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Methodology on Development of Less Lethal Safety Device Stun Stick

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Abstract: ***The use of electroshock weapons, such as TASERS, has become widespread among defence agencies, including police departments and prison guards. It serves as a means to immobilize individuals and maintain control. Despite their effectiveness, these devices have a very long history of accidents, some of which have resulted in severe, and occasionally lethal, injuries. Acknowledging these inherent risks, there is a urgent need to explore alternatives that balance effectiveness with safety. This project introduces the concept of a "Stun Stick" as a potential less-lethal weapon, aiming to address the shortcomings of traditional electroshock devices. The Stun Stick offers the prospect of enhanced safety for both officers and subjects while preserving the imperative need for effective law enforcement tools. This discussion delves into the design, functionality, and potential benefits of the Stun Stick, advocating for a shift towards its consideration in the ongoing discourse surrounding less-lethal options for law enforcement agencies.***
Keywords: TASERS, Personal Safety, Women Safety, Less Lethal, Electroshock Device.

I. INTRODUCTION

The use of electroshock weapons, such as TASERs, by defense agencies like the police department and prison guards has become a common strategy to control criminals without resorting to lethal force. These devices play a crucial role in maintaining public safety, enabling law enforcement to subdue potentially dangerous individuals and prevent them from harming the civilians or officers. However, despite their widespread use, concerns have been raised over the years due to a significant number of reported accidents and instances of injuries, some of which have been fatal. The inherent risks with which the electroshock weapons come with, we the need to a carefully look for an alternative technology that can provide effective handling without the potential for severe harm. In response to these concerns, the concept of a less lethal device, known as the Stun Stick, emerges as a great solution. The Stun Stick aims to address the safety issues that comes with traditional electroshock weapons, offering a balance between effectiveness and reduced risk of injury. As technology advances, the development of less lethal alternatives becomes important in ensuring the safety of both law enforcement personnel and the public. The Stun Stick is a step toward achieving this balance by providing a tool that can aid in maintaining control over potentially dangerous situations with the reduced level of risk as compared to conventional electroshock weapons. The ongoing debate surrounding the use of such less lethal devices emphasize the commitment to evolve the law enforcement practices, focusing on the importance of preserving life while still ensuring public safety.

II. PROBLEM IDENTIFICATION

In a modern society struggling with heightened concerns about personal safety, the need for a simple, portable, and user-friendly safety device has become increasingly apparent. While various IoT-based safety devices flood the market, their effectiveness often falls short, leaving individuals seeking a more reliable solution. Even traditional self-defense measures, such as Pepper Spray, may not offer the level of assurance needed in critical situations. The go-to alternative, Stun Guns, is effective but has the two main drawbacks of potential lethality and legal restrictions categorizing them as firearms due to the inclusion of projectile cartridges. To address these challenges, the concept of a less potent yet efficient safety device emerges - the Stun Stick. This device is designed to be non-lethal, offering a practical solution to immobilize potential threats without the risk of fatal injuries and incidents. By developing a Stun Stick, this project aims to provide civilians with a viable safety tool that is both accessible and effective. Simultaneously, it presents law enforcement with a less potent, yet still immobilizing, device, steering clear of the legal complexities that comes with traditional electroshock weapons. By closing the gap between personal safety concerns and legal constraints, the Stun Stick project strives to empower individuals with a practical means of self-defense while offering law enforcement agencies a valuable tool for non-lethal intervention.

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This innovative approach to safety seeks to redefine the landscape of self-defense, making effective protection more accessible to the public while navigating the intricate legal framework surrounding less-lethal weapons.

III. OBJECTIVES

1) *Objective:* Developing a less lethal device based on the Stun Gun (commonly known as the TASER) by eliminating the use of projectiles.
2) *Functionality:* Design a safety device that retains the immobilizing capability of the Stun Stick without incorporating traditional firearm elements.
3) *Versatility:* Create a tool that serves as a defensive device, catering to the needs of both civilians and law enforcing agencies.
4) *Purpose:* Shift the focus from a full-fledged weapon to a safety device, striking a balance between civilian accessibility and the operational requirements of law enforcement.

IV. LITERATURE SURVEY

The Stun Stick project is crucial for enhancing public safety by offering a compact, non-lethal alternative to electroshock weapons. It addresses legal and ethical concerns while providing a safer tool for civilians and law enforcement, promoting responsible and effective means of self- defense and control. This literature review examines the Stun Stick drawing insights from three key research papers.

1) Development use of less lethal electroshock weapons in law enforcement by Adelina Tumbarskaand (2021):

Taser-type weapons are widely used in law enforcement globally, notably in the United States, where they dominate as the primary less-lethal option. Conducted energy devices are evolving for better efficiency and safety, showcasing a commitment to continuous technological improvement. Contrary to popular belief, data suggests that Conducted Energy Devices (CEDs) are safer than some other less-lethal options, challenging prevailing safety concerns. The project emphasizes responsible use, advocating for the deployment of CEDs only when necessary to prevent more significant risks posed by firearms or alternative lesslethal weapons. By discouraging unnecessary aggression, the project promotes a balanced use of CEDs, fostering safer outcomes in law enforcement and civilian self-defense.

