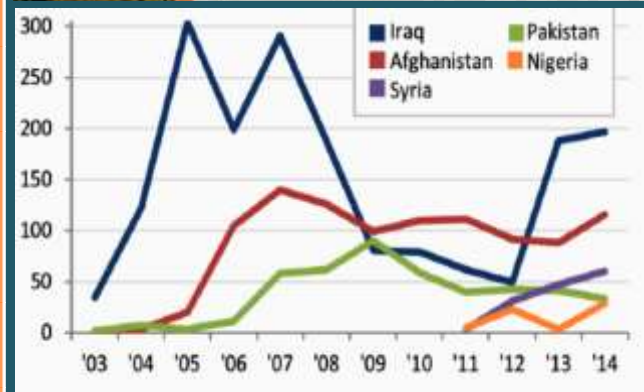


2015

Vehicle-Borne Improvised Explosive Devices (VBIED)



Vehicle-Borne Improvised Explosive Devices (VBIED)

August 2015

Homeland Security Research Corp. (HSRC) is an international market and technology research firm specializing in the Homeland Security (HLS) & Public Safety (PS) Industry. HSRC provides premium market reports on present and emerging technologies and industry expertise, enabling global clients to gain time-critical insight into business opportunities. HSRC's clients include U.S. Congress, DHS, U.S. Army, U.S. Navy, NATO, DOD, DOT, GAO, and EU, among others; as well as HLS & PS government agencies in Japan, Korea, Taiwan, Israel, Canada, UK, Germany, Australia, Sweden, Finland, Singapore. With over 750 private sector clients (72% repeat customers), including major defense and security contractors, and Fortune 500 companies. HSRC earned the reputation as the industry's Gold Standard for HLS & PS market reports.

**Washington D.C. 20004, 601 Pennsylvania Ave., NW Suite 900,
Tel: 202-455-0966, info@hsrc.biz, www.homelandsecurityresearch.com**

Table of Contents

1	Appendix C: Vehicle-Borne Improvised Explosive Devices (VBIED)	4
1.1	Introduction	4
1.2	VBIED Technologies	4
1.3	VBIED Detection Considerations	5
1.4	Terror Groups that Use VBIED	6

1 Appendix C: Vehicle-Borne Improvised Explosive Devices (VBIED)

1.1 Introduction

Vehicle-Borne Improvised Explosive Device (VBIED) is an improvised explosive device placed inside a car or other vehicle and then detonated. It is commonly used as a weapon of assassination, terrorism or guerrilla warfare, to kill the occupants of the vehicle, people near the blast site, or to damage buildings or other property. Car bombs act as their own delivery mechanisms and can carry a relatively large amount of explosives without attracting suspicion; in larger vehicles and trucks, weights of at least 7,000 pounds (3200 kg) have been used, for example, in the Oklahoma City bombing. Car bombs are activated in a variety of ways; including opening the vehicle's doors, starting the engine, depressing the accelerator or brake pedals or simply lighting a fuse or setting a timing device. The gasoline in the vehicle's fuel tank may make the explosion of the bomb more powerful by dispersing and igniting the fuel.

Car bombs are effective weapons as they are an easy way to transport a large amount of explosives to the intended target. A car bomb also produces copious shrapnel, or flying debris, and secondary damage to bystanders and buildings. In recent years, car bombs have become widely used by suicide bombers.

Defending against a car bomb involves keeping vehicles at a distance from vulnerable targets by using Jersey barriers, concrete blocks or bollards, metal barriers, or by hardening buildings to withstand an explosion. Since the height of the Provisional Irish Republican Army (PIRA) campaign, the entrance to Downing Street has been closed, preventing the general public from getting near Number 10. Where major public roads pass near buildings, road closures may be the only option (thus, for instance, in Washington, D.C. the portion of Pennsylvania Avenue immediately in front of the White House is closed to traffic). Historically these tactics have encouraged potential bombers to target "soft" or unprotected targets, such as markets.

1.2 VBIED Technologies

Car bombs and detonators function in a diverse manner of ways and there are numerous variables in the operation and placement of the bomb within the vehicle. Earlier and less advanced car bombs were often wired to the car's ignition system, but this practice is now considered more laborious and less effective than other more recent methods, as it required a greater amount of work for a system that could often be quite easily defused. While it is more common nowadays for car bombs to be fixed magnetically to the underside of the car, the underneath of passenger/driver's seat, or inside of the mudguard, detonators

triggered by the opening of the vehicle door or by pressure applied to the brakes or accelerating pedals are also used.

Bombs operating by the former method of fixation to the underside of the car more often than not make use of a device called a tilt fuse. A small tube designed of glass or plastic, the tilt fuse is not dissimilar to a medical tablet tube. One end of the fuse will be filled with mercury, while the other open end is wired with the ends of an open circuit to an electrical firing system. Naturally, when the tilt fuse moves or is jerked, the supply of mercury will flow to the top of the tube and close the circuit. Thus, as the vehicle goes through the regular bumping and dipping that comes with driving over a terrain, the circuit is completed and the bomb or explosive is allowed to function.

