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CODE OF PRACTICE FOR THE ASSESSMENT OF CLAY TARGET SHOOTING NOISE - AN EXAMINATION OF ITS DESIRABILITY AND VIABILITY

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1. INTRODUCTION

For a number of years there have been calls from various organisations for a nationally accepted Code of Practice to be produced to assess the noise produced by the sport of Clay Target Shooting. This paper examines the background to this perceived need, the practical and technical difficulties associated with measurement, assessment and rating of shooting noise, the viability of various control options and offers an opinion on the way forward in the development of such a Code of Practice. All opinions expressed in this paper are those of the author and do not necessarily reflect the policy, practice or views of Suffolk Coastal District Council.

2. BACKGROUND

The sport of clay target shooting dates back to the 19th century, when it was introduced as a more humane alternative to live bird trap shooting, and has continued to the present day as a popular sport in its own right. In recent years its popularity has grown at a considerable pace, and it is now the fastest growing shooting sport and one of the fastest growing of all sports. Inevitably, this has brought pressure from within to expand both existing shooting grounds, either in size or intensity of use, or for the development of new facilities in areas which have previously not experienced intensive shooting activity.

In parallel with this pressure, the change in agricultural practices that this country has experienced over the last few years has led to many landowners seeking alternative, potentially more profitable uses for parts of their land, a move that has been broadly encouraged by the present planning system. Clay target shooting, either on an ad hoc basis or as organised competitions with prizes, attracts many participants who are prepared to pay to enjoy their sport. The earning potential is therefore high and the capital costs involved in setting up a shoot are relatively low. It is hardly surprising that many landowners are keen to develop such facilities.

Unfortunately, by its very nature, shooting has a considerable environmental impact on surrounding land, primarily from the noise produced by the guns themselves. The use of inappropriate areas of land for organised shooting has led to many instances of conflict between shoot operators and nearby - or indeed, not so nearby - residents and land users. All too often, the task of resolving these conflicts falls to the Local Authority, represented by the Environmental Health Officer, whose experience of this type of noise complaint may well be very limited.

Many, if not most, of the day to day noise issues that are dealt with by Local Authorities require some form of technical assessment, either to determine if nuisance exists or to make recommendations in respect of a planning application. There exists a wealth of British Standards, Codes of Practice, Guidance Notes etc which the officer can look to for assistance in reaching a decision, or at least to give technical advice on how to take measurements and the likely effectiveness of control measures. Curiously, the cupboard is almost bare, or at best the advice is inconsistent, so far as shooting noise is concerned. This cannot be because the noise problem is a recent phenomenon, given that the sport has existed for so long, and, unlike many newer noisy activities, the basic equipment of gun and cartridge

have not changed to any major extent in the last several decades. Indeed, modern cartridges do not produce as much noise as those used twenty years ago. The reason may be associated with the nature of the sound produced by a firearm, which makes objective assessment and rating very difficult.

3. MEASUREMENT OF SHOOTING NOISE

Before any attempt can be made to rate shooting noise, a decision must be made on the choice of parameter to use. Different weighting networks or time constants will give widely differing results and may have similarly differing correlations with the level of annoyance caused by the sound. It is at this point, probably the most critical so far as field officers are concerned, that the available research data becomes confusing and contradictory. The two most commonly quoted works on this subject, those of Sörensen and Magnussen (1978) [1] and Smoorenburg (1981) [2] effectively contradict one another, with the former recommending that shooting noise should be measured as $L(A)_{I,max}$, whilst the latter finding better correlation using $L(A)_{I,max}$. The most commonly used Code of Practice, that produced by the Midlands Joint Advisory Council for Environmental Protection (1989) recommended the use of $L(A)_{I,max}$ and compared this with the prevailing background noise to determine the exceedence level.

Actually measuring the noise from shooting ranges may not be so straightforward as measurement of a relatively steady state sound close to the point of origin. Under most circumstances the potentially affected properties will be some distance from the source, and may be as distant as 2 to 3 km. Clearly this will allow meteorological and topographic effects to play a very great part in attenuation and propagation, and in practical terms this will mean that the individual measured levels will vary to a greater or lesser extent, dependant on the separation distance.

