

# Proceedings of The Institute of Acoustics

## PLANNING FOR INDUSTRIAL DEVELOPMENT

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### 1. INDUSTRY AND THE COMMUNITY

When a plan for building a major chemical complex is first made, the specific details which have to be known, to make an accurate assessment of the noise emissions are often undecided. Yet it is at this stage that the community begins to react to the proposal of industrial development. At this stage also, the local planning authority may need to consider in some detail whether or not planning permission should be granted and, if so, what consent conditions should be imposed.

In most cases, there are many people in the neighbourhood who welcome the development because of the prosperity it is likely to bring. There are just as many, however, who dislike industrial development in their vicinity.

All too easily, antagonism at an early stage precludes free communication. Fear of the unknown and mutual mistrust aggravate the situation. However, many difficulties can be overcome, and seemingly insurmountable incompatibilities can be resolved, given the genuine desire to succeed. The following pre-requisites are essential:-

1. Adequate time for base line studies, feasibility studies and consultation with the local people.
2. Adequate expertise on the part of the planners and their advisers - that is, on the part of the industrial planners as well as the planners of the local authority.
3. Adequate knowledge of the costs and benefits. This includes the costs and benefits, both long term and short term, financial and social, cultural and ecological.

### 2. THE PRACTICALITY OF COMPROMISE

The site chosen by the developer for a major plant or mine is often far enough away from the more densely populated residential areas to provide significant attenuation of the emitted noise. The few isolated dwellings nearer the plant, on the other hand, may be threatened by more severe noise. However, even in areas further away from the plant, the noise would, at times, rise substantially above the usual level. The reaction of the community to such situations will be determined, not only by their sensitivity to noise, but also by their assessment of the developer's genuine, or not so

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genuine, endeavour to control noise.

No industrial nation can survive without building, and six months' or a year's substantial construction noise may be a tolerable sacrifice. But the same level of noise would, with justification, be regarded as intolerable, if it were part of a succession of building projects stretching over several years.

Even at the planning stage, it should be possible to give at least an approximate indication what the noise emissions would be, and at this point, discussions can start.

In their excellent paper "Damage and Annoyance Caused by Noise" Professors Bastenier, Klosterkoetter and Large reviewed the means for predicting community reaction, and drew attention to the wide variation between different methods of prediction. (CEC Eur 5398: 1975). They say that a level of noise that is reasonably acceptable for the majority of a population may be intolerable for a numerically large minority of that population. For this reason, the setting of noise limits must either involve the acceptance that large numbers will continue to be adversely affected OR the inclusion of the large factors of safety if there is to be no effect on any but a few of a population. The use of the following two concepts is therefore suggested when formulating noise limits:-

1. The level that is apparently tolerable to the majority of the population.
2. The level that is clearly acceptable to the majority of the population.

Negotiations between the developer and the local authority should be guided by the consideration that an ACCEPTABLE standard should be set, where best practicable means allow such a standard to be achieved. Where technology and economic practicability preclude such a standard to be achieved, the TOLERABLE standard should be regarded as a minimum requirement.

The author believes that local authorities in Scotland, have recently broken new ground, and have set an excellent example for the formulation of noise limits. Industry has helped to make this possible by providing information to the planning authorities well in advance of what would have been common practice in the past. In order to find compromises which would be acceptable to local residents without unacceptable constraints on the construction or operation of the plant, several noise limits were considered rather than just one or two. Thus, for instance, rather than setting one limit which could be guaranteed for all operating conditions, a limit was agreed for normal plant operation, and others for occasional non-normal conditions, restricted in frequency and duration of occurrence.

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It is important that planning conditions should 'fit' a particular development in a particular neighbourhood, and cater for the varying severity of noise to be expected. Detailed planning conditions of this kind may look formidable. In practice, they are simple enough to implement, although they cover different aspects of the developing programme, from construction through to commissioning, and thence to normal operation. Suitably chosen, they offer both the developer and the neighbouring community adequate protection of their respective interests.

#### AN EXAMPLE FROM CASE HISTORY

This example illustrates how mutually acceptable compromises were reached during the phase leading up to the Public Inquiry at Peterhead, in 1975. The applicants themselves had carried out a detailed noise emission study, and this provided the basis for suitable noise limits to be set. These limits took into account not only what was necessary to protect the local environment, but also what was feasible, technically and economically. The information provided by Humphreys and Glasgow Ltd., on behalf of Scanitro, included a time-table of infrequent plant noises of significant magnitude, shown in Table 1.

In formulating planning conditions, different permissible noise limits could then be set for the continuous plant noise, and for such noise as would, from time to time, be allowed to exceed this continuous noise limit for a given period.

A more detailed treatment of this subject and additional case histories can be found in "Noisy Plant and Quiet Communities", a recent paper by Francis Oakes and David Shirley, I. Chem. E. Proceedings: Control of Odours and Noise in the Process Industries, 1978.

TABLE 1 - Noise Time-Table for Infrequent Plant Noises

Sources	dB(A) Noise Power re 10 <sup>-12</sup> watts	Pre-Commissioning 2 months	Initial Start-up	First Year's Operation	Subsequent Years
Pipe blowing	125 - 130	200 to 400 blows, each lasting about 2 mins	None	Possibly up to 30 blows, each lasting 2 minutes	Possibly 2 days of 10-20 2 min blows, every 2 years
Safety relief valves	Mostly less than 120 dB(A), very few up to 135 dB(A), duration about 1 min	5 to 10 occasions of about 1 min	About once daily for 1 min	10 - 20 occasions of 1 min each	5 - 10 occasions each year
Main silenced process vents to flare stack	Usually at reduced flow. Full flow maximum 110 - 115 dB(A)	None	In con- tinuous operation for 2 - 3 weeks	About 10 occasions, total time 150 hours	About 3 or 4 occasions, 50 - 100 hours total
Steam and air vents (silenced)	Below 110 dB(A)	Occasional	Mostly continuous	About 200 - 300 hours total	About 100 - 200 hours total