



Are you listening?

Preventing hearing damage during training

By Ed Allen

As law enforcement officers we rely heavily on all of our senses to keep us alive during dangerous situations. Most experienced officers can tell you at least one harrowing story of how their life or the life of their partner was saved merely by paying attention to the smallest sensory cue. Furtive movement by a suspect's hands, the smell of freshly fired gunpowder or the sound of rustling by a suspect hiding from you — all require that your senses are functioning at peak performance. So if we recognize that it is critically important to maintain

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The law

While safety equipment and procedures have improved over the years, we still see officers who fail to adequately protect themselves from both temporary and long term hearing damage. Noise capable of causing such damage can come in a variety of forms. Typically they are referred to as persistent or impulse noises. Persistent noise could be generated by a piece of machinery like a generator, an engine in an armored vehicle or even a helicopter. Impulse noise is often occasional, yet instantaneous, sharp sounds such as the beating of drum, an explosion or gunfire. The U.S. Department of Labor, Occupational Safety and Health

Administration (OSHA) provides guidance for employers on reducing harmful noise in the workplace in 29 CFR 1910.195. Within this federal regulation, it is specified that the maximum permissible exposure limit (PEL) should not exceed 90 decibels (dB) averaged over an 8-hour time period and that typically applies to persistent noise sources. Since the noise generated by weapons is considered impulse noise, it falls into a different category of the regulation. The regulation specifies that impulse noise shall not exceed 140 dB sound pressure level (SPL). You should check with your organization's safety officer to determine which federal or state safety regulations apply to you.

The danger

There are well over one million federal, state and local law enforcement officers employed in the United States,

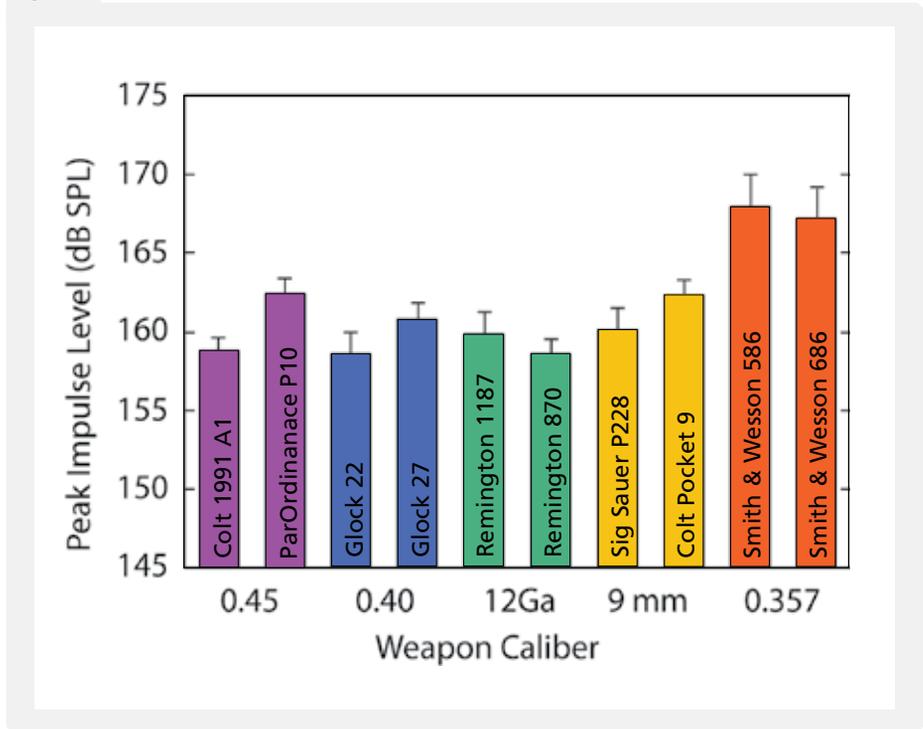
each of whom are required to utilize issued firearms during training on a regular basis. Normal firearms training exposes every law enforcement officer to potentially damaging levels of impulse noise, well over the 140 dB SPL. The National Institute for Occupational Safety and Health (NIOSH) has conducted research (Kardous et al. 2003; NIOSH 2003; Murphy 2007) into this potential workplace safety issue. Sound measurements were conducted on a variety of commonly used firearms within the law enforcement community at both indoor and outdoor range facilities. Peak sound pressure levels ranged from 155-168 dB SPL (See Figure 1). Such sound pressure levels can be even more dangerous when they occur inside a small confined space, such as when a weapon is fired from within a fully enclosed armored vehicle. Human exposure to such levels could potentially cause tinnitus (constant ringing in the ears), temporary and long term hearing loss.

