Proceedings of The Institute of Acoustics

THE NEW CODE OF PRACTICE FOR NOISE CONTROL ON CONSTRUCTION AND OPEN SITES

RD Jones

Wimpey Laboratories Limited

INTRODUCTION

Although noise from construction and demolition operations has never been one of the most significant sources of nuisance to many because of its localized and relatively short duration, it can however have serious implications for those persons living or working in close proximity to major sites. Prior to 1975 there was no guidance readily available to assist contractors or local authorities in how to quanitify the noise or sensibly reduce it. BS 5228: 1975 'Code of Practice for Noise Control on Construction and Demolition Sites' was prepared to fill this gap and to coincide with the enforcement of the Control of Pollution Act 1974. The Code was based on the best available information at that time, but it was recognized more information was necessary and there would be a need for a revision in the not too distant future.

In 1980 it was decided to revise BS 5228, not only to include the considerable amount of additional information which had become available through research and experience, but also to expand the scope to include for other similar activities. Experience had shown that parts of the original Code had been used for other "open sites" such as surface mineral extraction and sand and gravel quarrying in the absence of more appropriate guidance and the intention was to include these amongst other activities within the scope of the Code. The format for the revised Code was decided as a multi part document, the first part to contain basic information common to all types of work on open sites and all other parts to contain specific advice on legislation and appropriate specialized noise control procedures.

STRUCTURE OF THE CODE

The programme of work set by the Committee was to prepare the first three parts of the Code initially and once these were published to proceed to subsequent parts sequentially over a period of time. Parts 1, 2 and 3 of the Code "Noise Control on Construction and Open Sites" were published in 1984 and entitled:

Part 1. Code of Practice for basic information and procedures for noise control.

Part 2. Guide to noise control legislation for construction and demolition, including road construction and maintenance.

Part 3. Code of Practice for noise control applicable to surface coal extraction by opencast methods.

THE NEW CODE OF PRACTICE FOR NOISE CONTROL ON CONSTRUCTION AND OPEN SITES

At the present time, Part 4 "Code of Practice for noise control applicable to piling operations" is being prepared with a target for publication towards the end of 1985. No decision has been taken to proceed with the remaining parts which were originally identified as necessary requirements. These parts are to cover four other activities; sand and gravel extraction, hard and soft rock quarrying, railway construction and dredging.

Part 1 Basic Information and Procedures

The first part of the new Code on basic information contains much of that information in the original BS 5228 upgraded where necessary. This part includes noise and its affects on the neighbourhood, noise and its affects on site personnel, project supervision and general noise principles. Extensive information is contained within the appendices on how to estimate or predict the noise to be expected from sites, methods of monitoring noise levels and control proceedures. The appendices also contain very comprehensive tables of typical plant noise levels in real situations. Much of the new information in the Code is contained within these appendices.

Noise prediction techniques. Since the original Code, techniques for predicting noise have been considerably refined as a result of extensive research. The most significant change is to prefer the prediction of any resultant noise to be based on measured levels of the equivalent continuous sound level, L_{Aeq}, rather than sound power level L_{WA}, because of the need to include time information which may not always be very precise. The prediction technique based on sound power level remains within the Code, but additional information on typical working times are included to provide guidance in the absence of more precise detail not usually available at the site planning stage when noise predictions are normally required.

Other changes in the prediction technique have been to include two methods for the prediction of noise from mobile plant, one for mobile plant on haul roads based on work carried out by TRLL(1) and the other for mobile plant working in closer proximity to the point of interest such as on enclosed sites. The first of these techniques is applicable to such items as scrapers, dozers and dump trucks on major civil engineering construction projects, whereas the second technique would apply to dumpers, loaders and fork lift trucks on building sites. The aim of the more detailed prediction techniques is to increase overall accuracy, as the method described in the earlier Code was found to over predict by a significant margin of up to 10 dB(A)(2).

When these refined prediction techniques contained in the Code have been used at the design stage to predict the noise level expected during construction of major civil engineering projects, and there has been subsequent opportunity to carry out measurements on site, a close agreement between the predicted and measured levels was found (3). Such studies go some way to validate the prediction techniques contained within the Code and demonstrate the improved accuracy achievable.

THE NEW CODE OF PRACTICE FOR NOISE CONTROL ON CONSTRUCTION AND OPEN SITES

Noise level data. Information on the noise levels of typical construction plant has been considerably expanded and rationalized and includes information from a number of sources including the substantial data bases from CIRIA Report 64 'Noise from construction and demolition sites - measured levels and their prediction' (4) and the National Coal Board. This information is given in more detailed terms listing the measured equivalent continuous sound level L_{Aeq}, the sound power level L_{WA} and the typical working time or "on time" of the noise in a working cycle. The noise level data is contained within tables, which can be expanded in any of the subsequent parts of the Code yet to be published, if more information applicable in those particular activity areas becomes available. The forthcoming Part 4 of the Code relating to piling will contain further information on noise from a number of different piling operations.

