Measuring low-frequency noise indoors

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A study of twenty-one cases of low-frequency noise complaints.

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From 203 cases of low-frequency complaints a random selection of twenty-one previously unsolved cases were investigated. The main aim of the investigation was to answer the question whether the annoyance is caused by an external physical sound or by a physically non-existing sound.

ii. low-frequency tinnitus. Noise recordings were made in the homes of the complainants, and the complainants were exposed to these in blind test listening experiments. Furthermore, the low-frequency hearing function of the complainants was investigated, and characteristics of the annoying sound was matched. The results showed that some of the complainants are annoyed by a physical sound (20-180 Hz), while others suffer from low-frequency tinnitus (perceived frequency 40-100 Hz). Physical sound at frequencies below 20 Hz (infrasound) is not responsible for the annoyance or at all audible in any of the investigated cases, and none of the complainants has extraordinary hearing sensitivity at low frequencies. For comparable cases of low-frequency noise complaints in general, it is anticipated that physical sound is responsible in a substantial part of the cases, while low-frequency tinnitus is responsible in another substantial part of the cases.

Contributed Papers

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At low frequencies, the sound pressure level may vary 20-30 dB in a room due to standing waves. For assessment of annoyance, mainly areas with the highest occurring levels are relevant, since persons present in such areas are not helped by the existence of lower levels in other areas. The level that is exceeded in 10% of the volume of a room \( L_{10} \) is proposed as a rational and objective target for a measurement method. In Sweden and Denmark rules exist for measuring low-frequency noise indoors. The performance of these procedures was investigated in three rooms. The results from the Swedish method were close to the \( L_{10} \) target, but, due to a doubtful use of C-weighting in the scanning, it may give too low results in case of complex sounds. The Danish method was found to have a high risk of giving results substantially below the target, unless complainants can precisely appoint measurement positions, where the sound is loudest/most annoying which they often cannot. An alternative method using measurements in four-three dimensional corners of the room is proposed. This easy and straightforward method seems to give reliable results close to the proposed target.

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2aNSe9. Research into the improvement of the management of helicopter noise in the UK. David C. Waddington (Acoustics Research Centre, School of Computing, Science & Engineering, University of Salford, M5 4WT Salford, UK, d.c.waddington@salford.ac.uk), Paul Kendrick (Acoustics Research Centre, School of Computing, Science & Engineering, University of Salford, M5 4WT Salford, UK, p.kendrick@salford.ac.uk), Geoff Kerry (Acoustics Research Centre, School of Computing, Science & Engineering, University of Salford, M5 4WT Salford, UK, g.kerry@salford.ac.uk), Matthew Muirhead (Qnetiq Ltd, Cody Technology Park, Ively Road, GU14 6LX Farnborough, UK, m.muirhead@qnetiq.com), Ray Browne (Qnetiq Ltd, Cody Technology Park, Ively Road, GU14 6LX Farnborough, UK, r.browne@qnetiq.com)

Helicopter noise has a negative impact on the quality of life for many people. Exposed populations are not just those living close to heliports, but include those exposed to noise from helicopters used by emergency services, the military, and commercial companies. One problem identified in the UK is that it is often difficult to complain about helicopter noise, since it is un