



Acoustical Society of America
The Journal of the Acoustical Society of America

Comparison of impulse peak insertion loss
measured with gunshot and shock tube noise
sources

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J. Acoust. Soc. Am. 136, 2165 (2014); <http://dx.doi.org/10.1121/1.4899834>

Abstract

The National Institute for Occupational Safety and Health in cooperation with scientists from 3M and the U.S. Army Aeromedical Research Laboratory conducted a series of Impulse peak insertion loss (IPIL) tests of the acoustic test fixtures from the Institute de Saint Louis (ISL) with a 0.223 caliber rifle and two different acoustic shock tubes. The Etymotic Research ETYPlugs™ earplug, 3M™ TacticalPro™ communication headset and the dual protector combination were tested with all three impulse noise sources. The spectra, IPIL, and the reduction of different damage risk criteria will be presented. The spectra from the noise sources vary considerably with the rifle having peak energy at about 1000 Hz. The shock tubes had peak levels around 125 and 250 Hz. The IPIL values for the rifle were greater than those measured with the two shock tubes. The shock tubes had comparable IPIL results except at 150 dB for the dual protector condition. The treatment of the double protection condition is complicated because the earmuff reduces the shock wave and reduces the effective level experienced by the earplug. For the double protection conditions, bone conduction presents a potential limiting factor for the effective attenuation that can be achieved by hearing protection.

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DOI: <http://dx.doi.org/10.1121/1.4899834>

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