2) Taser A View into the Future of Law Enforcement Technology by Corporal Kris K. Moffit (November 2008):

Taser devices, evolving since the 1970s, now feature advancements like Shaped Pulse Technology and Neuromuscular Incapacitation for more effective law enforcement. Taser International leads with products like Taser XREP, Taser Shockwave, and accessories such as Taser Axon, ensuring dependable electronic control devices for law enforcement. Taser accessories like Taser Axon and Taser Cam enhance accountability in law enforcement, promoting transparency in the use of electronic control devices. Courts consistently support the reasonable use of electronic control devices, as seen in cases like Draper v. Reynolds and Willkomm v. Mayer. Research, including studies from the Wake Forest School of Medicine and the Cleveland Clinic, affirms the safety of Taser devices, making them a vital tool for law enforcement in reducing injuries and preserving lives.

3) Electroshock weapons: Physiologic and pathologic effects by Dan Dermengiu, Sorin Hostiuc and George Cristian Curca (2008):

While allegations of taser abuse and deaths are rare, forensic medical professionals must be ready to handle such cases, both in clinical legal medicine and during autopsies or crime scene investigations. It is crucial for forensic MDs to be well-prepared with specific techniques and procedures when dealing with incidents involving tasers. This includes thorough examinations in clinical legal medicine and precise protocols during autopsies and crime scene investigations. In all taser-related death cases, ruling out drug overdose or excited delirium is essential.

These are the most frequent causes of death associated with taser use. Before attributing the death to taser use, these common causes must be thoroughly investigated and eliminated. To determine the role of taser use in a death, forensic MDs must prioritize ruling out drug overdose or excited delirium as potential causes. Only after eliminating these possibilities can the hypothesis that taser use contributed or determined the death be considered. Adhering to a methodical approach in examining taser-related cases ensures accuracy and reliability in forensic assessments, helping to establish the true cause of death and contribute to a thorough understanding of the circumstances surrounding taser use.

V. BLOCK DIAGRAM & CIRCUIT DIAGRAM

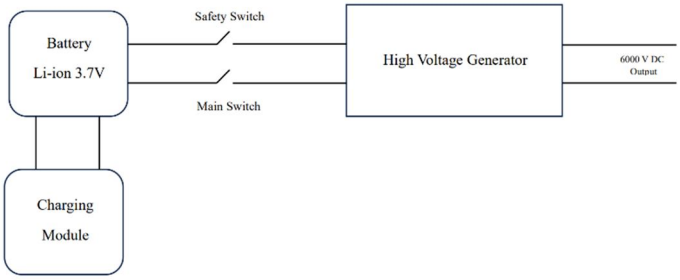


Fig. 1. Block Diagram of system

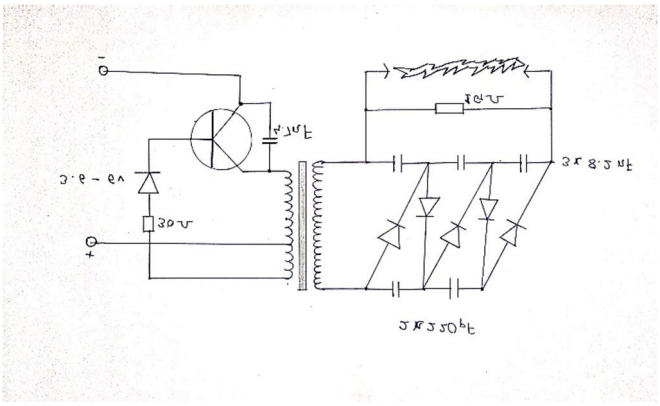


Fig. 2. Circuit Diagram of system

1) Li-ion 3.7v Battery: Represents the lithium-ion battery with a nominal voltage of 3.7V. This is the energy storage component of the system.
2) Charging Module: Manages the charging process for the Li-ion battery. Typically includes components like a charging controller, voltage regulation, and safety features.
3) High Voltage Generator: Generates a high voltage as per the requirements of your system. Could involve components like transformers, voltage regulators, and another circuitry. The generated high voltage may be used for specific applications or subsystems in your overall system

VI. ADVANTAGES

1) *Non-Lethal Immobilization:* The primary advantage of the Stun Stick is its ability to immobilize targets without causing significant harm or fatalities, making it a safer alternative to traditional Electroshock weapons.
2) *Legal Compliance:* Unlike firearms or projectile-based Electroshock weapons, the Stun Stick can potentially bypass legal restrictions due to its non-lethal nature, enabling easier accessibility for civilian use.
3) *Improved Safety:* Its design prioritizes safety, minimizing the risk of serious injuries or fatalities, thereby making it a more viable option for both civilians and law enforcement agencies.
4) *Versatility and Accessibility:* The Stun Stick can be designed to be portable, easy to use, and user-friendly, ensuring accessibility for individuals with varying levels of training or expertise.
5) *Ethical Implications:* It addresses ethical concerns associated with the use of force by providing a tool that aims to immobilize rather than cause harm, aligning with ethical principles in self-defense scenarios.

