

# Noise Control

The Environment Department has state-of-the-art facilities to enable a structured approach to the solution of noise control problems. The two main elements in the approach are the measurement of sound intensity and computer modelling of complex noise environments.

## Sound Intensity

Conventional noise instruments measure only noise levels, sound intensity equipment measures both the noise level and the direction which it is travelling (the intensity vector). This directional characteristic enables rapid identification of important noise sources, noise hot spots and transmission paths, and it can be used on plant during normal periods of operation with no disruption of production.

The results of sound intensity measurements can be used to calculate the sound power of noise sources for applications in computer models, or can be used in their own right to target noise control resources on specific machines or machine elements, producing efficient and cost effective solutions.



## TARGETED TREATMENT OF LOCOMOTIVE NOISE

A practical example of using sound intensity is control of environmental noise from a locomotive. There are many noise sources on a loco; engine panels, vents, radiators, exhausts, compressors, brakes and wheels. A sound intensity survey allowed the main areas of noise to be ranked. Only these were treated producing a 10dB(A) reduction in noise levels and eliminating the source of complaint at half the cost of conventional treatment methods.

## COMPUTER MODELLING

### Internal Noise

Computer modelling of noise levels within buildings is achieved by tracing the rays of noise spreading out from a noise source. Each time a ray strikes a wall or obstruction it is partially reflected and partially absorbed, and the noise energy in the ray decreases. The paths of all the rays can be computed rapidly to provide detailed information on the noise environment within the building.

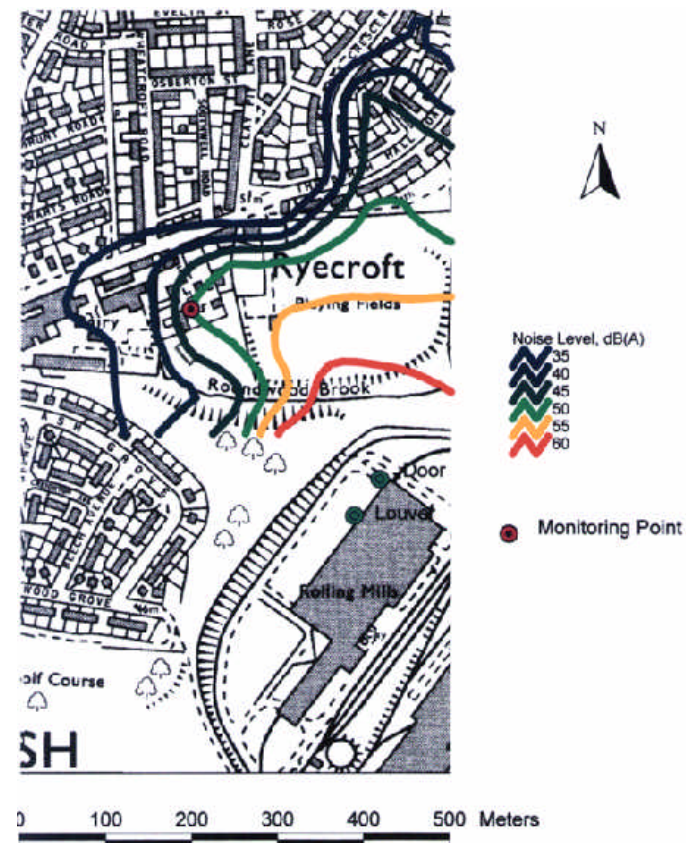
The model provides information on the noise levels within the building, the importance of each noise source and can be used to calculate quickly the effectiveness of different methods of noise control including enclosures, barriers and acoustic absorbers. The model can also be used to predict the noise levels in new buildings or the effects of installing new items of plant.

## Environmental Noise

Environmental noise levels are calculated by following the noise paths from the source to the receiver, taking into account the effects of distance, barriers, ground type, land usage type and the weather. Information on noise sources can be obtained from sound intensity measurements, the results of internal noise modelling or a database of known sources.

The geography of the environment and ground types are entered via a digitiser or from Autocad files. The model can be run to give results from selected receivers or to calculate noise contours around a plant.

The software has been used to help solve community noise problems from existing works and to predict the impact on noise levels from proposed new developments as part of an environmental impact assessment.



## MODELLING OF NOISE LEVELS FROM BAR IMPACTS