Understanding the Basics of Improvised Explosive Devices (IED)

Introduction

Improvised explosive devices (IEDs) continue to be the main threat to US and other coalition forces in both Afghanistan and Iraq. They also pose a significant risk to civilians. According to the United Nations Annual Report on Protection of Civilians in Armed Conflict, IEDs were the primary cause of violent civilian death in Afghanistan in 2010. In Iraq, an average of nearly two explosions per day by violent extremists in 2010 resulted in 685 explosions, killing 2,649 civilians.

Nor are the risks from IEDs solely in Afghanistan and Iraq. The US military command known as the Joint IED-Defeat Organization, or JIEDDO, stated in their 2010 annual report that IEDs continue to be the weapon of choice for global insurgents, with approximately 260 IED incidents per month occurring outside of Afghanistan and Iraq.

In the most basic terms, IEDs are homemade bombs. According to U.S. Army Field Manual 3-34.119, they can be made with explosives alone, or combined with other materials, such as projectiles or toxic chemicals,
to create an expedient, effective, and dangerous weapon that can cause death or serious injury to large numbers of people. IEDs can vary widely in shape and form – ranging from small pipe bombs to multiple artillery shells linked together to create a device with greater explosive weight. They can be planted alongside a road, magnetically attached to a target, placed in a vehicle, or be loaded in a car or truck and driven into markets or buildings. In the past few years, as military and commercial grade explosives become more difficult to acquire, bomb-makers have become increasingly creative by making IEDs from home-made explosives (HME). The characteristics, composition, and method for initiating IEDs are constantly changing, and the degree of complexity and sophistication of an IED is limited only by the ingenuity and the materials available to the bomb-maker. Although the difference may seem slight, and even though the effect of the explosions may be quite similar, a mine is not considered an IED unless it has been modified (improvised) in some fashion.

**Basic Components of an IED**

The basic elements of an IED consist of a main explosive charge, a power source, an initiating system, and a casing or container.

The IED is triggered by the initiating system, which could be a pressure plate, mobile phone, radio, timer or wire physically connected to the device. A battery is used as the power source. When the firing mechanism is triggered and the circuit is completed, a signal is sent to the initiator – a blasting cap or detonating cord – which then detonates the main charge. Common explosive charges could include mortar, artillery or tank ammunition rounds, since they are the easiest to handle and provide a ready-made means of fragmentation. However, when military munitions are not available, main charges can be made from plastic explosive, trinitrotoluene (TNT), ammonium nitrate fertilizer, fuel oil, or other types of explosive ingredients and placed in a container. In some cases, ball bearings, nuts, bolts, nails or other hardware can be added to the IED to enhance the fragmentation.

**Types of IEDs**

In generic terms, IEDs can be broken into several different types – depending on the method of detonation or the method of delivery.

There are three basic methods to initiate detonation of the IED. It can be detonated by command, by time, or it could be initiated through actions by the victim. In command detonation, someone observing the target area could trigger the IED by either a wire directly connected to the device or by remote control through wireless devices such as cell phones, pagers, remote car door openers, or garage door openers. IEDs triggered by wire are sometimes referred to as CWIEDs (command-wired) while those that are remotely detonated are known as RCIEDs (radio-controlled). A timed IED is designed to detonate at a specified time after the device is planted, thus providing the emplacer sufficient time to get away from the scene of the
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explosion. Finally, a victim-operated IED (VOIED) detonates when a person or vehicle triggers the initiator – which could be a trip wire, a pressure plate or pressure release mechanism, a light sensitive apparatus or other similar devices – resulting in the explosion.

Another type of IED is the vehicle-borne IED (VBIED), commonly referred to as a car bomb. The vehicle may be as small as a bicycle, motorcycle or as large as a car, van, or truck. It could be parked along a road or a target building, or could be driven by a suicide bomber. In many cases, VBIEDs are frequently used near crowded areas in order to maximize their destructive power and instill terror within the population. As insurgents have become more adaptive in their efforts, many VBIEDs may have a second person ready to initiate the attack in case the primary triggerman hesitates or is unable to conduct the attack. It is also not uncommon for terrorists to place other IEDs in the vicinity of the attack to target emergency personnel who may respond to the initial explosion. While the most common VBIED is a car or truck, that doesn’t have to be the case. The 2000 attack on the USS Cole in Yemen was carried out by terrorists on a boat loaded with explosives.

