C17 TASER® Non-Lethal Weapons: Safety Data and Field Results

Rick Smith, BA, MBA, TASER International, 17800 North 85th Street, Scottsdale, AZ 85255*

After attending this presentation, attendees will have seen an overview of TASER® non-lethal weapons, including methods of operation and overview of results of safety studies and results of applications in the field.

This presentation will impact the forensic community and/or humanity by addressing the current debate over the safety of TASER devices, and in particular will provide the listener with the current state of the art in this technology, along with a description of the studies to date regarding its safety.

Introduction: One of the challenges facing the evaluation of non- lethal weapons is confusion regarding the meaning of "non-lethal" and "safe." For opponents of non-lethal weapons, "non-lethal" is taken to mean that the risk of a fatality must be zero, rather than the way in which the term is defined by the U.S. Department of Defense (DOD), namely "weapon systems that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the envi- ronment. . ." DOD policy does *not* require or expect non-lethal weapons "to have a zero probability of producing fatalities or permanent injuries."

Similarly, and contrary to its use by opponents of the TASER, "safe" is not generally defined in absolute terms as meaning zero risk. For example, the Food and Drug Administration (FDA) has stated: "Although medical products are required to be safe, safety does not mean zero risk, since all medical products are associated with risk. A safe medical product is one that has reasonable risks, given the magnitude of the benefit expected and the alternatives available."

TASER® Technology: TASER brand non-lethal weapons are "con- ducted energy" weapons. They consist in major part of a hand-held device that when discharged uses compressed nitrogen to shoot two small probes, connected to the device by electric wires, a distance of up to 25 feet. There is a voltage difference between the two probes and when contact is made with a person, the hand-held device transmits powerful electrical pulses along the wires and into the person, through up to two inches of clothing. Analogous to radio jamming, the TASER stimulation overpowers the normal electrical signals conveyed by the body's nerve fibers, with the result that the person affected loses the capacity to perform coordinated action and falls to the ground. When the electrical pulses are terminated, the subject recovers within seconds. Primary risks associated with TASER use include fall-related injuries and injuries associated with strong muscle contractions, which are similar to strenuous athletic exertion.

Safety Studies: Numerous independent studies have established the general safety and effectiveness of the technology underlying TASER weapons. For example, a cardiac safety study published in January 2005 (Supplement, *Pacing and Clinical Electrophysiology Journal*) suggests a safety index ?20 for human adults weighting at least 99 lbs, a higher safety margin than many over-the-counter drugs including Tylenol®.

One TASER safety concern goes to whether the presence of drugs, e.g., cocaine, in the system of the targeted person increases the probability that an electrical stimulus will cause ventricular fibrillation (VF). Animal studies to date indicate the opposite, that cocaine presence actually *increases* the level of current necessary to induce VF, by over 50%. See Figure 1.

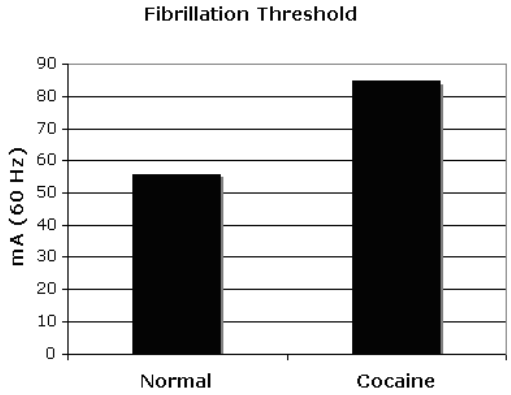

Figure 1.

In 1999 TASER International commissioned a university study of the cardiac safety of the TASER M26 in the presence of the drugs epinephrine, isoproternol, and ketamine. As part of that study, 17,000 electrical pulses were applied to five drug-dosed dogs over a period of two days without

 ** Presenting Author*

dangerous arrhythmias being induced in any of the animals, including one that had been given a toxic dose of ketamine, commonly used as an anes- thetic agent in animals and known among illicit drug users as "Special K," with effects similar to those of PCP. Although these results to all known drugs cannot be extrapolated; nevertheless this study with three drugs that can create a dangerous cardiac risk for people already at risk, supports a conclusion that the probability that a cardiac event will result in any random human targeted by a TASER is very low.

Another recent study of TASER devices was conducted by the Human Effects Center of Excellence (HECOE) for the DOD: *Human Effectiveness and Risk Characterization (HERC) for Electromuscular Incapacitation (EMI) Devices*. It concluded that: "Overall, the results indicate that the use of the TASER M26 and X26 as intended will generally be effective in inducing the desired temporarily incapacitating effect without presenting a significant risk of unintended severe effects. Although likely to be uncommon, some severe unintended effects might occur." …"Analyses provided by law enforcement agencies indicate that increased use of the TASER M26 or the TASER X26 has decreased the overall injury rate of both police officers and suspects in conflict situations when compared to alternatives along the use-of-force continuum." "….[D]espite the dramatic nature of the neuromuscular response, application of this conducted energy weapon for temporary incapacitation does not appear to pose significant risk to the recipients."

