Proceedings of The Institute of Acoustics

IMPLICATIONS OF THE NOISE ADVISORY COUNCIL CODE OF PRACTICE ON SOUND LEVELS IN DISCOTHEQUES

K Dibble

Ken Dibble Acoustic Facilities, Rugby.

INTRODUCTION

This new code was published in the spring of 1986 by HMSO under the auspices of the Department of the Environment. It was originally produced for the now defunct Noise Advisory Council by John Bickerdike and his team at Leeds Polytechnic and is based upon an earlier study (1) commissioned by the NAC in 1979. The full title is:-

"Draft Code of Practice on Sound Levels in Discotheques"

SCOPE

The Code is concerned only with the control of noise exposure by persons attending discotheques, whether in purpose built premises, in multi-use buildings or other temporary accommodation, and is intended to be applied whether the entertainment is provided by a permanently installed sound system or by a hired-in mobile operator. Thus, every type of discotheque venue from the opulent elegance of Peter Stringfellow's London Hippodrome operation to a village wedding reception at Nether Piddleton church hall or Troutbeck youth club hop, comes within the scope of the Code.

It does not address the problem of environmental noise control from discotheques, although by its very nature there is bound to be a spin-off in this direction. Also it specifically excludes venues used for live rock music performances, rightly recognising this as an altogether different problem.

STATUS

As is implied by its title, the document is intended as a voluntary code of practice and as such does not have the force of law behind it. However that may be, specific suggestions are given to local authority planning departments and licensing committees as to how compulsory compliance can be built into the planning and licensing processes, thus removing all semblance of the stated voluntary status and rendering its provisions in effect mandatory.

The new Code is therefore to be taken seriously and the object of this paper is to consider the need for such a code in the first instance, to assess its implications and to highlight some of the difficulties likely to arise from enforcement in due course.

CONSULTATION

The word "Draft" in the title is misleading as it implies a consultative status. This is not the case. It now appears that the document has been in preparation for some time - a first draft having been published by its author in 1982 (2) - and the implied consultation period has long since past. This it would seem is the final document and although wide consultation within the industry is claimed by its author (2), neither the author of this present paper, a well established specialist in this field, nor any of his clients - with several well known national club operators and trade journal publishers

among their number, nor any colleague so far approached, have even been aware that such a code was under preparation. Thus begs the question as to who was consulted?

SOME MISGIVINGS

A study of the research which would establish the requirement for such a Code is not convincing. It appears to be founded on inconclusive and contradictory evidence and the justification for basing an effectively mandatory Code of Practice, with its far reaching administrative and cost implications, on such evidence must itself be open to question. The introduction states that:-

"...Some sound levels experienced in discotheques and other similar premises are above the level at which noise induced hearing loss is considered to begin.." and goes on to cite the Bickerdike & Gregory study (1), Fearn & Hanson (3) and the well known work on industrial noise exposure carried out by Burns & Robinson (4) to substantiate the statement.

Whilst the general concept of noise induced hearing loss has indeed been amply demonstrated in terms of occupational noise exposure by many researchers over the years, the risks associated with exposure to discotheque or rock music have yet to be satisfactorily proved. Even Bickerdike's own investigations (1), which represents quite the largest investigation yet undertaken, involving 4166 discotheque attenders in 49 discotheques, were inconclusive. He concludes:-

"...Although the ranges of possible exposure to sound levels in discotheques is large the risk of noise induced hearing loss ...is small. Out of an estimated 6 million regular attenders some 0.025% might be expected to reach the low fence impairment level...at the end of their attendance period."

Rintelmann & Bienvenue in a keynote paper to the AES Symposium on Rock Music & Noise Induced Hearing Loss in 1976 (5) (This document provides references to no less than 38 studies) clearly shows that the five methods used to study the problem up to that time had produced as many different conclusions.

Of the five studies based on DRC (Damage Risk Criteria) principles (this is the method used in the Bickerdike & Gregory study) all showed that hearing damage was to be expected after subjection to rock music or dicotheques, whilst those based on TTS (Temporary Threshold Shift) (13 studies) showed that the assumed relationship between TTS and permanent hearing loss was not reliable and that whilst TTS might not be the most suitable method for the purpose, concluded that caution was nevertheless in order.

