NOISE ABATEMENT ZONES - A METHOD OF PREVENTING DETERIORATION IN ENVIRONMENTAL NOISE LEVELS?

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1. INTRODUCTION - THE CREEPING AMBIENT

The main statutory instrument for dealing with noise from existing premises in the UK is based on an underlying concept of nuisance. Local Authorities (LAs) have the power to serve notices requiring the abatement of noise amounting to a statutory nuisance. In England and Wales this power is currently conferred by the Environmental Protection Act 1990 [1].

Two particular problems with the nuisance approach to neighbourhood noise control were identified in the Scott Report [2]. Firstly, that it was not possible to deal with an unacceptable noise environment produced by a number of sources because nuisance action could only be taken against a specific and identifiable source. Secondly, that a noise environment could gradually deteriorate because of the effects of small increases in noise level which would not individually constitute a nuisance. This latter problem has become known as the 'creeping ambient'.

The UK government first responded to general concern about the 'creeping ambient' in Circular 10/73 [3] which advised LAs to operate their development control powers in such a way as to avoid increases in ambient noise levels affecting residential and other noise sensitive development. The UK planning system thus provides LAs with an opportunity to prevent an unacceptable noise environment arising in the case of certain new development. In the case of existing premises a different approach to the control of the 'creeping ambient' had to be developed and the concept of the Noise Abatement Zone (NAZ) was introduced.

NAZs are areas, designated by LAs, within which it is possible to control noise from classified premises by establishing the current noise levels and using these as reference levels for control of noise from premises in the future. The purpose of a NAZ is to prevent deterioration in environmental noise levels and achieve reductions in noise levels wherever practicable.

The special powers available to LAs within a NAZ represent the only opportunity in UK law to achieve a reduction in noise that can be related to amenity (rather than nuisance) and applied to existing development.

BRE has surveyed LAs to assess their experience, opinion and use of NAZs during the period between 1976 - 1992. This survey has been carried out for the Department of the Environment as the first part of the response to recommendations concerning the future of NAZs made in the Report of the Noise Review Working Party 1990 [4]. This paper outlines the legislation which determines the manner of operation of a NAZ and presents some of the initial findings of the BRE survey.

2.THE NOISE ABATEMENT ZONE CONCEPT

The statutory framework for NAZs was established, with effect from 1 January 1976, by a number of pieces of legislation and guidance [5,6,7,8] as amended in 1980 [9].

The basis of noise control in a NAZ is a Noise Level Register in which the noise levels around classified premises within the zone are entered. These registered noise levels can only be exceeded with the consent of the LA. The LA may seek a reduction in noise levels by issuing a Noise Reduction Notice in certain circumstances. Furthermore, within a NAZ the LA may also determine and enter in the Register the level of noise that will be acceptable from certain new or converted buildings.

2.1 Administrative aspects of NAZs

Classes of premises

The classes of premises which are to be the subject of control must be specified by the LA. It is intended that only those selected classes where control is practicable and may afford some benefit should be included. Circular 2/76 [8] suggests that such classes may include industrial premises, commercial premises, places of entertainment or assembly, agricultural premises, transport installations and public utility installations. It should be noted that domestic premises were deliberately excluded from the list of classes because NAZ procedures were considered inappropriate for control over noise of domestic origin.

Noise Level Register (s64 Control of Pollution Act 1974)

Section 64 requires the LA to measure the noise emanating from classified premises within the zone and to keep a public register of the recorded noise levels, the Noise Level Register. A copy of the record shall be served upon the owner and occupier of the premises concerned who may then appeal against the Register entry within 28 days to the Secretary of State. This is the only opportunity to challenge the validity of a Register entry. The 1976 Regulations [7] specify the required content of the Noise Level Register for each classified premises.

Noise exceeding registered level (s65 Control of Pollution Act 1974)

Section 65 makes it an offence to exceed a registered noise level without the consent of the LA, or to breech any conditions attached to a consent. An applicant may appeal to the Secretary of State within a period of 3 months against refusal or deemed refusal of consent to increase noise.

Although it is an offence to exceed a registered level there are examples given of where this could be allowed, specifically a return to full working capacity or where relocation of a noisy process will give a net public benefit. Other factors to take into account include the purpose of the NAZ, duration of any exceedance, financial implications for the applicant and employment consequences.

