Proceedings of the Institute of Acoustics

ENVIRONMENTAL NOISE AT BUILDINGS - FACADE OR FREE FIELD

P Hepworth

Hepworth Acoustics Ltd, 6 Seymour Court, Runcorn, Cheshire WA7 1SY

INTRODUCTION

This paper looks at the use of facade and free field noise levels in the prediction and measurement of environmental noise at buildings. It is particularly concerned with new developments where a noise condition will be based on noise predictions, and measurements will later be carried out to ensure compliance. Current practice is discussed with reference to various common documents relating to environmental noise and also by looking at planning conditions imposed after recent public inquiries. It will be shown that there is no common approach on whether environmental noise standards should relate to facade or free field noise levels. This is causing confusion amongst those involved in setting and monitoring environmental noise standards as well as the operators and developers who have to work to these levels. Suggestions are made as to how the confusion could be removed.

THE PROBLEM

The paper is largely based on my experience of work on surface mineral workings for a number of public inquiries, although the conclusions are relevant to other environmental noise sources. In most public inquiries, it is unlikely that the developer and the local authority agree on the scale of the noise impact of the development (if there was agreement, noise would not be a contentious issue at the inquiry). However, it has always been my approach when acting for a developer or a local authority, to agree as much noise data as possible with 'the other side' before the start of the inquiry. Normally, in order to assess the noise impact of the development and to assist in the preparation of a noise condition, I would try to agree a representative figure for existing and predicted noise levels at various points around the site. There is not usually a problem in identifying the noise sensitive properties around a site, but before measurements and predictions can be agreed, it has to be decided where in relation to the noise sensitive properties the measurements and predictions should be carried out. The main problem usually occurs in deciding whether the assessment point should be a facade or free field level. There is no consistency between different local authorities

and consultants as to whether free field or facade levels should be used. Each side quotes a different official publication to support facade or free field because there is no definitive guidance. Theoretically, the addition of 3 dB(A) to a free field level should provide the facade level. However, there are implications for the ease of enforcing the condition depending on which approach is chosen.

EXISTING GUIDANCE

The official guidance on noise from new developments, Circular 10/73 (1), does not provide any separate guidance on whether to use facade or free field for noise conditions but simply refers to noise criteria which existed when the Circular was produced, such as Corrected Noise Level. British Standard 4142 (2) is often used to provide guidance on setting noise standards for environmental noise, either by reference to the assessment method contained within it or by reference to other items contained in the standard such as monitoring location. Despite the confusion caused by the wording of the 1990 version, the Standard still prescribes the use of free field for a ground floor assessment point. This is used by many people as support for using a free field assessment for all environmental noise. With regard to noise from surface mineral workings, British Standard 5228 (3) is used as the basic prediction method. The Standard does not specify whether predictions should be carried out free field or facade, it merely states that if the point of interest is within 1m of the facade of a building, 3 dB(A) should be added onto the free field predicted level. Some people have taken this as support for the use of facade levels. The WS Atkins report 'Control of Noise from Surface Mineral Workings' (4), prepared for the Department of the Environment, recommends criteria in terms of facade levels, although any noise limit set would be checked by back calculating to an appropriate point and monitoring on a free field basis. 'Calculation of Road Traffic Noise' (5) specifies that road traffic noise should be assessed 1m from the facade of a building.

EXISTING PRACTICE

To assess current practice in relation to the use of facade or free field noise levels in planning conditions, I have examined the planning conditions imposed after public inquiries into 16 mineral applications. The reports by the inspectors for these 16 sites have been published within the last 18 months. The noise condition for one site did not contain any specific noise limits, but relied on the 'Best Practicable Means' phrase for noise control. Of the remaining 15 sites, 8 had free field noise levels

specified and 5 had facade noise levels specified. The last 2 sites had facade noise levels specified for preparatory works such as soil stripping and baffle mound formation, and free field noise levels for the main mineral extraction works. These figures indicate that the different approaches of local authorities and consultants are being carried through the whole of the planning process and are being embodied in planning conditions.

DOES IT MATTER ?

It could be argued that it does not matter whether facade or free field is used for noise predictions and measurements, because the 3 dB(A) correction can be used to convert from one to the other. This tends to miss the point, in my view, about the relevance of planning controls for noise. Planning controls for noise are designed to protect people from excessive noise levels from new developments and are usually specified at properties. To avoid any doubt, where the noise condition is specified at a property, compliance with the condition should be checked by monitoring the actual noise level at the property. This is then similar to the approach for investigating a noise nuisance complaint, which would also be assessed at the property. There may be noise levels set at other points such as the site boundary to facilitate a quick check of noise levels, but compliance with the noise condition should be checked at the property.

If it is accepted that the property is the place to monitor a noise condition, it then becomes important to decide on facade or free field. In my view there are a number of advantages of using free field instead of facade assessment points. The free field level is the actual noise level that people will experience in most of the area around the house and is the level from which internal noise levels would be calculated from. The facade level is only directly relevant to a position 1m from the facade. It seems odd to specify noise conditions in terms of a noise level which is experienced over an extremely limited area. Secondly, there is the question of whether the theoretical 3 dB(A) correction for facade noise levels is appropriate for all situations, particularly where the facades are at an angle to the noise source. In this case a reflection correction may not be appropriate and indeed, measuring at 1m from a facade may actually screen some of the noise sources. Finally there is the question of access. A facade noise level can only be accurately measured by being 1m from the facade. Adding 3 dB(A) onto the free field level may not be accurate for the reasons outlined above. Certainly an operator of a development has no power to enter onto private land and take measurements at the

facade of a property to check compliance with a noise condition. There is no guarantee that the local authority will continue to receive access to the private land to be able to monitor the noise condition. Therefore, if a noise condition is set in terms of a facade noise level, it may end up that neither the operator nor the local authority is able to gain access to accurately monitor compliance with the noise level. This is unlikely to happen in the case of a free field noise condition because it is usually possible to carry out measurements on land adjacent to a property if it is not possible to gain access to the particular property where the noise condition was set. It is therefore possible to check the noise condition by a direct measurement without having to carry out any mathematical corrections. It is accepted that using a free field assessment point for environmental noise would differ from the facade approach of road traffic noise. However, there are reasons why a facade level is appropriate for road traffic noise. One reason is that properties are often very close to roads (sometimes within 10m) and the distance between a facade point and a free field point can have a significant effect on the noise level. This generally does not apply to other environmental noise sources where the change in distance between facade and free field points is generally insignificant in comparison with the distance to the noise source.

CONCLUSIONS

The paper has looked at the advantages and disadvantages of using facade or free field locations for the assessment of environmental noise from new developments. Generally, the assessment of the environmental noise will lead to a noise condition being imposed on the new development to control noise. In many cases the noise condition will be specified at adjacent properties. Specifying noise levels at properties will certainly help local residents to understand the logic of the noise condition. However, the use of a facade level in a noise condition could lead to the developer and local authority being unable to directly measure whether the noise condition is being complied with. It is therefore my contention that noise conditions which specify noise levels at properties should specify them as free field noise levels, because the free field levels are easier to monitor and are more directly related to the noise levels that people experience at their properties.

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REFERENCES

(1) Circular 10/73 'Planning and Noise', Department of the Environment

(2) British Standard 4142:1990 'Rating Industrial Noise Affecting Mixed Residential and Industrial Areas'

(3) British Standard 5228:1984 'Noise Control on Construction and Open Sites'

(4) The Control of Noise at Surface Mineral Workings, Department of the Environment, 1990.

(5) Calculation of Road Traffic Noise, Department of the Environment, 1988.