Conventional Audiology methods (5 studies involving a mix of almost 300 professional musicians and regular rock concert or discotheque attendees, some spread over a 7 1/2 year period with the same subjects) showed little or no variation in pure tone air conduction thresholds, whilst a study of 400 normal hearing subjects, 100 rock musicians and 100 rock concert attendees carried out by Fletcher in 1972 (6) using High Frequency Audiometry techniques produced the conclusion "...Knowing the levels and durations of exposure these persons receive in that pastime it is almost unbelievable that no clearly observable losses could be found."

And herein, it is suggested lies the problem. According to DRC principles there ought to be a problem. The fact that this is not substantiated by research must therefore mean that the research is wrong. So assuming that a problem exists, it must be addressed!

Proceedings of The Institute of Acoustics

IMPLICATIONS OF THE NOISE ADVISORY COUNCIL CODE OF PRACTICE ON SOUND LEVELS IN DISCOTHQUES

SUMMARY OF THE REQUIREMENTS

The document itself is not logically arranged and is something less than concise. Its main provisions are summarised as follows:-

Venues Open to the Public more than 2 Days per Week

1. The interior layout of the premises and the loudspeaker arrangement to be such that high level music is contained as far as is practicable to the dance floor with reduced volume levels in any lounge, bar or dining areas. There is a specific requirement that at least 25% of the available public area be designated as "Rest Areas" where volume levels will be significantly lower than on the dance floor.

2. No public to be allowed within 2m of any loudspeaker.

3. The volume level measured at the nearest point to any loudspeaker accessible by the public (the MPEL point) not to exceed 100dB LAeq over the duration of the session.

4. Where designated Rest Areas are not provided the maximum music level is reduced to 95dB LAeq.

5. Volume levels within the designated Rest Areas not to exceed 85dB LAeq (5 minutes).

6. Volume levels at the MPEL point to be continuously monitored and real-time public display provided.

7. Permanent records of the MPEL values to be kept for inspection by the appropriate authority.

8. DJs to be equipped with hearing protection.

9. Warning notices to be displayed around the premises.

10. Literature to be available to highlight the risk of noise induced hearing loss in leisure activities.

Venues Open to the Public 2 Days per Week or Less

1. Layout considerations and volume constraints as already given.

2. The requirement for continuous monitoring of volume levels is waived. Instead, at least 6No dB LAeq (5 minute) measurements to be made during each session. The averaged level during each session not to exceed the 100dB LAeq limit and no single value to exceed 102dB LAeq.

3. The requirement for the public display also waived.

4. The requirements for record keeping, hearing protection and the display of notices as previously given will apply.

5. The Code to apply equally to all venues where discotheque entertainment is provided, including mobile operators.

6. Where mobile operators are employed it is the responsibility of the operator to provide the monitoring equipment and to ensure compliance with the requirements of the Code, and the management's responsibility to keep the necessary records and to ensure that the operator is suitably equipped.

THE IMPLICATIONS

Layout Considerations

The interior layout and loudspeaker placement considerations are not new and the majority of the specific recommendations made in the Code have been incorporated into many purpose built permanent venues for many years, either for the comfort of patrons, for operational convenience, or to comply with health & safety at work or environmental legislation (Dibble (7)). The main problems will arise where discotheques are operated in general purpose halls where there is no opportunity to influence the acoustical design and layout of the interior, and this will inevitably result in the 95dB LAeq fallback limit being applied in these circumstances.

The Exposure Limits

The dance floor limit of 100dB LAeq is certainly not unreasonable and is in practice little different from present typical operating levels in the majority of clubs and select discotheques anyway. Fig 1 shows a typical 96dB (A) discotheque music spectrum and it can be seen that at very low frequencies the 1/3rd octave levels are well up in the 105dB range. Fig 2 shows another example, at 100dB(A) with low frequencey peaks in excess of 120dB. The A-weighting filter characteristic shows how such high 1/3rd octave values can be accommodated within a 100dB(A) SPL measurement. Even in a purpose built venue the pressure waves generated when the low frequency 1/3rd octave levels approach 110dB can be expected to react upon the building structure and give rise to environmental noise nuisance complaints. Such considerations therefore impose a built-in volume constraint at around the 100 dB(A) mark anyway.

Also, the 95dB LAeq fallback limit cannot be considered unreasonable in a general purpose building, and again, anything higher would almost certainly run into environmental difficulties, especially in a village hall or similar building.