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Noise Reduction Notice (s66 Control of Pollution Act 1974)
Section 66 empowers the LA to require a reduction in existing noise levels emanating from classified premises by serving a Noise Reduction Notice if:
(i) the existing level of noise is unacceptable;
(ii) the reduction is practicable at a reasonable cost, and
(iii) the public would benefit.

The Noise Reduction Notice may specify different noise levels for different times or days. A minimum of 6 months must be allowed for compliance. Appeal is to the Magistrates Court within a period of 3 months. It is a defence in any proceedings for an offence under the section to prove the best practicable means has been used to reduce noise.

Determination of noise levels (s67 Control of Pollution Act 1974)
Section 67 applies the NAZ provisions to new buildings or to buildings which become classified premises as a result of works after the zone has been designated. The control over noise levels which will be permitted to emanate from new or modified premises in a NAZ is considered an adjunct to existing planning powers. LAs either on application or on their own initiative may determine and record in the Noise Level Register the noise level that will be allowed to emanate from such buildings. It is an offence under s65 to exceed the noise level so determined without the consent of the LA. There is a right of appeal to the Secretary of State against the determination, or a failure to make a determination on application. Where no determination has been made a Noise Reduction Notice may be served under s66 in respect of noise from the completed building, but the best practicable means defence will not be available and compliance may be required in 3 months instead of 6 months.

The power to serve a Noise Reduction Notice where no determination of permitted level has been made represents one of the strongest noise control powers available to LAs in the UK. Circular 2/76 actually states that "there may be few occasions where LAs will wish to exercise these powers".

2.2 Technical aspects of NAZs
The legislation and guidance gives detailed technical guidance on measurement procedures:

Where to measure
Measurements should be made on the Noise Control Boundary, an imaginary line drawn to enclose all significant noise sources on the premises. The Noise Control Boundary may but need not be the perimeter of the premises and should not be confused with the NAZ boundary itself.

Determination of measurement points
The 1976 Regulations state that the most complete control over noise level is to be obtained by determining the location of measurement positions using what has become known as the 'equal angle' method supplemented by additional measurement points for specific sources. They also state that the number and position of measurement points will be dictated by the degree of control proposed to be exercised over the level of noise from any premises. Circular 2/76 gives more extensive advice:

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"The number of measurement points will determine the degree of control over noise that can be exercised later. The choice of measurement points should aim at the effective use of resources. Where the methods described are applied in detail, full control over noise from the premises will be obtained. Where resources will not permit control in such detail, the minimum requirements of the Act can be met using a smaller number of measurement points. All local factors including the character and timing of any noise pollution and the cost effectiveness of any control which will be exercised should always be given careful consideration. In some cases measurement of noise at a minimum number of points will allow action to be taken against the principal existing sources of noise. But regard should be had to the long term objectives as well as the short term objectives in controlling the noise from any particular premises."

Height of measuring positions
In the case of unobstructed sites measurements should be made at a height of 1.2 metres. Measurement height or position should be changed to ensure a clear view of relevant noise sources from the measuring position.

When to measure
The aim is to determine typical noise emissions from the premises and so measurements should be taken when activity is as near normal as possible. If plant is running below capacity then this must be noted in the Noise Level Register. If doors and windows are normaly open then measurements should be made with them open.

Circular 2/76 gives only limited guidance on sampling strategy. Measurement periods and intervals should be determined by the pattern of noise and type of control needed within the constraints of available resources. The circular continues:

"For rigorous control of noise which varies throughout the day, and between weekdays and the weekend, the noise levels should be measured over appropriate daytime and nighttime periods and registered accordingly, allowing separate control of noise levels over these periods. For less rigorous control the separate noise levels may be combined to form an equivalent noise level over a longer period. Where the noise level is measured for several periods for registration separately, the object of the measurements should be to determine the typical noise level for each of the periods chosen."

Methods of measurement : general
The measurement index must be the $L_{Aeq,T}$, supplemented where appropriate (eg. for impulsive noise) by the maximum noise level during the period. Competent staff must be used and detailed records kept to allow the measurements to be meaningfully repeated.

