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**SS: Low Frequency Human Perception and Measurement (Wade Bray, Joe Gavin)**

**Title:**

**Perception of loudness and roughness of low frequency sounds**

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**Abstract:**

Growing traffic volume or the augmented use of wind turbines as another example elicit an increasingly high noise exposure especially at low frequencies. Consequently, there are more and more complaints about annoyance. Among other parameters, the loudness of a sound has a strong influence on annoyance. In general, loudness shows much better correlation to intensity phenomena than A-weighted sound pressure level. Especially in the low frequency range ( $f < 100$  Hz) the calculated loudness values show large differences depending on the standards used (ANSI S3.4-2007, DIN 45631/A1 and ISO 532) and their underlying models. Different results in the investigation of various signals (synthetically generated test signals as well as technical sounds) limit the comparability of the loudness calculations.

Furthermore, it is confirmed by listening tests using pure tones that the audible impression deviates below a certain cut-off frequency from a purely tonal sensation. The tones are perceived as modulated or rough. One possible explanation could be the relatively short length of the impulse response of human hearing, i.e., the relatively high time resolution in the low frequency range.

This paper deals with the loudness and roughness perception of low frequency sound events and presents first results of new experimental data.

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