from leisure activities and associated codes of practice

4. Environmental Noise Measurement in Practice (10 hours including field work)

The use of sound level meters in typical practical environmental noise situations. Choice of microphone position. The use of wind shields, and the effect of wind and other environmental conditions on measurement accuracy. The influence of screening and reflecting surfaces. The nature and causes of other uncertainties in measurement. Choice of sampling periods for time-varying signals – averaging of L_{Aeq} and the use of L_{A10} , L_{A90} etc.

Limitations on accuracy and tolerance limits associated with sampling.

Data interpretation and report preparation.
Comprehension of noise issues in environmental assessments and consultant's reports

5. Basic Understanding of Noise Propagation and Control (3 1/2 hours)

The effects of distance, reflection, air absorption, ground absorption, wind and temperature gradients (ISO 9613). Attenuation by barriers, earth banks, vegetation. Propagation from point, line and planar noise sources.

Consideration of noise reduction at source and standard noise control techniques (enclosures, barriers, use of absorption and insulation). The source-path-receiver model. Planning to control external noise, for dwellings. (BRE report BR238 'Sound Control for Homes', and BS 8233 : 1999 'Sound insulation and noise reduction for buildings – Code of practice' are recommended references.)

6. Written Examination (2 1/2 hours) Practical Test and Report Preparation (2 hours)

The practical test will include an objective measurement of an environmental noise source to demonstrate the use of suitable instrumentation and assessment of the noise using an appropriate measurement methodology.

Acquired data will then be presented in a written report of no more than 3 sides. The report must be laid out to include the following: date/time, description of noise source, subjective response, purpose of report, prevailing environmental conditions, instrumentation used and calibration, measurement location and proximity to noise source, measurement procedure, results, interpretation of results and conclusions.

Courses are offered on up to two occasions per year depending upon demand at Accredited Centres. Information on the Centres and dates of examinations may be obtained from the Institute.

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Certificate of Competence in

Environmental Noise Measurement

General Information