The possible effects of extraneous noise is refered to. Suggestions are made that it may be possible to silence the extraneous or premises noise temporarily to facilitate measurement or perhaps to relocate measurement positions so that extraneous noise is not dominant. Where extraneous noise is 6dBA or less below the level of noise from the premises, thereby producing an inflated level, then a subtractive correction to the measured level of between 1 - 3dBA is specified.

Where extraneous noise is dominant then a calculation method should be used. Essentially the method requires 6dBA to be subtracted from the measured level where extraneous noise is recognisably more than twice as loud as that emanating from the premises, and 3dBA to be subtracted when it is less dominant that this. The fact that a calculation procedure has been used must be noted in the Noise Level Register. This procedure will tend to give an over estimate of the level from the premises concerned.

Meteorological conditions
The meteorological conditions which are suitable for making measurements are specified in the 1976 Regulations. Measurements should not normally be made in adverse weather conditions such as strong winds, snow, rain, fog or during temperature inversions.

Monitoring
Once noise levels have been registered then Circular 2/76 advises that the extent of any subsequent monitoring effort is for the LA to decide in the light of local circumstances. Sample checks at a few measurement positions are advocated in addition to responding to complaints and there should be more extensive monitoring to establish possible offences.

3.RESULTS OF BRE SURVEY

There are approximately 400 LAs in England and Wales with the power to establish a NAZ. Preliminary contact with LAs at the outset of this survey indicated that some 58 NAZs now exist in 37 LAs.

The NAZs covered a wide range of geographical areas from the smallest with only 1 or 2 premises covering a few hundred square metres to the largest covering over 8 square miles (21 square kilometres). The number of classified premises varied from 0 on a green field site to over 350 in the most ambitious NAZ.

Further investigation revealed that 8 of the 58 NAZs do not have a Noise Level Register and that 14 other NAZs have incomplete Registers. It was not possible to obtain information about 8 further Noise Level Registers but it can be assumed that these are unlikely to be complete.

Thus there are 28 known NAZs in England and Wales where the LAs claim to have completed a Noise Level Register. These 28 NAZs are confined to 17 LAs. Many of these LAs said that their Noise Level Registers, although complete in the mid 1980s, may no longer be up to date because of development and other changes in the zones since that time.

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The survey found 9 LAs that claimed some level of activity in their NAZs which might include carrying out occasional noise monitoring in order to determine compliance with registered noise levels. There are 27 LAs who stated that all or some of their NAZs were either inactive or abandoned and this inactivity extends to 40 (69%) of the known NAZs.

Amongst the 37 LAs with NAZs there is 1 LA that is currently establishing a new NAZ and 2 other LAs that are considering establishing NAZs within the current technical and administrative framework. It is not known if any other LAs, currently without NAZs, are actively considering the establishment of a NAZ.

The survey found that 33 NAZs were designated in the four years prior to 1980 and that approximately 20 NAZs were designated between 1980 and 1984 using the simplified procedure [8]. However, only 5 NAZs were found that have been designated since 1985.

The survey has shown that, in very general terms, there are a number of different 'types' of NAZ that have been established. The strengths and weaknesses of each type of NAZ also tends to be different, depending primarily on size but also on a number of other factors. These other factors include whether long or short period $L_{Aeq,T}$ is used in the Noise Level Register, on sampling techniques, on the location of the Noise Control Boundary, and on the number of measurement positions used. These various types of NAZ have been placed into the five categories below primarily for the purpose of simplifying discussion:-

(i)Large scale NAZs (60+ classified premises). These are the most common making up about 50% of the total number of NAZs in England and Wales. Most of these NAZs were designated before 1980 and during the initial enthusiasm for the concept. Only 42% of such NAZs are accompanied by Noise Level Registers that are said to be complete. Large scale NAZs now comprise the majority of the abandoned NAZs.

(ii)Medium scale NAZs (16-60 classified premises). These make up a further 25% of the total number of NAZs and again only about 40% have complete Noise Level Registers. The majority of these NAZs have also fallen into disuse, particularly where long period $L_{Aeq,T}$ has been used to register noise levels.