The solution

Both NIOSH and OSHA recommend a systematic hierarchy of controls to reduce the risk of any hazard. The first is *elimination* or *substitution*. While there are many alternatives to actual firearms use in training, such as simulated marking rounds and laser simulated targeting firearms, they cannot completely substitute firearms training for a tactical team. The reality is that our operators need to fire their weapons in training scenarios that represent a real tactical situation as closely as possible. What we can eliminate is the need for additional operators to be standing close to the gunfire when they are not actually participating in the training. Team firearms instructors should consider segregating those waiting to fire away from those actually firing to reduce unnecessary exposure to the impulse noises.

The second phase of the hierarchy suggests the use of *engineering* controls

Figure 1



that can be implemented at range facilities to reduce exposure. Proper firearms range design can help drastically reduce exposure to impulse noise. Even if you are stuck with a range facility that lacks appropriate design, teams can certainly retrofit sound barriers and sound absorbing materials to help reduce the overall impact of the noise.

The third phase of this hierarchy suggests the use of *administrative* controls. Those include policies, procedures and regulations that help reduce the risk. This may come in the form of safety procedures that limit the type of ammunition utilized or by ensuring that mandatory hearing loss prevention education and training is provided.

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The fourth and final phase is *Personal Protective Equipment (PPE)*. During the NIOSH research, measurements were also taken with the use of a head mannequin and hearing protection devices. Resulting measurements clearly indicated that the use of a combination of both ear muffs and ear plugs together reduced peak noise levels significantly.

For years, many of us in law enforcement have been told that either ear muffs or ear plugs were sufficient. This may not always be the case and is largely dependent upon the type of weapon and ammunition utilized as well as the environment in which they are fired. Tactical team commanders and team firearms instructors should evaluate the specific risks that their operators are being exposed to on a regular basis and consider developing a hearing loss prevention program. Efforts should be made to take accurate sound level measurements and use that data to determine the appropriate hearing protection devices (HPD) to be used for their specific training activities.

Appropriate selection of PPE — in this case HPD — is equally important. Manufacturers now offer a wide variety of HPD that not only reduce impulse noise levels but also integrate into existing communication systems. Regardless of the type your team selects, careful research and attention should be devoted to identifying the dB capability rating that the manufacturer indicates and determining if it is sufficient for the weapon, ammo and environment that you are most likely to be firing in during training.

The average SWAT operator is likely to fire tens of thousands of rounds over the course of his or her career, the majority of which will be in training. Comparatively, they will likely fire very few, if any, in an actual incident. Subsequently, our

hearing protection programs should be focused primarily on our training environment and the dangers to which we expose our operators. ■

References:

NIOSH Alert. “Preventing Occupational Exposures to Lead and Noise at Indoor Firing Ranges.” April 2009; DHS Publication Number 2009-136.

About the author

Captain Ed Allen serves with the Seminole County Sheriff’s Office in Florida, and is an Eastern Region director for NTOA.

For more Information on developing appropriate hearing protection programs:

- www.cdc.gov/niosh/docs/2009-136/default.html
- www.osha.gov/SLTC/noisehearingconservation/index.html
- www.cdc.gov/niosh/topics/noise/hearingchecklist.html

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