Electronic hearing protectors for improving speech understanding and warning signal detection

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ABSTRACT

Maintaining speech understanding and warning signal detection in a noisy environment becomes progressively more difficult as the intensity of noise increases. There are two fundamentally different situations for communication, and for environmental noise: 1) face-to-face versus radio communication, and 2) circumstances in which the combined environmental and communication sounds at the ear are expected, or are not expected, to exceed occupational noise exposure guidelines. Each situation involves different performance requirements, and it is unlikely all can be fulfilled by a single electronic hearing protector (HPD) at the present time. So-called level dependent HPDs, in which environmental sounds are fed selectively by frequency to the ear thereby by-passing the passive attenuation of the HPD, are gaining acceptance for situations in which occupational noise exposure guidelines will not be exceeded. However, simply limiting the maximum sound level at the ear in intense noise to avoid exceeding exposure guidelines reduces both desired and undesired sounds, and so may compromise performance. Improvements in performance would appear to require strategies to distinguish desired from undesired sounds before improving the signal-to-noise ratio in selected frequency ranges. The issues will be discussed with reference to commercial and novel devices.