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NOISE COUNCIL SURVEY OF CLAY PIGEON SHOOTING NOISE

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1.0 INTRODUCTION

In 1988 the Noise Council circulated a questionnaire on clay pigeon shooting to all Local Authorities in England, Scotland, Wales and Northern Ireland, a total of about 525 bodies. The questionnaire which is shown in Fig.1 was kept short and simple in order to ease its completion and the high number of returns, (75%) divided as follows, illustrate the importance of the topic, since over half the Local Authorities have clay pigeon shooting in their areas.

Areas with no shoots	102
Areas with shoots but no complaints	67
Areas with shoots and complaints ("sometimes")	184
Areas with shoots and complaints ("frequently")	41
	394

A study of the questionnaires and the helpful documents which accompanied some of them, showed two main topics on which assistance is required to enable Local Authorities to advise shoots on the planning and control of their operations. These are:

- The factors which determine the noise at sensitive locations.
- The noise measurements and criteria to use at the sensitive locations.

Factors which determine the noise are: separation distance of shoot from sensitive location, the type of operation, the shooting orientation, the number of shooters at one time, use of barriers close to the guns, the topography and the atmospheric conditions.

Whilst there is wide agreement on these factors, there is more uncertainty on how to measure the noise and how to assess it in order to develop criteria.

It was also agreed that clay pigeon shooting is an expanding and relatively expensive sport which is changing its pattern from that of local self-supporting clubs to more commercial enterprises run for profit. These are increasingly becoming a form of company business entertainment and there is likely to be a new phase in the development of clay pigeon shooting holiday centres, which will provide accommodation and varied shooting on the same site. Profitability may require commercial shoots to operate throughout the week, so having a greater potential for disturbance than those clubs which are mainly for weekend sport.

Where problems have arisen, some have been settled by discussion whilst others have led to legal action under the Control of Pollution Act. Control at the planning stage is available where planning permission is required and refusals have led to a number of Public Inquiries.

2.0 FACTORS AFFECTING THE NOISE AT SENSITIVE LOCATIONS

2.1 Separation.

The separation distance between the noise sensitive premises and the closest noise source is the most important single factor. In general, disturbance will occur if the distance is less than 1km and may occur between 1-3km. However, the minimum permissible separation distance can be affected by the topography of the land, whilst atmospheric conditions may introduce a propagation variable effect.

2.2 Types of operation.

The frequency of the shoot and the length of the shooting day, together with general management of the site can be controlled to reduce disturbance. The control might typically relate to:

Number of days a year on which shoots are permitted.
Minimum number of days between consecutive shoots.
Restrictions on certain days which have religious significance.
The hours between which shooting may occur.
the number of simultaneous shooters.
Orientation of the shooting stands.
The number of shots which may be fired on any day.
The types of cartridges which may be used.

2.3 Shooting orientation.

The radiation from the gun is directional, with the maximum in the direction of shooting. The level behind the shooter can be as much as 12d8(A) lower than that in front, although it is normally less than this. The orientation must therefore be away from sensitive premises.

2.4 Permitted number of guns.

The greater the number of shooters the more cartridges are likely to be used and there is an increased chance of simultaneous shooting occuring. The number of cartridges to be used may be controlled and simultaneous shooting restricted.

2.5 Barriers.

These may have some effect if they are higher than the shotgun muzzle and several times wider than their height. They should be close to the shooting stand, preferably enclosing it on three sides. Barrier material may be masonry with an aborbent lining, an earth bund or similar for permanent sites. Straw bales can be used for temporary sites.

2.6 Topography.

The lie of the land can increase or decrease the level at receiving locations. For example, hills act as barriers whilst valleys may channel the sound. Shooting below ground level eg in a disused quarry or a deep ditch, may be helpful. Narrow belts of trees do not absorb noise usefully although wide and dense woodland can give a reduction which it is difficult to quantify.

2.7 Atmospheric conditions.

The main factors are the wind speed and direction, which affect the long distance propagation. A strong wind will increase noise levels in the direction in which it is blowing. The prevailing conditions should be taken into account in planning the site.

3.0 MEASUREMENT.

3.1 Measurements available.

A wide variety of measurements are available on modern sound level meters, for example A and C Weighting with, slow, fast, peak and impulse responses, Leq and SEL. Additionally, statistical measurements are used widely in environmental noise measurements.

3.2 A or C Weighting?

Work by Sorensen and Magnusson (1979) has shown the best correlation between 'A' weighting and annoyance.

3.3 Measurement function.

Long term Leq measurements are unsuitable for shotgun noise since, at a distance, audible annoying noises may be only a few decibels above background noise so that the measured Leq will be controlled by the background. Sorensen and Magnusson (1979) compared dB(A) Fast, Peak and Impulse and showed that dB(A) Fast maximum was their preferred indicator of annoyance. They also found that annoyance was not dependent on total number of shots fired, although this is questioned by other experience and may result from the limited data available for the analysis.

Other workers have used dB(A) Impulse measurements. Smoorenburg (1981) reviewed work on rating of impulse noises and concluded that a rating level Lr was given by:_

$$Lr = L(imp) + 10 \log N - 42 \text{ dB} \quad (1)$$

Where L(imp) is the level of a single impulse measured in dB(A) Impulse and N is the number of impulses per day (100<N<10,000)

Hoffman et al (1985) developed a rating

$$Lr' = L + 10 \log D + 3 \log M - 44 \text{ dB} \quad (2)$$

L is the calculated "average level of the individual shot" , where "the calculation method yields the resulting value that would be indicated on a sound level meter having the time constant 125ms (FAST)." D is the number of shooting occasions per year and M the number of shots fired per year. L appears to equate to L(A) Fast (max).