Amplification Systems

Another limiting factor is the cost of the amplification systems necessary to achieve very high sound levels at an acceptable quality. On average, it costs between £10,000 and £15,000 to provide good quality "disco sound", with its characteristic low frequency emphasis, at 100dB(A) in a 1000 capacity venue and would involve something of the order of 2Kw of amplifier power through four fairly large loudspeaker systems. To increase this to 103dB(A) would involve a doubling of the amplifier power and a doubling of the number of loudspeakers used, pushing the cost to near £20,000. Many of the small mobile operators use only 100 or 200 watts of amplifier power and inefficient loudspeaker systems because that is all they can afford, and such systems are just not capable of generating 100dB(A) without severe overloading of both amplifiers and loudspeakers. Subjectively, a badly distorted 95dB(A) programme from an inadequate amplification system will be adjudged much louder than a clean 105dB(A) programme from a fully engineered rig with adequate headroom capacity, and will be far more distressing to the listener.

IMPLICATIONS OF THE NOISE ADVISORY COUNCIL CODE OF PRACTICE ON SOUND LEVELS IN DISCOTHQUES

Instrumentation, Public Display & Record Keeping

The least expensive integrating SPL meter on the market is the Castle GA203 which costs around £400, plus a calibrator at £130, plus VAT. Many mobile operators, youth clubs and local community halls spend less than that sum on their total sound system!

Meeting the other requirements of the Code intended to apply to permanent venues will not be a practicable proposition using such a basic instrument. If compliance is not to become an operational nightmare, it will be necessary to install a fully automated system with built-in interface for the real-time public display and a built in printer. The CEL262 Environmental Noise Analyser, which appears to be the least expensive off-the-shelf, self contained equipment which will meet the requirements costs almost £7,000, is far too complicated to be used by an inexperienced operator and greatly exceeds the actual requirements. Other options are to take a standard integrating SPL meter which has a digital interface facility (such as the CEL493) and to hook this up with a suitable printer and display unit via an interface unit. But even that is going to cost around £4,000, will again greatly exceed the actual requirements of the Code and be difficult to operate satisfactorily.

The simple fact is that contrary to the unequivocal statement made in the Code itself, there is no item of equipment available on the market which will satisfactorily meet the requirements of the Code at a reasonable cost, and in a form that will facilitate use by untrained operators.

Added to that, it will in all instances be necessary for a permanent venue to employ a consultant to advise on the selection of equipment, to supervise its installation, to set up and commission and to provide staff training in its use. This will be likely to incur at least a further £1,000 expenditure. Good news for consultants but not for the operator!

Given that the Code itself acknowledges that the majority of operators already take a responsible approach, and that as has been shown, volume levels in the majority of instances are self governing anyway, one must question the reasonableness of the monitoring requirement of the Code, and it is anticipated that this will be the greatest problem area.

Hearing Protection

In the majority of clubs today the DJ is a front man, encouraging audience involvement, dancing, promoting, etc., often with technical operators to cue up and change records and to operate the lighting and video systems. Even these operators are often required to be mobile as part of "the act" and are frequently attractive girls in scant clothing. We are talking about show business, and the concept of DJs or their operators wearing ear defenders is no more acceptable than, say, John Williams being required to wear ear plugs whilst playing with his band Sky or Barbara Streisand appearing on a Broadway stage wearing ear defenders.

Enforcement

Dealing with the larger, high profile fashionable venues is a fairly easy matter and these will doubtless fall easy prey. But it is hardly fair, nor is it in the spirit of the Code to compel compliance in that instance whilst all the smaller operators carry on regardless. Such an approach could well lead to accusations of discrimination in favour of the smaller operators.

And who will keep track of the mobile operators? Without a compulsory register and licensing system it is contended that this will be impossible to enforce. And who is going to refuse an MSD license to a youth club or local church hall for non-compliance? Who will go around checking every wedding reception, birthday party or village hop?

The staffing levels at the local authority Environmental Health Dept. will need to be doubled just to enforce this one Code! And who will pay? - the ratepayer yet again?

CONCLUSIONS

There are many possible reasons as to why many researchers have been unable to substantiate the widely held supposition that the enjoyment of rock music in any of its forms must result in impaired hearing, but that is another topic to be left for another occasion. But as Rintlemann & Bienvenue (5) concluded, the research does however suggest that caution may be in order.