Noise control targets. Due to misinterpretation of the advice given in BS 5228:1975, any reference to a noise level of 75 L_{Aeq} has been omitted. It was never the intention that this noise level should be referred to as a standard or starting point on which to base acceptable noise targets and it was always intended that noise targets, where appropriate, would be evolved depending on the local environmental conditions. The new Code has attempted to redress this situation by including criteria for setting noise control targets which directs the user to consider the influencing factors such as location, existing ambient noise level, duration of works, hours of working, public relations, etc. The emphasis is on encouraging both local authorities and contractors to keep their own records and use their own experience of situations where problems are likely to occur.

Other Parts of the Code

Part 2. Part 2 of the Code is specific to construction, demolition, road construction and maintenance operations and is limited to guidance on legislation. The reason for this is that no further technical detail was available other than the basic information contained in Part 1 for these activity areas. Questions have already been raised whether or not the revised BS 5228 still applies to demolition because the term has been dropped from the overall title of the Code. The intention is that the document does still apply to demolition, although this is not spelt out in the main title it falls within the definition of open sites and is specifically referred to in the title to Part 2.

Part 3. Part 3 of the Code referring to surface coal extraction by open cast methods not only includes guidance on legislation, but also certain specific guidance on site planning and other practical techniques to reduce noise which would be applicable to this particular industry. The inclusion of specific information on surface coal extraction is new, there was no reference to this activity in the 1975 Code.

Part 4. Although piling is part of the construction process it has also been defined as the one area of activity which can result in more noise problems than any other part of the construction process. It was for this reason that piling was not included in Part 2, but was considered of sufficient importance to merit a separate part. However, to overcome any difficulties prior to publication of Part 4 limited information was included in the noise data contained in Part 1. Part 4 on piling provides guidance on the relevant legislation, factors to be considered when setting noise control targets, advice on project supervision and practical measures of noise reduction. Piling is defined as "the installation of bored and driven piles and the effecting of ground treatments by vibratory, dynamic and other methods of ground stabilization". Part 4 contains a table giving further details on the sound level from a variety of piling operations to augment the information given in Part 1 of the Code, again this information has been obtained from a number of sources particularly via the Federation of Piling Specialists. Part 4 also contains a table detailing the alternative piling and other ground treatment techniques so the optimum choice may be made with respect to the noise produced, but there is a timely warning that the overriding decision on the technique to be chosen will depend on the load bearing requirements and the geological conditions.

CONCLUDING REMARKS

As mentioned at the outset, the Code was prepared in a multi part format which allows for ease of updating as necessary, particularly to take account of any changes in the legislation. Originally the intention was to have an eight part document and by the end of 1985 the first four parts should have been published. At the present time, no decision has been taken to proceed with the remaining parts as there does not appear to be sufficient demand for them and at a time when resources are stretched other demands must take precedence. Obviously, if the public or private sector could establish a strong case to proceed with any of these parts this situation may be reconsidered. Users of the Code will require Part 1 plus one or more of the subsequent parts specific to their area of interest.

The Code is restricted to noise although Section 73 of the Control of Pollution Act defines noise to include vibration. Many requests were received to include vibration, as guidance was required particularly on construction sites, but as vibration was included within the remit of other BSI committees it was specifically excluded from the brief for revision of BS 5228.

It is hoped that the revised Code will increase the awareness and understanding of noise from open sites and its effect on local environments. It is further hoped it will assist in promoting noise control measures leading to quieter sites and processes and thus quieter environments.

THE NEW CODE OF PRACTICE FOR NOISE CONTROL ON CONSTRUCTION AND OPEN SITES

REFERENCES

(1) Martin DJ and Solaini AV, 'Noise of earthmoving at road construction sites', Transport and Road Research Laboratory, Supplementary Report 19 OUC, 1976.

(2) Jones RD, 'Difficulties in construction site noise prediction in relation to contract programmes', Proceedings of the Institute of Acoustics 5-5-1 to 5-5-4, April 1977.

(3) Jones RD, 'The measurement and prediction of noise from construction and mineral extraction activities', proceedings of the Canadian Acoustical Association Convention, Edmonton, Alberta, October 1981.

(4) Beaman AL and Jones RD 'Noise from construction and demolition sites - measured levels and their prediction', Construction Industry Research and Information Association Report 64, April 1977.