

Alternatives to A-weighting - Psychoacoustic background. Hugo Fastl (AG Technische Akustik, MMK, TU Muenchen, Arcisstr. 21, DE 80333 Muenchen, Germany, fastl@mmk.ei.tum.de)

As early as 1926 the late Professor Barkhausen from Dresden proposed a procedure for measuring noise, based on features of the human hearing system, which was patented in 1927. He used the psychoacoustic method of loudness comparisons which eventually led to the phon scale. His groundbreaking proposal to use for noise measurement human sound perception still deserves the highest praise. Since more than 50 years, A-weighting follows this concept by mimicking a psychoacoustic feature, i.e. equal loudness contours. Despite the conceptual advantage of A-weighting, with the years also severe drawbacks showed up. In comparison to human loudness perception, low frequency components and in particular broadband sounds are underestimated. To achieve the same loudness of sounds with different bandwidth, level differences even larger than 15 dB(A) can be necessary. Also concepts based on physical magnitudes like equal energy can deviate substantially from human sound perception. For example, the equal energy concept can lead to rather unrealistic predictions of noise immissions: If a new aircraft produces 20 dB(A) lower level, according to the equal energy prediction, one single loud old aircraft could be replaced by as many as 100 new softer aircraft! In the presentation, examples are given, how to overcome many of the drawbacks and unrealistic predictions of A-weighting by using advanced psychoacoustically based metrics.

Suggested Special Session: **"Invited"** Alternatives to A-Weighting

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