THE UK NATIONAL NOISE ATTITUDE SURVEY 1999-2001: KEY FINDINGS & DOSE-RESPONSE ANALYSIS.

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1. INTRODUCTION

In 1999/2000 BRE carried out a national noise attitude survey on behalf of the Department for Environment, Food and Rural Affairs and the Devolved Administrations. The survey involved interviews using two different questionnaires, the first of which was the same as that used in a similar survey undertaken by BRE in 1990, and allowed trends in attitudes to environmental noise in England and Wales to be investigated. The second questionnaire was used over the whole of the United Kingdom, and was newly designed to get the best possible estimates of UK attitudes towards environmental noise. The findings from this second questionnaire covering the whole UK are presented in this paper.

In addition, a parallel measurement survey was undertaken by BRE (the National Noise Incidence Study 2000/2001). Residents of all dwellings where measurements were taken in this study were asked to complete a short self-completion questionnaire regarding their attitudes to environmental noise. Dose-response analyses carried out on this data-set are also included in this paper.

2. UNITED KINGDOM ATTITUDES TO ENVIRONMENTAL NOISE

The new questionnaire (NAS99) that was designed for the UK wide survey, had a modular structure that is intended to allow the six supplementary questionnaires dealing with various categories of environmental noise to be used independently of each other in the future. This would allow, for example, better monitoring of trends in attitudes to neighbour noise than can currently be obtained from LA complaint statistics. Numerous specific sources of environmental noise were embraced in the design of NAS99 through the extensive use of showcards. Supplementary sections on road traffic noise and neighbour noise were made mandatory for all respondents. A total of 2,876 interviews were achieved, with an overall response rate of 63%. Some key findings from this survey are listed below:

- 18% of respondents reported noise as one of the top five from a list of environmental problems that personally affected them. Overall, noise was ranked ninth in this list of 12 environmental problems.
- 69% of respondents reported general satisfaction with their noise environment (i.e. liking the amount (or absence) of noise around them at their home to some extent).
- 21% of respondents reported that noise spoilt their home life to some extent, with 8% reporting that their home life was spoilt either *'quite a lot'* or *'totally'*.
- 84% of respondents heard road traffic noise at home; 40% were bothered, annoyed of disturbed to some extent; 28% said it had got worse, and 10% that it had got better over the past five years.
- 81% of respondents heard noise from neighbours and/or other people nearby; 36% were bothered, annoyed or disturbed to some extent; 14% said it had got worse and 15% that it had got better over the past five years.
- 71% of respondents heard noise from aircraft; 20% were bothered, annoyed or disturbed to some extent.
- 49% of respondents heard noise from building, construction, demolition, renovation or road works; 15% were bothered, annoyed or disturbed to some extent.
- The most commonly selected word (from a list of 21) used to describe the effects of noise was *'irritated'*; 30% of respondents selected this for road traffic noise, and 25% for noise from neighbours and/or other people nearby.
- The evening (19:00-23:00) and night time (23:00-07:00) periods are the times when the greatest proportion of respondents reported being particularly bothered, annoyed or disturbed by most types of noise from neighbours and/or other people nearby.
- Only a small proportion of respondents who were bothered by the various specific sources of noise from neighbours complained to the environmental health department of the local authority. The most common action taken was to complain directly to the person responsible. In general, only a small proportion (usually less than 10%, although this depends on source) of respondents who were bothered contacted any department of the local authority. For all sources of noise from neighbours a greater proportion of respondents complained to the police than to the environmental health department.

For more detail of these findings, the full reports on this study can be found on the DEFRA website[1].

3. SELF COMPLETION QUESTIONNAIRES

Residents of dwellings where noise measurements were taken during the national noise incidence study were asked to complete a short questionnaire asking about

[1] http://www.defra.gov.uk/environment/noise/nas9900/

their attitudes towards environmental noise. A total of 920 questionnaires were received, representing a response rate of 79%.

Respondents' perceptions of changes in road traffic noise over the last five years showed a similar pattern to that obtained from the NAS99 questionnaire. 23% of respondents reported that road traffic noise had got worse, whilst 15% reported that it had got better over the last 5 years. This is in contrast to the findings that the measured noise levels have shown little change between 1990 and 2000, with L_{A10} and L_{Aeq} indicators showing small decreases during the day time. Table 1 shows the responses given when respondents were asked whether they thought that the road traffic noise they heard at home had got better or worse in the last five years.

