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INAUDIBILITY - PRACTICALITY AND PRINCIPLE

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INTRODUCTION

Inaudibility as a criterion has advantages for the Environmental Health Officer. Not least of these is that he no longer has to argue what is a reasonable level. Should the measurements have been made as Leq? Should the background be taken as L90? If he can hear it, it is a nuisance.

This paper discusses two implications of this criterion. The first is the effect it has on the technical recommendations of the consultant and the problems of responsibility it imposes on him. The second is whether this method of control via the licensing bye-laws is reasonable and whether the criterion itself is reasonable.

The criterion of inaudibility demands designing for the worst case. Designing for the maximum source noise level and for the minimum background masking level. The use of the words maximum and minimum is deliberately left vague. Inaudibility means inaudibility at all times. If the brief to a consultant is to design sound insulation to ensure inaudibility then the client will want a guarantee - if not in writing at least by implication - that the noise will not be heard.

In order to protect himself from legal action, the consultant must interpret inaudibility as meaning exactly what it says. He has to assume that if, during the course of an evening the person next door hears music at any time, it is not inaudible. Even this is not clear cut. Music may be heard at very low levels, but not perhaps recognised as such; it may not even be possible to identify its source but it can still be heard.

A number of cases have been examined, but to present the principle these have been simplified into one typical case. To do this a source noise spectrum and transmission loss values over the frequency range have been assumed. There is not time in this paper to go into details of the assumptions, but they are typical of values in these circumstances directly through a wall or floor.

ASSUMPTIONS

Maximum source noise level. It could be argued that L1 is a quasi-maximum in these circumstances. L1 is typically about 6dB above the Leq so the design source level has been taken as Leq +6. For the illustration, the source level is taken as 80dBA(Leq).

Minimum background level. Away from the major roads in late evening in cities, there is surprisingly little variation in L90 from traffic noise - which is likely to be the most predominant. Experience suggests that a level inside dwellings with windows closed ought to be set at about NR25 or 30 dBA. This is a level broadly acceptable as a typical L90 in the late evening and the L99 is unlikely to be much less, though it will obviously depend on circumstances.

TRANSMISSION LOSS REQUIRED

Taking account of the frequency spectrum of the source sound and the variation of sound insulation with frequency we would need a wall with an Rw typically of 53 to reduce a steady noise level of 80dBA to 30dBA. But this takes no account of the extra 6dB maximum levels over and above Leq. This gives an Rw of 59. So far maximum levels have only been reduced to NR25 - the same as the background noise level. Reducing intruding noise to the same measured level as the background in terms of NR or dBA is not sufficient. It is necessary to look at what is happening in critical bandwidths - or to get a feel of the problem, in one third octaves. This suggests that with dBA levels for the intruding noise and background noise the same, the intruding noise might exceed the background noise by about 5dB in one or more bands. To ensure complete inaudibility as a rule of thumb, every band should be about 6dB below background level making a total of 11dB by which the level needs to be further reduced.

This gives a total Rw required of 70. To reduce a noise level of 80dBA to become inaudible in a background of 30dBA therefore requires a wall with an Rw of 70. This is borne out in practice in the case of speech. To achieve inaudibility of speech across a partition - as opposed to making it unintelligible - also requires an Rw of about 20 more than the simple arithmetic difference of source and background levels.

The example taken is of a source level of 80 dBA (Leq) - by no means excessive. Some compromises have already been made, for example L1 has been taken instead of the true maximum and L90 instead of the true minimum. Furthermore we have no control over the background noise. If the person next door puts in double glazing to cut down traffic noise from outside his background noise might drop to NR15 and the source would no longer be inaudible.

The implications for the construction of the sound insulation are clearly enormous. We can compare the requirement of Rw70 as deduced above with the Rw53 which we would need to achieve a level of NR25 (Leq) in the next door premises.

IS THE CRITERION REASONABLE?

In a large number of cases - perhaps the majority - the criterion of inaudibility is not practically achievable within sensible cost limits. Nevertheless that in itself may not be a valid argument against using it as a criterion. Nor, on the other hand, is the convenience of a simple measure of nuisance a valid argument for using it as a criterion.

A criterion must be reasonable or, rather, there must be a reasonable balance between the desire of some of the population to be entertained and others to sleep peacfully in their beds. The concept of inaudibility does not get that balance right.

It is suggested that noise levels identified as not being a nuisance by BS4142 or some other objective criteria are often judged subjectively to be one. Here the word nuisance has become misused. It has come to mean that if someone is annoyed by a noise then it is a nuisance. The law is quite specific as to its meaning - even if not objectively precise. A nuisance is something which would cause annoyance to a reasonable person, not something which in fact annoys an individual. People who complain are both reasonable people and unreasonable people and all shades in between.

Nuisance must be of a continuing nature which suggests that if a noise is audible on one occasion that is not sufficient to prove nuisance in its legal sense. Account must be taken of the locality. Is it city centre with late night activity, or is it a quiet residential suburb? The use of inaudibility in a blanket manner does not take sufficient account of this.

It is unlikely that inaudibility would be held by the courts to be a suitable criterion by which to establish nuisance except in the most extreme circumstances. The law would probably take the view that sheep bleat in the country and under normal circumstances that does not constitute a nuisance. It would also probably take the view that in towns people go to pubs where music is played. Of course there must be reasonable control, but there must also be give and take.

The principle of inaudibility is far too one-sided. It does not take sufficient account of a balance of reasonableness.

Apart from the common law position, inaudibility as a blanket criterion is not desirable. People have always lived with noise. The noise of the countryside, the noise of traffic from the earliest days of horses. The noise of church bells and striking clocks, even the noise of music in pubs. All these form part of the whole environment. Noise reflects activity, it reflects the environment. It is too simple to say noise is bad. If a method ould be found of reducing noise at source, it would not only be

undesirable and detrimental to the environment to do so but in some cases - such as motor cars - it would be positively dangerous.

IS THE LEGAL FRAMEWORK REASONABLE

Where nuisance is dealt with in common law or has been incorporated in Statute - for example, in the Control of Pollution Act, although the Environmental Health Officer may be given the responsibility for deciding what is a nuisance, there is an appeal procedure. Under the Bye-Law system there is not any appeal procedure. The Bye-law was drawn up in perfectly reasonable terms saying that the Licencing Board may impose such conditions as they see fit. It was not drawn up with a wording that might have suggested to those passing it that inaudibility would be the criterion. There is no discussion in the law making process about the rights or wrongs of inaudibility itself. The decision is left to the Environmental Health Officers and however reasonable they are this is not a decision that they should make without there being any right of appeal. Irrespective of the rights and wrongs of the particular criterion of inaudibility this is not a fair way to make law.

SUMMARY

This does not question the actions of the Environmental Health Officer nor does it suggest that they are acting outside the law. Rather the reverse - they are acting within the law, but it is the process of making that law which is wrong.

Inaudibility as a criterion is neither practicable nor reasonable. There should be control - that is not a point at issue - but that control should employ a balance of reasonableness.