Deaths In-Custody Involving TASER Use: According to a recent study published by the Madison (WI) Police Department, there have been approximately 90 incidents in which a TASER was used and the subject died at some point while in custody. This study found that the 90 incidents broke down as follows:

- 89 involved significant physical exertion (fleeing or fighting) on the part of the suspect.
- In 41 out of the 51 cases for which information was available, the suspect had ingested
- Controlled substances—usually cocaine, but also including PCP and methamphetamine prior to police contact (in 39 of the cases drug information was not available).
- In 54 out of the 59 cases for which information was available, there was a significant time delay between the application of the TASER and the suspect's death—sometimes up to a week (information was not available for 31 cases), a clear indication that the TASER did not contribute to these deaths (electricity is not stored in the body—if an electrical current is sufficient to cause ventricular fibrillation, it will do so immediately).
- Most involved violent struggles with police, in which other use-of- force tools/techniques (such as OC spray, baton strikes, beanbag rounds, and empty hand techniques) were utilized.

Included among the 90 cases were:

- 2 subjects who were shot (with firearms) by police after TASERs were deployed unsuccessfully.
- 2 subjects who died from head injuries (1 from a fall after TASER
- deployment, 1 prior to police arrival).
- 1 subject who slit his wrist prior to police contact and died as a result.
- 1 subject who filled his home with natural gas prior to police contact—when the TASER was deployed the house exploded, killing the subject and injuring two officers.

It was found that the breakdown of medical examiner or coroner cause-of-death findings in the 90 cases was as follows:

- In 46 cases the cause of death was recorded unknown, or the autopsy is unavailable. Most of these cases involved drug ingestion and/or a delay between TASER application and death.
- In 23 of the remaining 44 cases, the death was attributed to lethal drug consumption
  - In 8 of these cases the autopsy report specifically excluded the TASER as a contributing factor
  - In 3 of these cases the role of the TASER was deemed to be unknown
- In 9 of the remaining 21 cases, the death was attributed to medical causes, usually cardiac arrest due to physical exertion or pre-existing disease
  - In 5 of these 9 cases, the autopsy report specifically excluded the TASER as a contributing factor
  - In 2 of these 9 cases, the role of the TASER was deemed to be unknown
- In 6 of the remaining 12 cases, the death was attributed to trauma (gunshots, etc.) unrelated to the TASER
- In 6 cases, the TASER was deemed to have *contributed* to the subject's death; all 6 of these findings appear highly speculative and a review of them suggests that the TASER actually played no causative role in any of them.
- **Not one** of the autopsy reports ruled or suggested that the TASER was a primary cause of death.

It is useful to compare these 90 in-custody deaths with in-custody deaths *not* involving the use of TASERs. Most cases of sudden and unex- pected death proximal to restraint involve young men in an "excited" state or one of "agitated delirium" resulting from psychiatric illness or intoxi- cation from illicit drug use, individuals who were combative and suffered injuries as a result of a confrontation with law enforcement *before* being placed in the restraint position (Chan, Vilke, & Neuman, 1998). Given that approximately 5000 questionable in-custody deaths occurred in the U.S. and Canada in the five-year period (2000-2004) during which the referenced 90 deaths occurred, the latter represented only 1.8% of the total.

Field Use Data: Figure 2 shows the results of a Los Angeles Police Department study finding that TASER

technology had the lowest injury rate to suspect and arresting officer of any force option available to the police, and that in fact both rates for the TASER were zero.

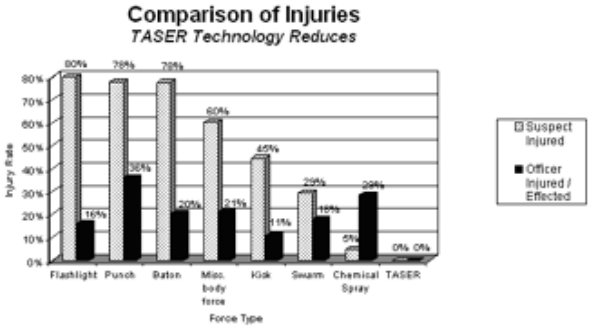

Figure 2.

Conclusion: The question of safety for non-lethal weapons is one that need be addressed relative to available alternatives. The question must be, "are these emerging technologies better than the alternatives in use have today?" The author strongly believes that TASER devices, while imperfect, are significant improvements over the traditional force options. Both laboratory studies and field results in the 7,000 law enforcement agencies deploying TASER technology today strongly indicate that TASER devices reduce the risk of injury to both police officers and subjects, resulting in safer communities, safer jobs for public safety officials, and fewer lives lost in police-involved confrontations.

TASER, Non-Lethal, Safety

 ** Presenting Author*