Suicide bombers constitute another category of IEDs. Suicide bombers may opt to attack using a vehicle laden with explosives, or the attacker could choose to wear an explosive belt or vest. Suicide bombers who use an explosive vest or belt to conduct the attack are referred by the military as person-borne IEDs (PBIED). The IED could be triggered by the bomber or by another person located nearby. In recent years, suicide bombers have targeted crowded markets, funerals, wedding celebrations, local police and government facilities, and military recruitment centers. In some cases, female suicide bombers and unsuspecting children have been used to conduct attacks.

IED Trends in Afghanistan


Similarly, the UK newspaper, The Telegraph, reported on 2 September 2011 that the use of IEDs rose 14% year-on-year in the 2nd quarter of 2011. Citing JIEDDO sources, the article went on to say that from April to
June, 2011, 3,845 IEDs exploded or were found. Coalition killed and wounded from IEDs rose 15% yearly to 1,248 soldiers over the same period. Citing a United Nations report released in August, The Telegraph reported that 60% of coalition casualties and 30% of civilian casualties were caused by IEDs.

In general, IEDs in Afghanistan tend to be of simple, but effective, design. They tend to be primarily victim-operated or command wire IEDs. Despite a ban enacted in February 2010 to prevent the import, sale, manufacture, and use of ammonium nitrate fertilizer, many IEDs are prepared using home-made explosives (HMEs). Increasingly, many IED attacks are targeting military personnel on foot patrols.

**IED Trends in Iraq**

In Iraq, the overall number of IED attacks has been drastically reduced, and according to JIEDDO, is currently at levels that have not been seen since 2003. However, despite the decline in the number of IED attacks from its peak of 3500 events per month in 2006, JIEDDO’s 2010 Annual Report shows that substantial numbers of IED attacks still occur each month (see chart below).

Nor are the casualties insignificant. Data from Iraqbodycount.org shows that in 2011, an average of over six people are killed each day from IED attacks (see chart below). The New York Times reported that on 15 August 2011, 42 apparently coordinated attacks against Iraqi security forces and civilians killed 89 people, including 3 suicide bombers, and injured 315 others. The most lethal attack occurred in Kut, when two car bombs exploded, killing 35 and wounding 71 Iraqis.
The Military’s Concept for Countering IEDs (C-IED)

The key to defeating IEDs may lie in attacking the network that procures, develops, and emplaces the weaponry rather than focusing on just the device itself. The dangers associated with IEDs have prompted many countries to create a counter-IED task force to serve as the strategic focal point for C-IED issues. In nearly all cases, these task forces are organized along three major efforts:

- **Attack the IED network.** As shown in the diagram below, acquiring, manufacturing, and emplacing IEDs require a robust support network. First, a supply network is needed to acquire, move, and store the range of explosive materials, initiators, and triggers. Second, a process for recruiting is needed to find qualified bomb-makers and emplacers. Third, there needs to be funding support and a process to move money around. Finally, at the lowest level, there has to be people who can develop the intelligence, plan, organize and conduct the attacks. This whole chain, from people, parts, expertise, and money, is subject to interdiction. Thus, attacking the network includes all efforts to interdict, disrupt or destroy the insurgent’s supply chain and his command and control infrastructure. Much of this effort requires friendly forces to have an intelligence process that can collect, analyze and distribute relevant information in a timely manner. Examples of attacking the network include persistence surveillance of suspected IED making facilities, exploiting evidence recovered from IEDs, network and geographic profiling, and counter-bomber targeting.

- **Defeat the device.** Ideally, while attacking and reducing the network’s ability to function effectively are the preferred means of C-IED, there is also the need to find and neutralize IEDs that may already be emplaced, and failing to find them, protect personnel who may be working in the environment. This is a significant challenge as IEDs may be modified (improved) in different ways and detonated by different means. When IEDs are found, explosive ordnance disposal (EOD) specialists are generally called in to disarm them. Defeating the device includes developing tactics and technologies to detect and neutralize IEDs. This may be as simple as developing a denial system to prevent insurgents from putting IEDs in culverts or as sophisticated as devising electronic jammers to preclude remote control detonation of IEDs. Finally, over the past several years, significant investments have been made in the armouring of vehicles to protect the occupants inside.