The traditional NAZ (ie. large and medium scale NAZs) would appear to have earned the NAZ concept a 'bad reputation'. LAs claim that these types of NAZ cannot be operated in a cost effective manner. The amount of resources consumed by the procedure for designating the NAZ, compilation of a Noise Level Register and subsequent monitoring activities are said to be out of all proportion to the benefits obtained by the local community.

(iii)Small scale NAZs (2-15 classified premises). These comprise only 10% of the total number of NAZs but have proved a little more successful. Approximately 70% of such NAZs have complete Noise Level Registers and there is still some limited monitoring activity with this type of zone in some LAs. In the most succesful of these NAZs it was found that the location of measurement points had not been determined by the 'equal angle' method and that a reduced number of measurement positions had been used.

(iv)One premises NAZs. Only 5 such NAZs have been identified in the whole of England and Wales. However, several of the LAs concerned did report success in adapting, or using perceived flexibility in, the legislation to control individual premises using short period $L_{Aeq,T}$ and a much reduced number of measurement points.

(v)Section 67 NAZs. These have been introduced by one or two LAs. The Noise Level Register consists of acceptable noise levels determined using the powers in s67 Control of Pollution Act 1974. Such NAZs have been used to try and control future development of green field sites and small industrial estates.

The survey has found that the use of the noise control powers contained in s63-s67 Control of Pollution Act 1974 has been very limited. Only 1 LA was identified that had used Noise Reduction Notices yet these are the only formal mechanism for achieving a reduction of noise levels in a NAZ. Only 1 LA was found to have prosecuted for exceedance of registered noise levels. The most commonly used NAZ power was s65 consent but this actually allows an increase in registered noise levels.

The survey has found that the reasons for the unpopularity of NAZs are many and complex. LAs claim that there are problems with the legislation and guidance, for example that it is too complex, ambiguous and inflexible. There are practical, technical and administrative problems with the implementation of NAZs. There may also be problems which relate to the original conception of NAZs as well as the expertise, funding and role of LAs in environmental noise control.

Some of the difficulties encountered by LAs seem to be at least partly due to misunderstandings of the relevant legislation and guidance. In the context of this paper perhaps the most important failing in the implementation of the concept has been that several LAs may have inadvertently used the NAZ powers in such a way as to actually encourage the 'creeping ambient'.

For example, some LAs carried out short sampling of noise levels under conditions of maximum noise emission and then registered these levels. Other LAs registered high extraneous noise levels (particularly from road traffic) against otherwise quiet premises. Some LAs allowed the owner or occupier of premises to determine typical noise emission levels hence avoiding the need to cary out extensive noise surveys themselves but likely to result in inflated Register entries. A few LAs have tended to rubber stamp applications for consent to exceed registered noise levels provided that no complaints were likely and irrespective of any resultant increases in ambient noise level.

4. CONCLUSION

It has been found that less than 10% of LAs in England and Wales have designated NAZs and that 46% of these LAs claim to have completed a Noise Level Register. It is estimated that less than 25% of LAs with NAZs are currently carrying out noise monitoring in order to determine compliance with registered noise levels. It is clear that the NAZ concept has proved and is continuing to prove an unpopular method of noise control.

The survey has found that NAZs have not met their original objectives and that they have not, in general, been used as a method of controlling the 'creeping ambient' or unacceptable noise environments due to several sources as originally intended.

However, NAZs have been used successfully as a specific problem solving tool. The NAZ concept and, in particular some of the associated powers, can provide a useful additional method of noise control in certain circumstances.

The Report of the Noise Review Working Party 1990 [4] states that the application of the NAZ concept has been limited by its complexity and its demand on LA resources and recommends that NAZs should be established in future using procedures issued under a code of practice.

The findings of this survey suggest that complexity of procedures is not the only problem and that the value of NAZs as a means of noise control may need to be more fundamentally reassessed.

5.REFERENCES

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[3] Circular 10/73 Planning and Noise, DoE, HMSO, 1973.
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[7] Control of Noise (Measurements and Registers) Regulations 1976 (SI 1976/37) HMSO.
[8] Circular 2/76 Control of Pollution Act 1974 - Implementation of Part III - Noise, DoE, HMSO, 1976.
[9] Local Government, Planning and Land Act 1980 (Ch 65) HMSO.