



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Facial, Hearing, and Visual Injuries Standardization of Impulsive Auditory Hazards

Noise-induced hearing loss due to blast exposure reduces mission effectiveness, with associated healthcare costs to the VA reported to be \$1.4 billion annually. Assessment and prediction of auditory hazards associated with blast injury has posed significant analytical challenges. ARL-sponsored research has shown that auditory hazard is not a simple function of summary waveform characteristics, such as waveform energy or peak pressure, and previous utilization of linear models are likely to have both over-predicted safe levels of exposure associated with the military's largest weapons systems, and under-predicted safe levels of exposure associated with rifles and other small-caliber weapons. These disparities are related to a non-linearity in the human auditory system that is captured in the AHAAH model. The AHAAH model, which is the result of over 40 years of experimental and analytical research and development, was recently incorporated in the newly published update to MIL-STD 1474(E), Design Criteria for Noise Limits (April, 2015). It replaces previous standard hazard assessment models, making the AHAAH model the DoD criteria for evaluating compliance with impulsive noise limits, and providing materiel developers with improved and more accurate methods for assessing the risks of noise-induced injury to the Service Member in the technology development cycle.

In the newly revised MIL-STD 1474 (E), AHAAH allows weapon developers to create more powerful weapons, because AHAAH accurately determines auditory risk, thereby eliminating the need for over-protection and the possibility of providing insufficient hazard assessment of the broad spectrum of blast-related impulsive noise exposures experienced by the Service Member.