PREDICTIVE MODELLING OF ANNOYANCE TO NOISE FROM MULTIPLE SOURCES

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ABSTRACT

Much of the population is exposed to multiple noise sources where combinations of different environmental sounds are present ; as such it is considered important to develop models that can be used to predict the community annoyance which may result.

The aim of the study was to investigate the validity of the procedures that had previously been developed to predict such annoyance. Models included the dominant source model, the subjectively corrected model and a recent variation of the subjectively corrected model proposed in EC studies.

Using a simulated indoor home listening facility and a panel of subjects, a pilot study established source specific dose-response relationships for traffic, military aircraft and gunfire noises over a range of sound levels. The result suggested that having the third source of low-flying military aircraft would not facilitate the investigation of the models at this stage, and so the main study was restricted to traffic and gunfire noise.

The main study was carried out where the two noises were heard both in isolation (traffic and gunfire noise at L_{Aeq} levels varying between 30 and 60 dB), and in combination (traffic noise was held at either an L_{Aeq} of 50 dB or 57.5 dB and the gunfire was played at L_{Aeq} levels varying between 30 and 60 dB). Subjects were again asked to give their reported annoyance reactions.

The data were analysed and compared with values predicted by the models. It was found that for noises in isolation the results were consistent with previous EC studies where it was shown that impulsive components can lead to additional annoyance requiring a level dependant penalty. This penalty varied from about 10dB at an equivalent outdoor level of 50 dB falling to 0dB at 80 dB. For noises heard in combination it was concluded that the dominant model appears to be adequate for the prediction of annoyance, except in situations where the noises were deemed to be equally annoying. In these cases an additional "penalty" of about 3 dB would be required.