Experimental work carried out at the Institute of Acoustics 1995 Autumn Conference [3] demonstrated very effectively that as the distance between the shotgun and the meter increased, so the standard deviation for measured values increased. At distances that may be measured in kilometres, it is likely that it would be necessary to measure an inordinate number of shots before the representative level could be stated with confidence.

Where the issue being addressed is that of the creation of a new shooting ground, it might at first be thought that there is scope for a prediction protocol to be developed, but this is fraught with difficulties. The major problem remains the great distances involved, with the attendant variability in location and topography, which can range from disused quarries to open fenland. Whilst there are methods of predicting long distance sound propagation, this could prove to be over complex for general application and they would still need to be proved to be valid for impulsive sounds.

On balance, it is probably preferable to actually measure the noise levels in the case of a proposed new ground, choosing times with as near ideal weather conditions as possible and measuring a large number of shots at each location and shooting direction. This latter point should not be ignored, as shotgun noise has a very directional character, even over extended distances. If practicable, the exercise should be repeated under conditions of moderate prevailing wind. The value of local wind rose data must not be overlooked.

3. RATING AND ASSESSMENT

Unfortunately, measurement of the noise is not the end of the matter. The most difficult hurdle to clear is converting this raw measured data into a rating value that takes into account a number of factors. Any rating method employed must take into account the likely annoyance response of the potentially affected

population, but this has appears to have an inordinate degree of variability, which may be ascribed more to social factors than to the physical properties of the sound.

There has been for many years some degree of polarisation of views regarding the ownership and use of firearms by the general public, which to some extent must colour any individual's views on the intrusiveness of noise from shooting sports. Relatively recent tragic events have served to further polarise these opinions, and it is suggested that this presents almost unique difficulties in determining a reasonably objective test of annoyance threshold which it may not be possible to overcome.

Practical experience has shown that the individual responses vary, one individual being satisfied with a noise level which would be patently unacceptable whatever the circumstances, to other complainants who, to quote the EHO involved, 'had an attack of the vapours every time they heard a distant gunshot.' The first affected person owned a shotgun, whilst the latter involved a family with young children. These extreme views are quite understandable, but given that they are both likely to be encountered in populations near shooting grounds, place tremendous obstacles in the way of anyone attempting to correlate noise dose with annoyance threshold. If the threshold spans a very wide range, more than 10dB, it may well be that it is unusable.

The extent to which background noise levels affect annoyance threshold in case of impulsive sounds is also unclear, further complicating the issue. The MJAC code based its rating method on an exceedence above background, but this has not found favour with others. Taking background levels into account has a certain attraction, if only because it mirrors other codes and standards, but personal experience indicates that there is room for doubt as to its validity, especially where higher than usual background levels exist.

Finally, the relationship between annoyance and the rate of impulses requires further investigation, as it may be important in considering the size of shooting ground that may be acceptable. The maximum rate of fire is directly related to the number of shooting stands that can be used simultaneously, and to some extent, the type of shoot proposed, with trap shooting probably having the highest rate.

The most influential factor in determining annoyance threshold will obviously be the level of the impulse heard by the recipients, but the issues of background level and rate cannot be ignored if a valid relationship is to be found. If the relationship is too vague, spanning more than 10 dB, for example, it could be argued that it is of little value in practical enforcement situations. No doubt what most Environmental Health Officers would prefer is a code which gives very precise values, as it leaves no room for doubt or argument. The broader the range, the more the officer has to rely upon subjective assessment, which is exactly what codes of practice are designed to prevent. Regrettably, it seems that rating shooting noise in terms of annoyance could prove an almost intractable acoustics problem.

