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REPORT OF THE FIFTH TECHNICAL MEETING

OF THE C.A.A. TORONTO CHAPTER

SEPTEMBER 21, 1981 - 7:00 P.M.

AUDITORIUM OF ONTARIO HYDRO, 700 UNIVERSITY AVENUE, TORONTO

CHAIRPERSON: CHRIS A. KRAJEWSKI

TOPIC: IMPULSE NOISE

FIRST SPEAKER: ALBERTO BEHAR

As an introduction, the speaker gave a short historical overview of impulsive sound perception and the effect of this type of noise on hearing (references were made to the use of gunpowder and to the industrial revolution in Europe). A comparison between steady and impulsive noise and a summary of the existing and proposed descriptors followed the introduction. The complex nature of the impulsive sound signal was emphasized; peak value, time duration, rate at which impulses occur and spectral characteristics. In his presentation, the speaker also talked about the assessment of impulsive noise and the potential for hearing damage resulting from exposure to impulsive noise.

A review of Ontario Ministry of Labour evaluation criteria and difficulties in characterization of various types of impulsive noise concluded his talk. Excellent slides supported his oral explanation.

SECOND SPEAKER: ANDY MCKEE

This speaker also started with a historical overview of impulse noise measurements. He described how the advent of acoustical instrumentation designed in the early 30's brought about sound level meters capable of measuring sound with 125 ms time constant. However, difficulties in following rapid needle fluctuations by the observer resulted in standardization of "slow response" with 1 second integration time. Later on, developments in psychoacoustic research led to a discovery that 35 ms time constant represents a limit on the time period of human brain reaction to short duration sounds. This integration time was generally accepted as a standard for impulsive noise measurements.

In the following part of his presentation, the speaker showed the acoustical model of the human ear and explained the possible reason for commonly experienced hearing loss in the 3-4 kHz frequency region.

The perception of impulsive noise by the human ear and analogies in the acoustic instrumentation were discussed, followed by a short summary of new methods for analysis of transient and impulsive noise using the Fast Fourier Transform technique.

A lively discussion ensued with questions referring to both preceding presentations.

THIRD SPEAKER: STAN FORSHAW

In this presentation, the speaker focused on the effect of impulsive noise on armed forces personnel and various aspects of hearing protection. Using excellent slides, he showed an audiometric comparison of hearing loss suffered by 3 major groups of military units, over an extended period of time. It was pointed out that some army personnel operating recoilless-rifles or anti-tank weapons are frequently exposed to peak SPL values over 180 dB, and that special types of hearing protectors are required for such applications.

The effectiveness of various types of hearing protectors and new developments in the field of ear plug technology were discussed. A type of ear plug was shown with a minute opening at the centre. This plug offers little attenuation at the low range of sound levels, allowing for verbal communication, but high attenuation is achieved when the laminar flow through the opening changes into a turbulent flow at high sound levels. Another example of innovative design shown during the presentation was a set of specialized ear muffs (head-set protectors), containing electronic circuitry to allow for amplification of low intensity sound (to retain ability for verbal communication), while high noise levels are effectively attenuated. Both devices were demonstrated and circulated among the audience.

Coffee in the intermission was courtesy of Ontario Hydro, while B & K provided refreshments during the coffee break.

Chris Krajewski closed the meeting expressing thanks to the speakers and all participants in the discussion. Announcement was made of the forthcoming acoustic events and copies of the Toronto Chapter's future program were distributed.

C. A. Krajewski