It is seen that Eqn.(1) assesses on a daily basis whilst Eqn.(2) covers a full year. The effectiveness of daily ratings versus annual ratings, or some duration in between, has yet to be evaluated.

4.0 COMPONENTS OF A CODE OF PRACTICE.

This section gives proposals which might be incorporated in a Code of Practice.

4.1 Separation.

Minimum 1km, preferably at least 3km unless topographical features suggest otherwise. (See note 1).

4.2 Operating times.

Limits on hours per day, days per month and minimum interval between holding shoots when the separation distance is less than 3km. (See note 2).

4.3 Shooting orientation.

Away from sensitive areas. (See note 3).

4.4 Barriers.

May need to be used if separation less than 3km. (See note 4).

4.5 Number of guns.

Limit to an agreed number. (See note 5)

4.6 Number of shots per day

Limit to an agreed number. (See note 6).

4.7 Types of cartridges.

Noisy makes to be banned. (See note 7).

4.8 Effects on animals.

Shoots limited during sensitive times. (See note 8).

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4.9 Public address system.
Use discouraged except in emergency. (See note 9).

4.10 Measurement.
In terms of L(A) Fast (max). Measuring position to be specified in relation to reflecting surfaces. (See note 10).

4.11 Criteria.

Noise sensitive locations	60 dB(A)	
Public Gardens	65 dB(A)	
Other Public & Open Spaces	70 dB(A)	(See note 11).

NOTES.

1) This is based on repeated experience of those who responded to the questionnaire.

2) Various limits have been applied. e.g. maximum of four hours per day between 09.30 and 18.00. Three hours on Sundays, but not at times of Church Services and not permitted on Good Friday, Easter Sunday, Remembrance Sunday, Christmas Day. Shooting permitted only once per fortnight.

3) This takes advantage of the directional characteristic of the noise.

4) Advice on barriers to be sought from Environmental Health Officer or other competent person.

5) Limits have been suggested as 12, 6 or 4 persons discharging their shotguns at any one time.

6) Limits have been suggested at 2,000 shots per day. A large shoot could reach several times this.

7) Eastern European cartridges are banned. Sub-sonic cartridges are recommended.

8) Animals during foaling or lambing time or birds at nesting time can be distressed by noise. Shoots should be suspended or reduced during these times.

9) Public address systems have been banned except for emergency use and limited in volume at other times. Advantage should be taken of optimum orientation of loudspeakers.

10) L(A) Fast (Max) is to be treated with reservations because the tolerances in sound level meter specifications could lead to differences. However, it is widely used and is the same as that in the draft code of practice for noise from audible bird scarers. It is recommende that SEL, measuring the energy of the event, should be given consideration.

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11) These are the criteria in the Surrey County Council guidelines. Note that 60 dB(A) is also the limit in the bird scarer code.

APPENDIX 1. SOME SURVEY STATISTICS.

1.0 The survey showed that 291 local authorities had shoots in their areas divided as:-

No complaints	67	23%
Complaints "sometimes"	183	63%
Complaints "frequently"	41	14%
Total	291	100%

Thus, 77% of authorities in which shoots occur have had complaints including 14% which have had "frequent" complaints.

2.0 Legal action under the Control of Pollution Act has been taken by 23 of the 41 authorities who have had "frequent" complaints and by 36 of the 183 authorities whose complaints occurred "sometimes". These represent 56% and 20% respectively.

3.0 Experience of planning applications was reported by five authorities with "frequent" problems and 24 authorities whose complaints occurred "sometimes". These are 12% and 13% respectively.

APPENDIX 2. AUTHORITIES WITHOUT PROBLEMS.

The reasons given for absence of problems were:-
- infrequency of the shoots
- acceptable in country areas
- well planned and co-operative shoots
- small number of shooters
- remoteness of the sites.

REFERENCES

Hoffman et al (1985) Prediction and evaluation of noise from rifle shooting ranges. Proc Internoise 85, 883-886

Smoorenburg (1981) Evaluation of impulse noise, in particular shooting noise, with regard to annoyance. Proc Internoise 81, 779-782

Sorensen and Magnusson (1979) Annoyance caused by noise from shooting ranges. Jnl Sd and Vib 62 437-444

N O I S E C O U N C I L

WORKING GROUP No 3

CLAY PIGEON SHOOTS.
Survey of Local Authorities.

Local Authority:

Contact:

Phone no:

Do clay pigeon shoots occur in your area? yes [] no []

Do you know of plans for extension? yes [] no []

Do you receive complaints of noise?
Never []
Sometimes []
Frequently []

Has your Authority taken Statutory Action for noise nuisance in respect of clay pigeon shooting. If yes, please send details. yes [] no []

Have you developed codes or assessment methods? If yes, please send details. yes [] no []

Have Court Cases or Public Inquiries occurred in your area? If yes, please send details. yes [] no []

Please give your brief personal assessment of the problem.

Thank you for your help. Please return this form to:

Dr H G Leventhall, Commins-BBM Partnership, South Bank Technopark, 90, London Road. London SE1 6LN before 31st August 1988

FIG 1 SURVEY FORM