As a safety mechanism to protect the bomber, the placer of the bomb may rig a timing device incorporated with the circuit to activate the circuit only after a certain time, therefore ensuring that the bomber will not accidentally activate the bomb before he or she is able to get clear of the blast radius.

Mass-casualty car bombing, and especially suicide car bombing, is currently a predominantly Middle Eastern phenomenon. The tactic was first introduced to the region by the Stern gang, who used it extensively against Palestinian and British military targets; it was subsequently taken up by Palestinian bombers as well. The tactic was widely used in the Lebanese Civil War by the Islamic fundamentalist group Hezbollah. A notable suicide car bombing was the 1983 Beirut barracks bombing, when two simultaneous attacks killed 241 U.S. Marines and 58 French military personnel. The perpetrator of these attacks has never been positively confirmed. In the Lebanese civil war, an estimated 3,641 car bombs were detonated.

1.3 VBIED Detection Considerations

The problem of VBIED detection can be split into two operational categories:

1. Checkpoint screening applications wherein the detection system occupies a fixed location and observes all vehicles passing through the checkpoint for evidence of the presence of a VBIED; and
2. Mobile or portable applications that may be needed to determine from a distance whether or not a suspicious vehicle is a VBIED.

The desired VBIED detection solution:

- Must provide rapid, non-invasive, standoff explosives detection capabilities across the threat spectrum, in a noisy environment, in sufficient time (minutes if not seconds) for effective action to be taken to neutralize the threat at a sufficient distance to place the operator and target outside of the hazard zone for that category of device.

Optimally, it also will identify the location of the explosives within the vehicle.

- For mobile applications, the solution should be compact enough to be transported on a bomb squad response vehicle or trailer, require minimal effort to set-up and operate, and have a small footprint. Ideally, it would be handheld or at least small and light enough to be deployed by a robot or carried and set-up by an individual wearing a bomb suit.
- Should require minimal training to operate and maintain.
- Should be able to quickly screen suspect vehicles without having to scan each side of the vehicle separately.
- Must be able to quickly adjust screening capabilities to accommodate any size vehicle.
- Must not be affected by: the physical condition of the vehicle; emissions that are given off from the subject vehicle or any other vehicles in the vicinity; elements such as water, salt, dirt, sand and other grime that is commonly found on vehicles. It must be able to operate in all environments and weather conditions.
- Must not pose an unacceptable safety risk to the operator, bystanders or occupants of the vehicle being surveyed. Safety considerations both with regard to operation and disposal of nuclear materials would seem to make nuclear-based solutions unsuitable for use by state and local agencies.
- Must be cost effective.

1.4 Terror Groups that Use VBIED

Groups that use car bombs include:

- Various Palestinian militant groups, against both military and civilian Israeli targets
- Many Lebanese militants continue to use car bombs against domestic opponents, a notable example being the assassination of Rafic Hariri, the country's former Prime Minister, on 14 February 2005
- Hezbollah member Imad Mughniyah was assassinated by a car bomb in Syria in 2008, allegedly by Mossad
- Although it has never been officially acknowledged, the American CIA has occasionally been accused of being behind car bombings. One such attack was the failed assassination attempt on Grand Ayatollah Mohammad Hussein Fadlallah in the Beirut car bombing on 8 March

1985. Although there has been widespread speculation of CIA involvement, this has never been proven conclusively.
- Dissident republicans in Northern Ireland used car bombs in the last two decades, the deadliest attack being the Omagh bombing of 1998.
 - Al-Qaeda, in attacks around the world since the 1990s, most notably the 1998 United States embassy bombings.
 - Militants and criminals in India occasionally utilize car bombs in attacks. This includes Muslim, Sikh, Kashmiri and Naxalite militants, as well as rival politicians within the government and organized crime. A notable attack was the 25 August 2003 Mumbai bombings, in which two car bombs killed 54 people. The attack was claimed by the Pakistani-backed Kashmiri separatist group Lashkar-e-Taiba.
 - Since the beginning of the U.S.-led war in Afghanistan in 2001, the Taliban have often employed vehicular explosives against enemy targets. This has included not just cars and trucks but even bicycle bombs.
 - A 2005 car bombing in Iraq, in which a second car bomb was detonated while U.S. forces were investigating the scene of an earlier such blast, resulting in 18 casualties.
 - The Iraqi insurgency - an estimated 578 car bombs were detonated in Iraq between June 2003 and June 2006. Car bombs continue to be commonly used.
 - The Pakistani Taliban have occasionally used car bombs in their ongoing conflict with the government of Pakistan.
 - The Juárez Cartel's armed wing, La Línea, used a car bomb to attack police officers in Ciudad Juárez, Mexico on 15 July 2010.
 - The Sinaloa Cartel and the Gulf Cartel were blamed for using car bombs in Nuevo Laredo, Mexico on 24 April 2011 to "heat up" the turf of Los Zetas.
 - The Revolutionary Armed Forces of Colombia (FARC-EP), a very active communist guerilla group in Colombia, sometimes use car bombs against civilian and military targets in Bogotá, Cali, Cauca disambiguation needed and other cities.

More information can be found at:

[Standoff IED, Person-Borne & Vehicle-Borne Explosives & Weapon Detection: Technologies & Global Market - 2015-2020](#)