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Title:

Sound character, sound quality, sound design and soundscape – Important acoustical aspects of today and in the future

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Abstract:

Acoustics does not only mean the presence of sound waves. A sound event can certainly lead to different auditory events. The context, the attitude of the exposed person to the source of the noise, as well as the experience and expectations of the noise exposure, influence the perception and assessment of sounds. Acoustics are determined by spectral composition and temporal patterns. For this reason, the discipline of psychoacoustics has established itself, which can provide more differentiated, meanwhile globally standardized analyses to describe sound character. Parameters such as loudness, sharpness, tonality, roughness, and fluctuation help to classify the sound character of a sound event, but determining the sound quality requires additional information about the meaning and functionality of the sound source with consideration of the context. Only through suitable listening tests can the relationship between sound character and sound quality be recognized, to recommend targeted measures and modifications through sound design to optimize the acoustic effect of a sound event. The international standard ISO 12913 "Soundscape" describes this relationship of perceived sound quality considering the context, while also considering that there are usually several spatially distributed sound sources that determine the entire sound event. The aurally correct recording of a complex sound event for the purpose of psychoacoustic analysis and auditory assessment is therefore normatively based on the use of binaural measurement technology. Psychoacoustics, sound quality and cognition provide information on how humans perceive and interpret their surrounding world. With psychoacoustics alone it is only possible to describe sound character. Whereas the perceived sound quality depends on the context of how people experience the sound situation. While the overall noise measured at a specific location can be analyzed in terms of several acoustic parameters, the annoyance or pleasantness level of a complex soundscape composed of several sound sources cannot be determined solely from the values obtained through such analyses. Even if the acoustic contribution of a single sound source to the overall noise does not appear significant in a physical sense, the influence of this

sound source on the soundscape can be relevant perceptually. The definition was part of ISO 12913-1 (2014): Soundscape is the acoustic environment as perceived or experienced and/or understood by a person or people, in context. Two major components like pleasantness and eventfulness describe soundscape. This concept allows to consider sound quality aspects beyond noise annoyance, a good soundscape quality is not simply identical to the absence of annoyance. Judgments cannot be fully understood by only considering acoustic quantities, since contextual parameters and interactivity are relevant for assessment of a soundscape as well. The description of complex sound quality, how it is created, how it is assessed, how it becomes predictable through simulation, will be explained in this article using examples.