Response	Proportion selecting (%)
1 – Definitely better	5
2	10
3	25
4	12
5 – Definitely worse	21
Have not lived here for 5 years	19

Table 1. Opinions on change in road traffic noise over 5 years

Levels measured according to L_{A10} indicators in the evening period (19:00-23:00) appeared to correlate better with most forms of reported annoyance from road traffic noise, than did other noise level indicators. In general, it was seen that noise exposure during the evening period was the best indicator of annoyance during all periods of the day.

Table 2 presents rank correlation coefficients between reported annoyance during the day, evening and night, and the L_{Aeq} levels measured for these periods. This indicates that, despite low correlation coefficients, for each period of the day the correlation is strongest with the evening noise level. Table 3 presents correlation coefficients between the extent to which respondents reported feeling bothered, annoyed or disturbed by road traffic noise and L_{Aeq}, L_{A10} and L_{A90} during the day, evening and night-time periods. This table shows the strongest correlation to be with the L_{A10} indicators, and in particular, the evening $L_{A10,4hr}$ indicator.

Bothered, annoyed or disturbed in period	Daytime $L_{Aeq,12hr}$	Evening $L_{Aeq,4hr}$	Night $L_{Aeq,8hr}$
Daytime (07:00-19:00)	0.230	0.235	0.171
Evening (19:00-23:00)	0.242	0.332	0.240
Night (23:00-07:00)	0.241	0.302	0.232

Table 2 Correlation coefficients between annoyance during the day, evening and night and L_{Aeq} noise levels at different times of day

Index	Correlation coefficient
$L_{A10,4hr}$	0.444
$L_{A10,12hr}$	0.429
$L_{Aeq,4hr}$	0.406
$L_{Aeq,12hr}$	0.366
$L_{Aeq,8hr}$	0.334
$L_{A90,12hr}$	0.328
$L_{A10,8hr}$	0.304
$L_{A90,4hr}$	0.273
$L_{A90,8hr}$	0.161

Table 3 Correlation between noise indicators and extent bothered, annoyed or disturbed by road traffic noise in general

For more detail on the findings from these self-completion questionnaires, the full reports on the national noise incidence study can be found on the DEFRA website[2].

4. DOSE-RESPONSE ANALYSIS

The self-completion questionnaires discussed in Section 3 of this paper have also provided the opportunity for a UK dose-response analysis to be undertaken. In general, correlation between noise level indicators and the extent to which respondents reported being bothered, annoyed or disturbed by road traffic noise was significant although weak. A stronger correlation was seen between noise level and the proportion of highly annoyed respondents, as obtained from the following question:

When you are at home, to what extent are you personally bothered, annoyed or disturbed by noise from each of the following?

iii) Road traffic of any kind from any kind of road vehicle (cars, motorbikes, lorries, etc.) on any kind of road.

Not at all – A little – Moderately – Very - Extremely

The results of this analysis using the L_{den} indicator are shown in Figure 1, where the top 28% of the 5-point response scale has been used to define "highly annoyed". The L_{den} indicator has been calculated according to the definition in the recent EU Directive[i] but has been derived from measurements made at 1.2 m height, 1 m from the façade, including façade reflections. Further work has indicated that for *average* results over the whole country there will be little difference between levels measured at this position and those measured at 4 m height, 2 m from the façade, excluding façade reflections. In addition it should be noted that our measurements cannot account for the annual averaging inherent in the L_{den} indicator.