But even acknowledging that protection for the public from exposure to music played at very high SPLs may ultimately be desirable, is it reasonable, having regard to the existing constraints and the generally responsible way in which the industry is operated, to expect all discotheque management, from the Hippodromes to the rural church halls and youth clubs to take on the financial and complex administrative burden being imposed on them by this code?

Even the author of the code himself, in a paper to the 89th Environmental Health Congress in 1982 (2) acknowledges that the problem ".....is not well enough researched and defined in all its aspects to warrant specific proposals being made..... it is considered that specific legislative control is unwarranted....."

Given its almost certain eventual adoption by many local authorities as an instrument of planning control and as a condition of licensing, it is suggested that this Code will indeed become, in effect, the "specific legislative control" its author considered unwarranted in 1982.

It is considered that the extent of monitoring and administration involved, by venue management, by operators and by the Authorities, the attendant cost implications, and often petty restrictions the Code seeks to impose, are far in excess of what is reasonable, having regard to the inconclusive evidence upon which the Code is based. When this is coupled with the fact that the hardware necessary to implement the monitoring requirement - which represents the main thrust of the proposals - in a practicable manner is not commercially available, the entire proposal becomes unworkable.

Now that agreement on noise exposure limits has finally been reached among the EEC partners, by January 1990, the 90dB LAeq (8 hour) exposure limit will be required to be legally enforceable in all member states, and in the UK, this is to be incorporated in the Health and Safety at Work Act. All venues employing staff will be required to operate a management policy to ensure that their own staff are not subjected to a noise dose in excess of 90dB LAeq (8 hours) and compliance here will in most instances, ensure that the public too are not exposed to excessively high levels as they move about such venues. This, it is suggested, will provide the most effective long term solution without the elaborate hardware provision and attendant administration being recommended by this Code, and will thus render the Code superfluous.

Thus, it is suggested, the problem will simply disappear.

It is an ill thought out Code which, in relation to the extent of the problem it seeks to address, places unnecessary restriction and unwarranted obligation on a normally responsible industry, and should either be withdrawn immediately, or be disregarded by local authority administrators.

References

(1) J Bickerdike & A Gregory, "An Evaluation of Hearing Damage Risk to Attenders at Discotheques", Noise Advisory Council (DoE) Project Report by Leeds Polytechnic School of Constructional Studies, 1979.

(2) J Bickerdike, "Hazards to Hearing from Amplified Music", a paper presented to the 89th Environmental Health Congress of the Institution of Environmental Health Officers, 1982.

(3) R W Fearn & D W Hanson, "Hearing Acuity in Young People Exposed to Pop Music & Other Noise", Lancet Vol 2, No 7923, pp 203-205 1975.

(4) W Burns & D W Robinson, "Hearing & Noise in Industry", HMSO, 1970.

(5) W F Rintelmann & G R Bienvenue, "Rock Music & Noise Induced Hearing Loss - A Review of Research", a keynote paper presented at the AES Symposium on Rock Music & Noise Induced Hearing Loss, AES Preprint No 1181, pp 7-15, 1976.

(6) J L Fletcher, "Effects of Non-Occupational Noise Exposure on a Young Adult Population", Contract No HSM 099-71-52, National Institute for Occupational Safety & Health, US Department of Health, Education & Welfare, 1972.

(7) K Dibble, "Environmental Control of Entertainment Sound", Proceedings of the Institute of Acoustics, Vol 7, Pt 3, pp 299-306, 1985.

