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A SOCIAL SURVEY INTO ANNOYANCE CAUSED BY THE INTERACTION OF AIRCRAFT NOISE AND TRAFFIC NOISE

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Acousticians of the last decade responded so energetically to the planner's request for noise criteria that the noise criteria scene is now (excluding one notable exception) complex and unco-ordinated at best and wrong at worst. Each type of noise has given rise to units for its measurement and then some function of these units which relates to community response. Many studies have been well done but the majority of dwellings are subject to noise of more than one type. Indeed to find a site for subjective or physical measurements which is only subjected to one type of noise is difficult.

The notable exception mentioned above is Robinson's (1.2) Noise Pollution Level L_{NP} which proposes a single unit to rate effectively any type of noise or mix of noises. This unit has been developed by re-analysing social survey data from aircraft noise surveys and traffic noise surveys.

The purpose of the present survey is to obtain data from sites subjected to aircraft noise and traffic noise in an attempt to validate a noise pollution unit. Alternatively the study can be considered as an investigation into the effects of background noise on subjective response to aircraft noise. This data is badly needed since utilisation of McKennel's (3) Heathrow data for provincial airports with predominantly less background noise may be invalid.

Survey sites were chosen to the East of Heathrow Airport to combine three levels of aircraft noise with three levels of road traffic volume (hopefully noise). The aircraft noise was predominantly landing noise and the levels were 60NNI, 45NNI and 25NNI. The three levels of traffic flow were over 32,000 vehicles per day, 20,000 vehicles per day and access traffic only.

The questionnaire consisted of:

(i) Introductory questions enquiring about likes and dislikes of the area.

(ii) Questions relating to specific disturbances by aircraft, including fear of aircraft (essentially McKennel's Guttman Scale).

(iii) Questions relating to specific disturbances by traffic including fear of traffic.

(iv) An "Any other noise question"

(v) The interview terminated with a seven point semantic differential scale labelled definately satisfactory - definately unsatisfactory. Respondants were asked to consider all the noises they heard when answering this question.

(vi) In addition there were the usual classification questions of age, sex, etc.

Houses were selected randomly within a site and the sex of the person to be interviewed was also determined randomly. If the required person did not live in the house all residents over twenty-one were listed in order of age and were selected by a sampling plan. This sampling frame cuts out obvious biases. Three call backs were made where necessary and thirty-five people were interviewed at each site. All respondants were middle class and lived in semi-detached houses of traditional construction.

The results showed a complex but consistent picture. For a given aircraft condition people in general became less bothered by aircraft as road traffic increased, i.e. people living in areas with quiet background noise were more bothered by aircraft. However, the seven point scale which is a measure of total noise dissatisfaction gave results compatible with a noise pollution principle.

1) At 25NNI road traffic noise was predominant and the greater the road traffic the greater the median general dissatisfaction.

2) At 45NNI median general dissatisfaction was equal for all road traffic conditions - any variation in energy mean of the noise is compensated for by an equal and opposite change in weighted standard deviation component.

Estimated L_{NP}'s from traffic flow and available NNI contours gives a correlation of .96 with median dissatisfaction scores. It therefore seems that L_{NP} is a good predictor of median general dissatisfaction for existing communities and existing noises. The situation however may be very different if either new noises and/or new populations are to be considered.

References

1) Robinson, D.W. 'The Concept of Noise Pollution Level' N.P.L. Aero Rep. Ac38, 1969 (National Physical Laboratory) Ministry of Technology.

2) Robinson, D.W. 'An Outline Guide to Criteria for the Limitation of Urban Noise' N.P.L. Aero Rep. Ac39, 1969 (National Physical Laboratory) Ministry of Technology.

3) McKennell, A.C. 'Aircraft Noise Annoyance Around London (Heathrow) Airport', Central Office of Information, SS 337, April 1963.