[2] http://www.defra.gov.uk/environment/noise/nis0001/

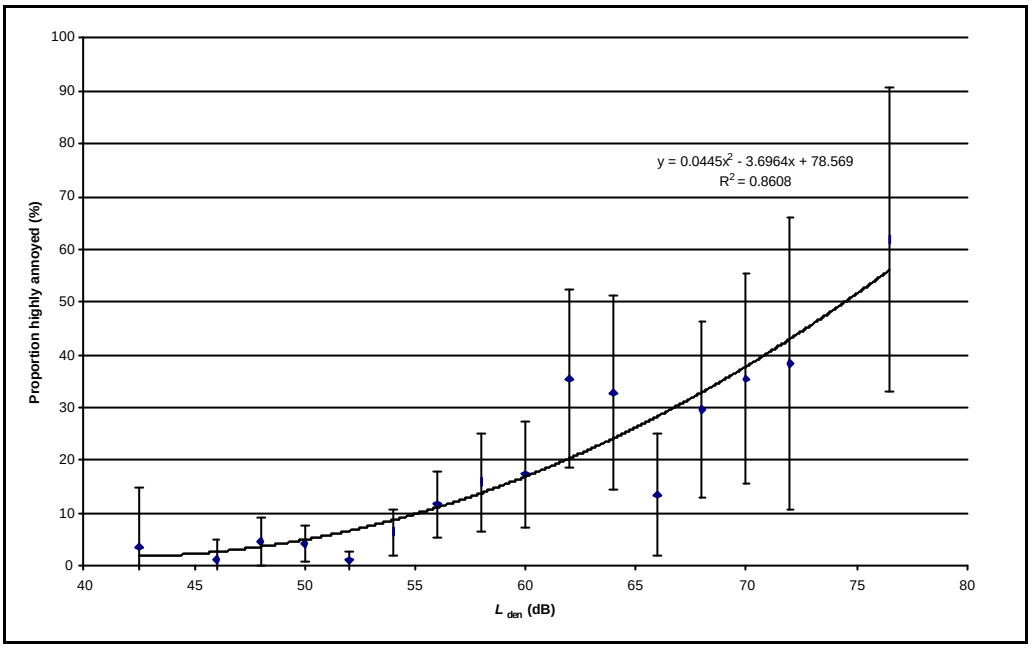

Figure 1. Proportion of respondents highly annoyed by road traffic noise as a function of measured day-evening-night noise level, L_{den}

The relationship produced from this study was compared with that synthesised from many such studies by TNO for road traffic noise[ii]. These relationships, together with a cubic fit to the data from this questionnaire[3] are shown in Figure 2.

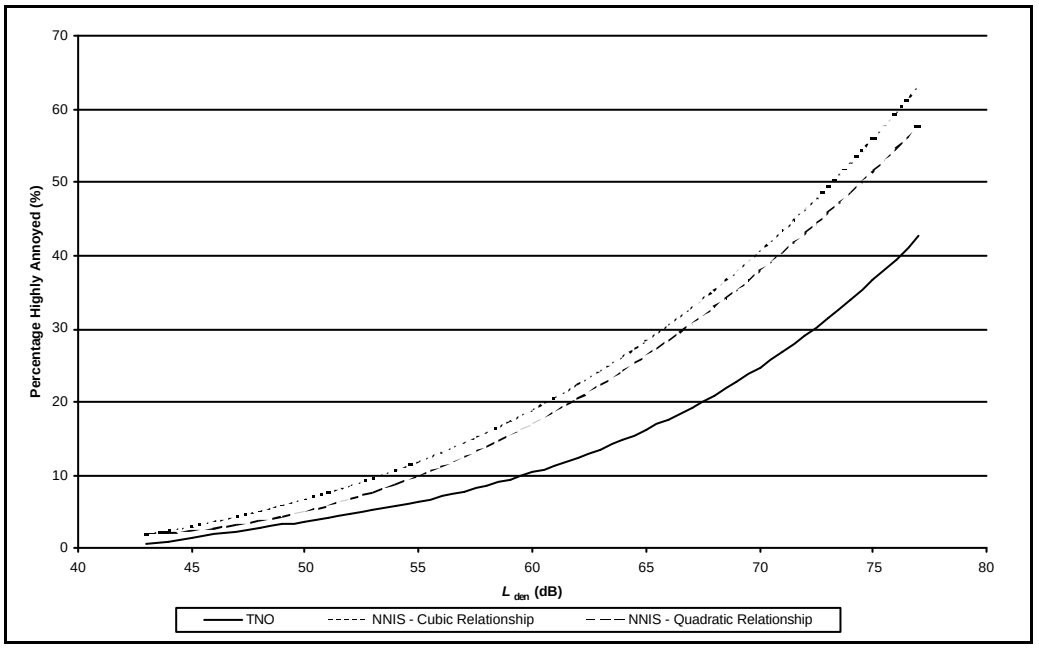

Figure 2. Relationship between L_{den} and proportion highly annoyed by road traffic noise, as compared to equivalent relationship from TNO dataset.

