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RURAL VILLAGES - A NOISE SURVEY

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Introduction

This paper describes a noise survey undertaken in 10 villages in Hampshire and Wiltshire which was carried out in conjunction with a social survey of subjective reactions to the acoustic environments experienced there. The social survey inquired into many aspects of the sounds of rural life and included specific questions on road traffic noise identical to those used in a national study (Ref.1). The philosophy of the social survey was to look not only at the adverse reactions but also at the positive reactions to sound, unlike most social surveys which look only at dissatisfaction. This philosophy has defined some of the goals of the noise survey.

In low noise environments, unusual noise sources become significant; wind, wild animals, neighbours conversation, etc., become clearly audible. The noise survey included a comprehensive catalogue of sources for later reference when interpreting the data.

A more simplistic goal of the noise survey was merely to categorise the environments considered. A world project (Ref.2) is already in existence to this end. It is hoped that the project at I.S.V.R. will in some way add to this knowledge. Currently, much data is available on noisy environments and events but quiet environments, on which little information is available, are often the most vulnerable to new industrial, housing and transport developments.

Definition of sites

Noise measurements were made outside the dwelling units of the social survey respondents. The social survey was carried out in villages which were:

i) within about 50 minutes by car of Southampton,

ii) of a size larger than 100 dwelling units (D.u's) but small enough not to be acoustically urban,

iii) reasonably clustered, i.e. collections of very scattered households were undesirable,

iv) subject to some traffic noise.

The ten villages selected were then visited by a member of the team who classified areas of each village roughly into homogeneous noise groups after monitoring with a sound level meter. Each homogeneous noise group was then split into observational groups that comprised no more than ten d.u's; the data required from these groups (constructional and topographic details) was thought to vary too much for consideration of groups larger than ten d.u's.

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Measurement Methodology

A first stage of measurements was carried out at 29 sites following a specific format. Six time periods were defined throughout the day,

7.30 - 9.30
9.30 - 12.00
12.00 - 14.00
14.00 - 16.30
16.30 - 18.30
18.30 - 22.00

It can be seen that these periods relate roughly to

morning peak commuting time
morning
lunchtime
afternoon
early evening peak commuting time
evening.

It was decided to measure once during each of these periods and the following format was used for these samples

10 min.sample/10 min.sample/10 min.break/10.min.sample

This sampling procedure was developed for three reasons:

i) The comparison of a 10 min.sample with a 20 mins. sample, (by taking logarithmic averages of L_{eq} and arithmetic averages of L_N for the first two samples).

ii) The comparison of sequential and separated samples, to observe any 'carry over' effect of a noise event from one sample to another.

iii) To give a further check on variability within the day period monitored, i.e. measurements over a 40 minute period represent a more significant proportion of 2-2½ hours than a 10 minute sample.

A second stage of measurements is now in progress at the same sites using more comprehensive sampling; 24 hour surveys are being carried out with 10 minutes sampling in every 20 minutes.

Observed Effects

The variation between sites of L_{10}, L_{90} and L_{eq} is quite marked and Figure 1 shows the range of variation throughout these time periods at 5 sites in the study where L_{10}, L_{90} and L_{eq} were all found to have a statistically significant 'time of day' effect. It can be seen that L_{10} parallels L_{eq} very much in level and range, although on occasions L_{eq} values were found that were higher than the corresponding L_5. This would be very unusual in an urban environment.

Figures 2 and 3 show the noise level variation at two sites where 'time of day' effect is significant. Site 1 is a very quiet village and site 2 is a village with a major road running through it. It can be seen that L_{90} varies greatly whilst L_{eq} and L_{10} varying over much smaller ranges. In these quiet environments a single noisy event is often enough to determine L_{eq}, L_1, L_5 and L_{10}. The dynamic range experienced is huge considering that there are no extraordinary noise sources, for example L_1 on occasions, has been found to be

40 dB(A) higher than L_{90}. Figure 4 illustrates the noise level occurrence distributions for the six time periods at one very quiet and one very noisy measurement site.

Conclusion

This study seems to be highlighting some of the problems associated with characterising noise environments. The environmental acoustician must be certain that the noise descriptor is describing what it is supposed to describe, be it the overall environment or the noisy event. The danger is that noise units may actually become all things to all men, in which case they could end by being meaningless.

References

1. D.G. Harland and P.G. Abbot. 1977. TRRL Laboratory Report 770. Noise and Road Traffic outside homes in England.

2. B. Truax. 1978. Document 5 in Music of the Environemnt Series. The World Soundscape Project's Handbook for Acoustic Ecology.

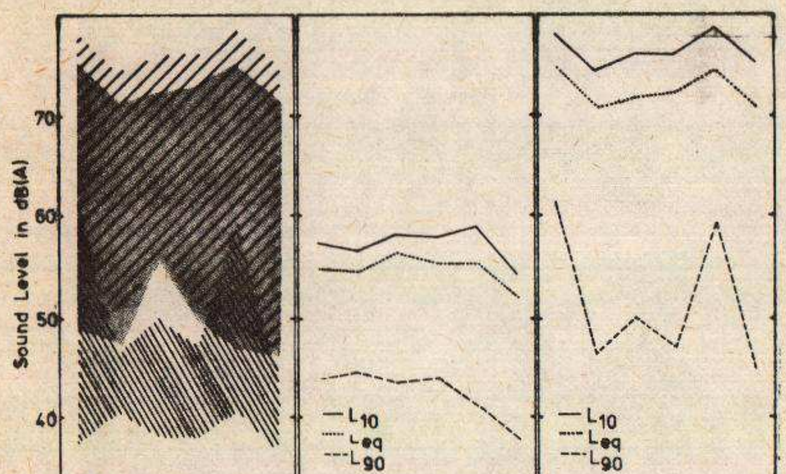

FIG.1 RANGE OF VALUES FIG.2 VARIATION AT QUIET SITE FIG.3 VARIATION AT BUSY SITE

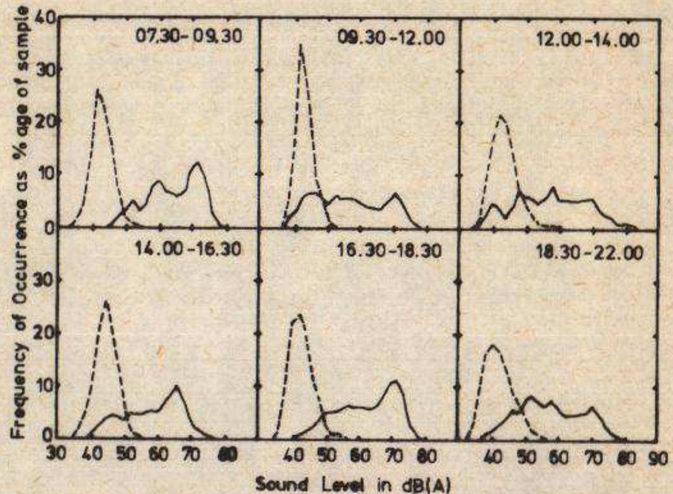

FIG. 4 DISTRIBUTIONS OF OCCURRENCE OF SOUND LEVELS THROUGHOUT THE DAY AT A QUIET (-----) AND AT A BUSY SITE (——)