VII. CONCLUSION

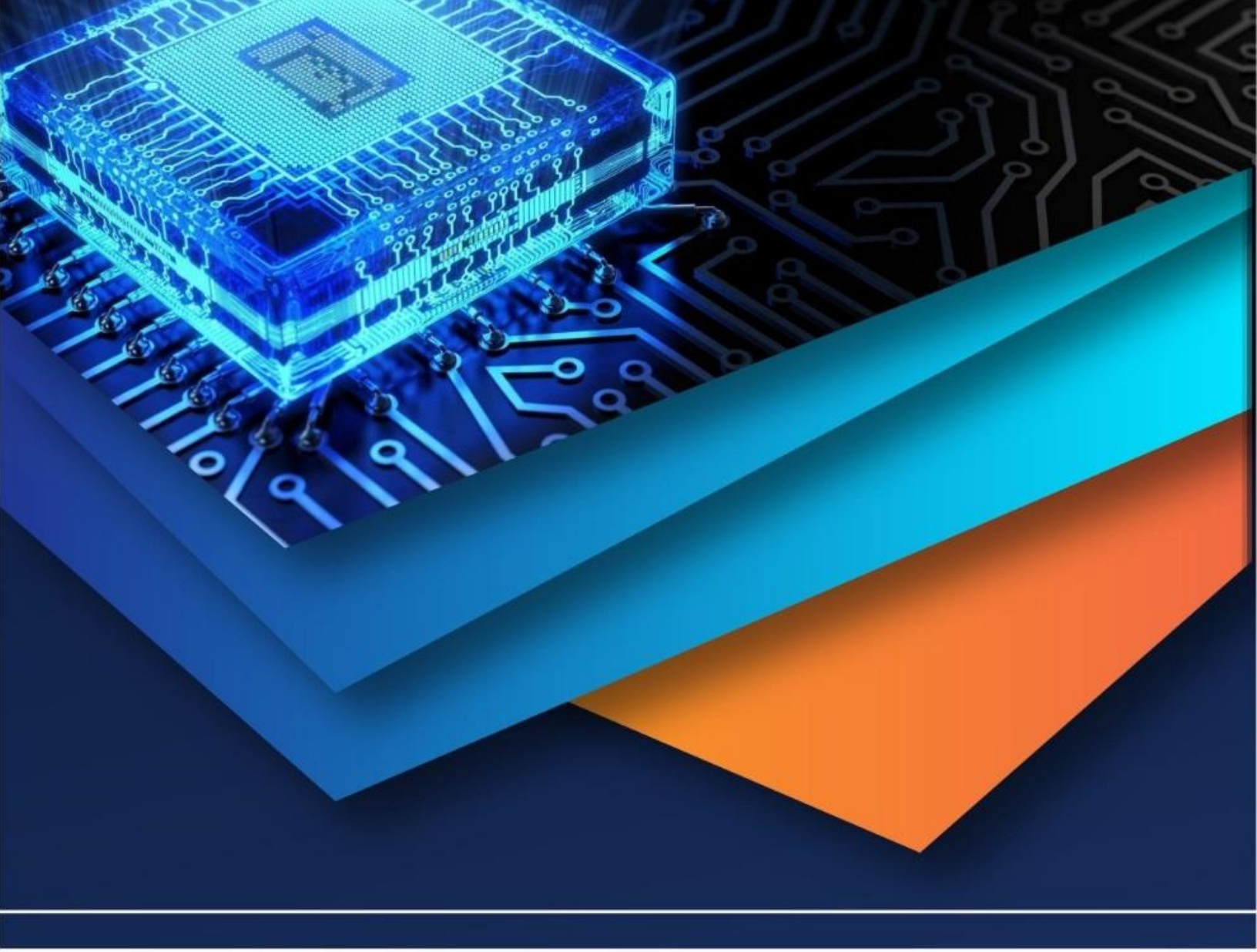
In conclusion, the Stun Stick represents a groundbreaking advancement in self-defense, addressing deficiencies in traditional tools by reducing risks associated with Electroshock weapons while maintaining legal and ethical standards. Balancing effectiveness and safety, it serves as a non-lethal immobilizing device with the potential to revolutionize self-defense.

Prioritizing accessibility and usability, it caters to both civilian safety needs and law enforcement requirements. Despite potential potency limitations, its compliance with regulations and ethical considerations presents clear advantages. Acknowledging certain drawbacks, addressing them through continuous innovation is crucial. Beyond functionality, the Stun Stick signifies a paradigm shift toward a safer and more conscientious approach to self-defense, fostering a culture of safety in civilian and law enforcement realms.

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