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

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A study of twenty-one cases of low-frequency noise complaints. Christian Sejer Pedersen (Acoustics, Aalborg University, Fredrik Bajers Vej 7 B, 9220 Aalborg Ø, Denmark, csp@acoustics.aau.dk), Henrik Møller (Acoustics, Aalborg University, Fredrik Bajers Vej 7 B, 9220 Aalborg Ø, Denmark, hm@acoustics.aau.dk), Kerstin Persson Wave (Dept. of Environ. Medicine, The Sahlgrenska Acad. of Gothenburg Univ., Box 414, 405 30 Gothenburg, Sweden, kerstin.persson-wave@amm.gu.se)

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, i.e. 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 - 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

2:40

2aNSe6. Phase spectral processing for improved time-domain soft microphone based noise estimation. Ioannis Paraskevas (T.E.I. Piraeus / Department of Electronics, 250, Thivon str., GR-1224 Athens-Aigaleo, Greece, paraskevas@env.aegean.gr), Maria Rangoussi (T.E.I. Piraeus / Department of Electronics, 250, Thivon str., GR-1224 Athens-Aigaleo, Greece, maria@teipir.gr), Stylianos M. Potirakis (T.E.I. Piraeus / Department of Electronics, 250, Thivon str., GR-1224 Athens-Aigaleo, Greece, spot@teipir.gr), Stylianos Savvidis (T.E.I. Piraeus / Department of Electronics, 250, Thivon str., GR-1224 Athens-Aigaleo, Greece, ssavvaid@teipir.gr)

'Soft Microphones' (SM) constitute a cost-effective, yet quality alternative to the multiple microphones measurement, in applications related to noise mapping. SM offer a solution of great interest to real field applications, e.g., industrial plants. The SM approach, proposed in previous work of the authors, is based on the estimation of the noise signal and the calculation of noise levels over a set of points within the space of interest. To this end, a novel, frequency domain method was introduced and verified in a real field, textile plant experiment, with satisfactory results. However, in order to expand the use of SM from accurate noise mapping to a full Active Noise Control application, it is necessary to obtain accurate noise signal estimates in the time rather than the frequency domain. Further research into the deconvolution step of the proposed method reveals that discontinuities, appearing across the phase spectrum of the estimated signals, cause ambiguities that affect the deconvolution process. We propose here the use of the Hartley transform phase spectrum, which conveys fewer discontinuities as compared to its Fourier Transform counterpart, while it allows for a discontinuities compensation scheme. Experimental results verify that phase spectrum preprocessing provides accurate time domain signal estimates.

3:00

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, Codi Technology Park, Ively Road, GU14 0LX Farnborough, UK, mmuirhead@qnetiq.com), Ray Browne (QnetIQ Ltd, Codi Technology Park, Ively Road, GU14 0LX Farnborough, UK, rbrowne@qnetiq.com)

Helicopter noise has a negative impact on the quality of life for many people. Effected 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-