Proceedings of The Institute of Acoustics

# EVALUATING NOISE FROM CLAY PIGEON SHOOTS; PRACTICAL EXPERIENCE AND LITERATURE SURVEYS

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## 1. INTRODUCTION

Clay Pigeon Shooting is an established Olympic and Commonwealth Sport but it is in recent years that its increasing popularity has given rise to a significant number of complaints of noise nuisance. Unfortunately, there has been no accepted method of assessing this nuisance. Consequently, lay-people such as magistrates, public inquiry inspectors and planning committees have tended to disregard the scientific considerations of each case, simply because they have not been able to understand the fruitless arguments between opposing experts on methods of assessment.

As with most instances of alleged nuisance, people's reactions are intensely subjective. Indeed, the authors know of several instances of complainants who insisted that they would still be severely disturbed by a Clay Pigeon Shoot even if they could not see it, hear it, or personally sense it in any way.

This paper will outline a practical assessment method by a consideration of published work on similar types of noise and also by drawing upon the authors' experience in the field.

There are more than 500 affiliated Shoots in the United Kingdom.

The sport comprises a number of disciplines designed to simulate game shooting in the wild. To a considerable extent the words 'clay' and 'pigeon' are misnomers. The targets are not made of clay and they do not resemble pigeons.

Clay Pigeon Shooting is mainly a participation sport. Each Shoot is patronised by 50/100 shooters who spend about 1½ hours at the shooting ground and fire 50/75 cartridges each.

Akin with golf, sailing, tennis, there are 'knockabout' sessions, club, district, county, national and international competitions. It is mainly a summer sport but keen shooters are active throughout the year.

Non-shooters certainly do not want the sport to take place in the urban areas, nor do they want it deep in the countryside and here lies the nub of the problem.

The first part of our paper deals with practical experience of community attitudes gained in a number of planning and noise nuisance cases.

The second part deals with various quantitative approaches to shooting noise.

## 2. ATTITUDINAL

Some people do not like guns or even the thought of them. Whereas we all experience many noises louder than 72 dB(A) in our daily lives, a proportion of the populace become frightened or 'jittery' if they hear gunfire at this level or above.

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Another attitudinal aspect of community response concerns the type of property in the vicinity of the noise. We have found that property owners are more likely to be concerned about noise disturbance than are tenants.

In the absence of any fixed standard, nuisance action by the authorities is often based on a complaint or complaints.

However, a person's predisposition to complain about noise depends greatly on that person's attitude to the cause of that noise. As far as Clay Shooting is concerned, many country folk who have been brought up with the sport come to accept it as part of the landscape - just as much as cattle noises, birdsong, farm tractors. People who move out of the city for 'peace and quiet' do not accept such shotgun noise.

Many complaints arise from the public attitude about the use to which the countryside should be put.

3. SITUATION

Farmers and foresters, of course, say that the countryside is primarily for work, but generally understand that leisure is also a valid use - but very much second to work.

City dwellers consider that the countryside is for work, but they are entitled to make use of it for their own particular sport or recreation which may, of course, conflict with some other leisure use.

People who live in the countryside generally consider that they are entitled as of a right to peace and quiet so protest about any noise which they consider is unnecessary.

The Codes of Practice soon to be introduced for noisy sports; i.e. Power Boating, Water Skiing, and Clay Pigeon Shooting, indicate that noisy activities should be allowed to take place in the countryside, albeit under control.

Although further residential development is not permitted in the countryside, those who are fortunate to live there already are protected from noisy activities by the Control of Pollution Act and also by planning law. Such dwellers are encouraged to believe that the noise makers are behaving illegally and in such a climate Action Groups readily form.

4. ACTION GROUPS

These are a growing phenomena and have a life all of their own. We have found them to be self-perpetuating and sometimes bringing about welcome cohesion in a community. Unfortunately, strongly held views can become socially divisive. In the case of 'Action against the Shoot' groups, we are very doubtful as to whether they can always be regarded as genuine complainants, since the motivation of their individual members is not just inspired by hardship from noise, but often by other considerations.

5. INTRUSION v ABSOLUTE

Our experience with all shooting noise complainants leads us to believe that people appear to be more concerned about the absolute level of the shots than the degree of intrusion above background. Much in the same way that people have fixed ideas of noisiness. People living in quiet rural areas accept aircraft and vehicle or train noise for what it is.

They do not complain more about the loudness of such noises than do city dwellers, who are used to much higher ambient levels.

Because of the existence of BS.4142 and ISO 1996 and the concept of measurable intrusion, we find that the official case against shooting noise tends to be based on the degree of intrusion rather than the absolute level.

## 6. HABITUATION v SENSITISATION

There is ample evidence to show that people can become habituated to shooting noise providing the levels are comparable to other everyday noise.

Adaptation can set in with all types of noise, providing the concept of 'inevitability' is accepted. Those living in the vicinity of airports, railway lines, busy streets, soon become acclimatised to what generally would be considered to be an exceptionally high level of noise.