[3] The relationship produced by TNO is also represented by a cubic equation.

An additional, and less traditional, dose-response analysis has been undertaken, using L_{den} and response data from the following question:

In general, how do you feel about the amount of noise (or absence of noise) around here?

Definitely Like 1 – 2 – 3 – 4 – 5 – 6 – 7 Definitely don't like

The results of this analysis are shown in Figure 3, where the top and bottom 28% of the 7-point response scale have been used to define "definitely like" and "definitely dislike". Again, good correlation is seen, although it should also be noted that there are significant uncertainties (similar in magnitude to those shown in Figure 1) associated with the individual data points in this graph.

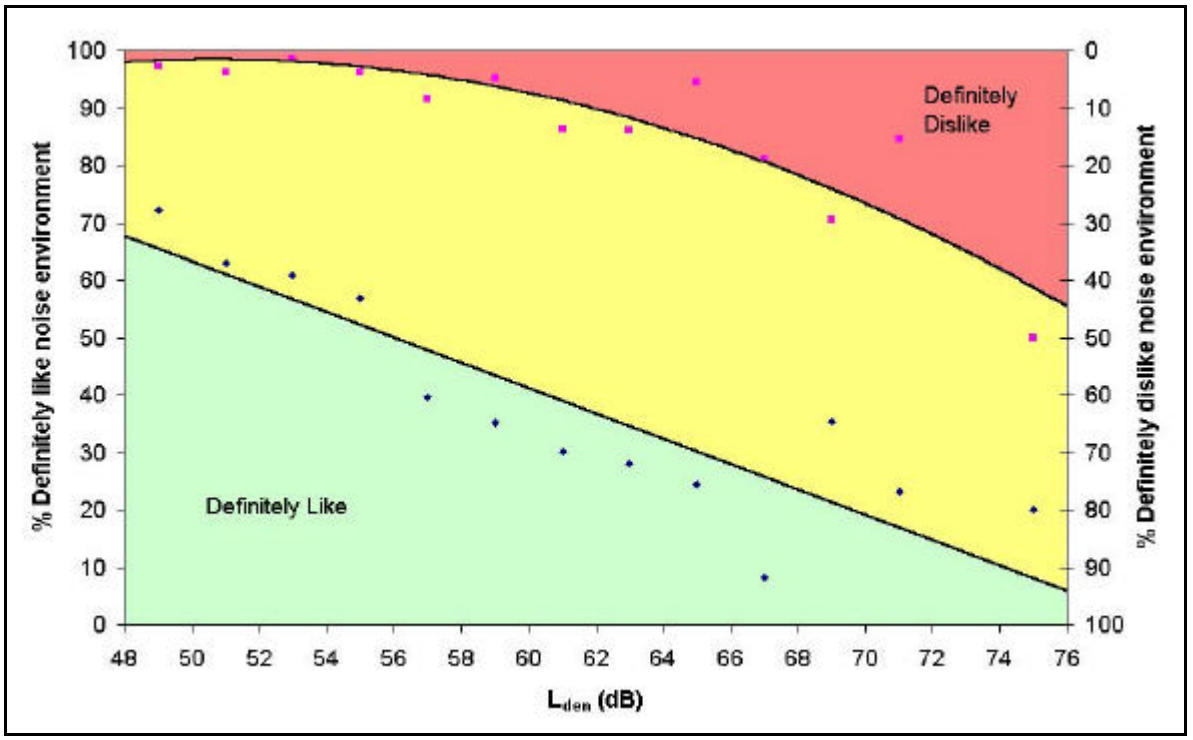

Figure 3. Relationship between L_{den} and proportion that definitely like/dislike the noise environment around their home.

5. REFERENCES

1. Directive 2002/49/EC of the European Parliament and of the council of 25 June 2002 relating to the assessment and management of environmental noise.
2. Miedema HME, Oudshoorn CGM, Elements for a position paper on relationships between transportation noise and annoyance, TNO report PG/VGZ/00.052, July 2000