Proceedings of The Institute of Acoustics

IMPLICATIONS OF THE NOISE ADVISORY COUNCIL CODE OF PRACTICE ON SOUND LEVELS IN DISCOTHEQUES

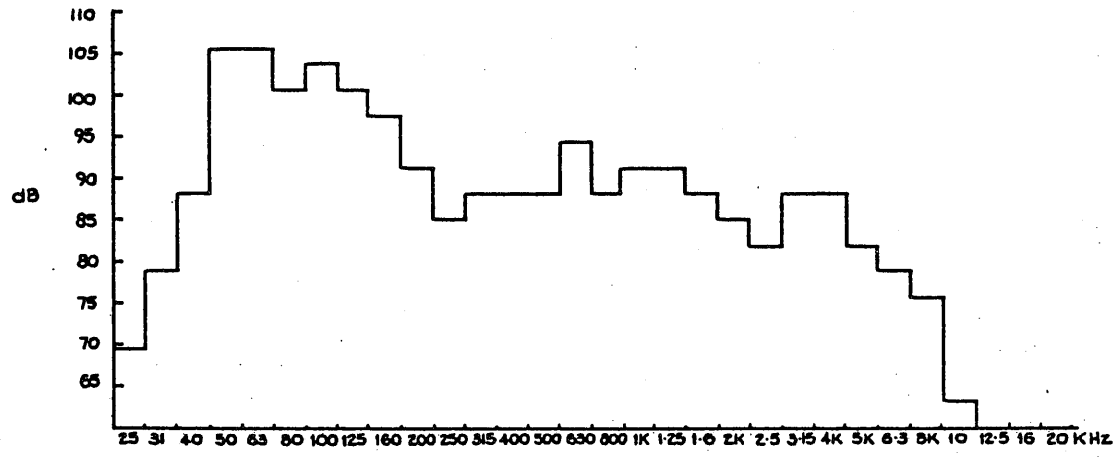

Fig 1 TYPICAL DISCOTHEQUE NOISE SPECTRA AT 96 dB(A)

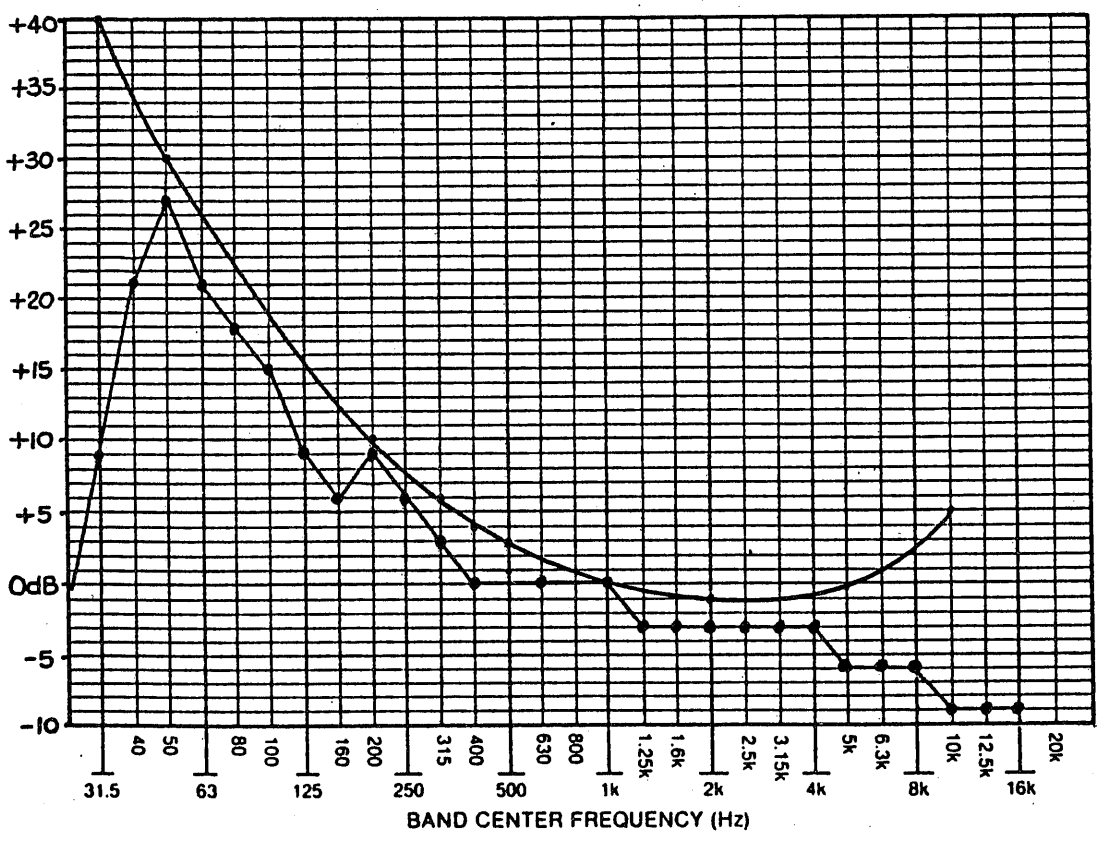

Fig.2 TYPICAL DISCOTHEQUE NOISE SPECTRA Vs 'A' WEIGHTING CURVE