4. CONTROL OF SHOOTING NOISE

Paralleling the difficulties in assessment and rating, there are also significant problems associated with the control of shooting noise, particularly in quantifying the likely effectiveness of the various options. The classic approach to controlling noise problems of almost any type follows the pattern of:-

- use a quieter machine
- take advantage of directional characteristics
- put something between the machine and the recipient
- put the machine somewhere else where it does not cause disturbance
- reduce the time that the disturbance continues for

In the case of clay target shooting, the first option offers little scope for improvement in noise levels, despite many attempts to develop quieter guns and cartridges. Subsonic cartridges have not lived up to their original expectations and are unpopular with shooters. Moderated or 'silenced' guns have such poor handling characteristics that it is extremely unusual to see one in use anywhere. Laser based systems are not regarded as a viable alternative by most shooters, as they cannot mimic the forward allowance necessary in normal shooting, to take account of changing target speed and direction. It is safe to assume that for the foreseeable future the conventional 12 gauge and pyrotechnic cartridge will remain the norm.

Shotgun noise has distinct directional characteristics that can often be taken advantage of. Research [4] has shown that there can be up to 20 dB difference at 100 metres between levels at the front and behind the gun. Over longer distances this reduces, but there are audibly noticeable differences at 800 metres. The elevation of the gun also affects the result, the greater the angle to the horizontal, the lower being the difference. These are all factors that can be measured relatively easily and there is a good case for the data to be included in a code of practice.

The use of barriers is common on shooting grounds, ranging from straw bale enclosures around the shooting stands to earth banks surrounding skeet ranges. Because the frequency spectrum of shotgun cartridges is remarkably consistent, prediction of the attenuation to be expected should be relatively straightforward, and representative values should form part of the code.

Because of the high noise levels involved, large separation distances are usually needed to give sufficient attenuation, but if a recommended minimum distance is to form part of the code, it must be realistic and not necessarily regarded as an absolute limit. The MJAC code recommended that shooting should not take place at less than 1 kilometre separation unless 'under well established or other modified circumstances'. It is important that this recognition of modified circumstances is retained and the 1 kilometre distance does not become regarded as an absolute requirement. In most parts of the country it is either difficult or almost impossible to find any area of land that does not have sensitive properties within 1 kilometre, except in areas such as National Parks where consent is very unlikely to be granted. As an example, there are six regularly used shooting grounds in the Suffolk Coastal district, none of which meet the 1 km requirement, but which cause few problems due to careful design and limitations on use.

Limitations on the duration and frequency of shoots must go hand in hand with the rating of the noise level expected at sensitive properties, and the adoption of a 'sliding scale' may prove to be the most useful and objective means of controlling shoots. If the rated noise level is below an agreed threshold there should be no other restrictions imposed on the shoot, and if it exceeds a maximum agreed value then clearly the location is inappropriate for this use and no shooting should take place. Between these two values there is scope for setting frequency and duration limits which will still allow shooting to continue but which will not result in unacceptable disturbance.

5. CONCLUSIONS

There is little doubt that Environmental Health Officers, other acoustics professionals and the shooting industry would welcome a national Code of Practice which would help to give a consistent approach to the noise problems which clay target shooting can and does cause. However, the technical difficulties in developing a rating and assessment protocol that can be well validated by research present a formidable obstacle. The question therefore has to be asked, is a code based on uncertain research results better than no code at all?

On balance, a pragmatic approach indicates that a code with quite tightly defined noise limits gives the advantage of consistency, which outweighs the drawback that the limits may not be acceptable to a significant proportion of those affected by it. To this end it is essential that as many interested parties as possible reach a consensus on what is and is not acceptable and achievable, especially in terms of measured noise levels. In particular, the shooting organisations must be under no illusions regarding the implications of adoption of a code under the terms of the Control of Pollution Act 1984.

Whilst adoption will not give the code force of law, it does increase its legal standing to the effect that courts and planning inspectors will not usually be prepared to accept arguments centred on its contents. There is little doubt that if the code is ratified by adoption many local authorities will take the opportunity to apply it very literally and this may have dramatic effects so far as existing and future shooting grounds are concerned. Commercial shoot operators should take careful note of a 1995 survey [5] which indicated that 'many authorities expressed a desire to see clay pigeon sites eliminated from their area completely.' Unless the code attains an almost perfect balance between the various interests - which seems nearly impossible, given the difficulties previously mentioned - this desire could so easily become reality.

6. REFERENCES

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