Whether we become habituated or sensitised depends mainly on psycho/attitudinal factors. In such circumstances just how to quantify any yardstick presents a very considerable problem for the acoustician.

A typical Clay Shooting example concerns the number of shots which are fired in a given period. We would suppose that most people would subscribe to the view that more shots equals more annoyance. But because this view appears to be logical, must it necessarily be true? It is certainly true to start with. Complainants about shooting consider that a reduction in the number of shots per occasion would be a step in the right direction. We do not find less shots per occasion to improve acceptability in the long term.

## 7. DAYS/HOURS/SEASONS

Sunday is the most popular shooting day. Sunday is also the most popular day for all outdoor recreation, according to national surveys. Sunday shooting causes more complaints than shooting on other days of the week.

Saturdays and evenings are less sensitive than Sundays, with weekdays least sensitive of all.

The sensitivity league indicates the attitudinal effect because the noise is no louder during different times of the week; it is just that people's expectations are different.

The seasons also affect considerations about noise nuisance. If confronted with a choice of having to experience shooting only in the summer or, alternatively, only in the winter, there seems to be a slight preponderance in favour of a summer restriction.

## 8. METHODS OF ASSESSMENT

There is little published information on the subject of noise nuisance caused by Clay Pigeon Shoots but from an analysis of work on similar types of noise such as gunfire noise from rifle ranges and impulsive noise, the following factors emerge:

a) Noise Level of Shots (including averaging)

Loudness has a great effect upon perceived annoyance. The louder the noise above a certain level, the more the annoyance. Because the level of gunshots is far from uniform it is necessary to specify

how to represent the variation. All the studies we have examined have used some average measure. Some have used Leq derived and the remainder have used an arithmetical average of the sound level of the gunshots measured using either standard 'fast' or 'impulse' response. All studies agreed on the use of dB(A).

Sorensen and Magnusson [2] in their study of Swedish rifle ranges, considered a wide range of response parameters and found the best correlation between annoyance and dB(A) (FAST) response. They further found from their social survey that 63 dB(A) (FAST) or thereabouts represented the threshold of annoyance. This means that below this level people will not normally be annoyed.

Reference [1] calculated the average sound level of the shots using dB(A) (FAST) only. The formula which they proposed is based on a sociological study involving 800 people living near shooting ranges.

Professor Smoorenburg [4] in his 1981 study suggests dB(A) (Impulse) because of the lack of international standardisation of 'Fast' response characteristics at that time.

References [5] and [6] both use dB(A) Leq. This is based on laboratory and field work using impulse noise with a traffic noise background. Both found that the Leq from the impulse noise alone minus the Leq caused by the background correlated best with annoyance. They did consider the mean dB(A) (FAST) of the shots but this did not correlate as well. The conclusion to be drawn from this is that the level of background noise probably affects the degree of annoyance caused by the impulsive noise.

b) Number of days per year on which shooting occurs

Only Reference [1] considered this factor, although to some extent it is incorporated in the number of shots fired per year. This reference proposes that the number of days per year on which shooting takes place is very important, rating it more highly than the number of shots fired per year, suggesting that people would probably prefer to have more intensive shooting on fewer days per year.

c) Number of Shots fired per day

The CEC joint project [5] and [6] found that with increased length of exposure (equivalent to more shots per day) the annoyance tends to decrease slightly. Sorensen and Magnusson [2] also found that annoyance decreased with an increase in the number of shots fired. Reference [4] considers the number of shots fired per year to be very important but does not conclude how their distribution throughout the year affected annoyance.

d) The days of the week and times of day on which firing occurs

Only Reference [1] considers this important and found that shooting on a Sunday is equivalent to shooting on three other days of the week. None of the references have considered time of day as a factor related to annoyance.

Having regard to the foregoing considerations, the rating method recommended by Hoffman et al takes into account most of the factors. The formula

they use is:-

$$Lr = L + 10 \text{ Log } D + 3 \text{ Log } M - 44 \text{ (dB)} \quad (1)$$

Where Lr is called to the rating level in dB, L is equal to the arithmetical average of the shots in dB (A) (FAST).

D is equal to the number of shooting occasions per year.

M is equal to the number of shots fired per year.

L is measured at the complainants property when the wind is blowing from the prevailing direction at normal strength.

Audible, but not measurable, shots are assigned a value equal to the background level in order to obtain a better estimate of the true average.

D can be obtained from the organisers of the Shoot. Morning and afternoon sessions are counted separately and Sundays are weighted with a factor of 3.

M can be obtained from a knowledge of the approximate number of shooters at any one meeting, the number of traps in use and the number of days the Shoot is open.

Hoffman et al [1] further propose a rating level of 60 dB for residential areas.

The authors of this paper would be pleased to hear of results of the assessments made using this rating method.

9. REFERENCES

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