- **Training and Preparation.** Training is fundamental to all military units. The tactics required to deal with the IED threat require personnel to receive specialised training. In nearly all cases, training is conducted at the home base before the unit deploys, and refresher training takes place periodically while the unit is in theatre. Host nation forces also receive C-IED training as part of their
development. As insurgent tactics change, friendly forces will have to keep abreast of recent lessons-learned.

**Individual Protective Measures**

Military forces have invested vast amounts of resources over the past decade in an effort to detect and defeat IEDs. However, a Homeland Security Newswire report in October 2010 indicates bomb-detecting dogs are more effective in detecting IEDs than the most sophisticated detection technologies.

For civilians working in high threat environments that likely will not have access to intelligence information or IED detection technology that military forces possess, host nation civilians may sometimes be able to provide information on dangerous areas that should be avoided. However, the number one way to protect yourself and others from an IED attack is to be alert to your surroundings. Although not intended as an inclusive list, some examples of possible roadside IED indicators from FMI 3-34.119/MCIP 3-17.01 include:

- Unusual changes in community patterns, such as fewer people or vehicles in a normally busy area, or the absence of women or children
- Personnel on overpasses
- People videotaping ordinary activities or military actions. Insurgents using IEDs will often tape their activities for use in recruiting, training, or planning
- Suspicious or metallic objects, such as cylinders or 5-gallon jugs / cans
- Colors that seem out of place, such as freshly disturbed dirt, concrete that does not match the adjacent / surrounding blocks, colored detonating cord or other parts of an IED that may be exposed
- Markers by the side of the road, such as tires, rock piles, that may identify an IED location to the local population or serve as an aiming reference

The US Department of Homeland Security issued some basic guidelines for actions in the event of an IED attack. While the guidelines are directed toward domestic threats, the principles appear equally useful for civilians working in high-threat environments overseas.

**Steps to take if you see something suspicious**

- Trust your instincts, if something feels wrong, don’t ignore it. Contact the authorities.
- Keep your distance from suspicious packages or devices
- Make a personal plan for emergency response, to include:
  - emergency procedures at your place of work or places you visit frequently
  - know how to get out of the area
  - routes to local hospitals
  - take a first aid course

**What to do if you encounter an IED attack**

- If you are in a building, get under a sturdy table or desk if objects are falling around you.
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- If you are outside, move away from the blast area to a safe location. Be aware that secondary explosions may occur at or near the original bombing site – either by accident or by design.
- If you are near, but not at the immediate site of an IED attack, avoid being lured closer to see what is happening due to risks of secondary attacks.

The IED is not a new phenomenon on the battlefield. It is one of the main causes of casualties among military forces and exacts a heavy toll on local populations. With its proven lethality and effectiveness, it will likely continue to be a weapon of choice among poorly armed insurgents in the future. Nongovernment and international organization civilian employees working in high-threat areas to alleviate human suffering and / or promote conflict resolution, health care, economic development, environmental protection, and other similar efforts should be aware of the risks and exercise care as they conduct their daily activities.

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The CFC is proud to announce the addition of our C-IED webpage. CimicWeb account holders will be able to access IED-related data, resources, and appropriate IED and C-IED related materials beginning 03 October 2011.

As always, your comments and feedback are welcome. Please email comments to the CFC Operations & Strategic Engagement Officer, robin.barnett@cimicweb.org. We encourage you to share this unclassified thematic report with other interested civilian or military personnel.

If you are not a current CimicWeb account user, we encourage you to become one. Please go to www.cimicweb.org and click on “Request an Account” on the right-hand side. Simply enter in your information and enter “John Caldwell “as the sponsor. Only account holders receive CFC publications directly to e-mail, and only individuals with accounts are able to submit specifically-tailored requests for information (RFI). We thank you again for your readership and subscription!!

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