Műszaki Katonai Közlöny

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BOMBERS, WIRES AND EXPLOSIVES PART I. – Death WITHIN A REACH –[2]

„Items are never the guilty,
But the hand that grabs them
And the mind, which ordered that hand..."[3]

INTRODUCTION

As a result of the quick development of the explosive devices used for malicious activities, there is an increasing demand of the professional handling with Home-made Improvised Explosive Devices. A device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals and designed to destroy, incapacitate, harass or distract. It may incorporate military stores, but is normally devised from non-military components. Their purpose of utilization is to incapacitate the combat capabilities of vehicles or personnel. To construct such devices they often use unexploded ordnance (UXO[4]) because they are easy to obtain, simply to transport and their shells are already made to produce fragmentation effect (artillery shells, grenades). It is possible to produce homemade explosives, but most of the cases these are less effective than UXO. The IEDs are used to harass, destroy, delay or force the opposing force to give up offensive intentions. The explosive component can be military grade or commercial explosive materials – occasionally a mixture of these – or other home-made explosives. The definition of terrorism is: „The planned usage of violence or threatening with violence with the intention of creating fear, extorting or intimidating of governments and societies." The tools of these activities are all those devices which pose lethal threat to everyone - once activated. Their psychical effect is as strong as their physical destructive power. This should not be neglected, and the psychological impact must be taken into account. However, the primary and most important effect is the physical destructive power. It is determined by the structure of the device and the size of the explosive charge used.

The home-made explosive devices can be categorized by several methods. The Improvised Explosive Devices are not just put carelessly into the way of the target but often hidden and camouflaged as much as possible.

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[3] Source: Dr. Lukács László: Aknahelyzet Horvátországban és Bosznia-Hercegovinában, Új Honvédségi Szemle 1999/1, 37–49. oldal.
[4] UXO – Unexploded Ordnance.

1. picture Ammunition rigged for an IED discovered by Iraqi police in Baghdad[5]

Thus, by type they can be hidden or non-hidden. Besides the conventional methods home-made explosive devices can be camouflaged by several methods. In this writing I would like to present the personally, remotely activated types of explosive devices. I also explain those motivation factors which affect how the terrorists fulfill their assignments.

THE MOTIVATION FACTOR

We have to make difference between a terrorist acts and terrorism. The terrorist act can be a brutal action or reaction while terrorism itself is a social phenomenon. We have to define what actions we classify within the conceptual group of terror.

Considered to be a terrorist act:

- The massacre of captured enemy soldiers (combatants);
- Threatening with non-acceptance of surrender in case of refusal of demands;
- Attacking targets indiscriminately from the air or surface;
- Attacking civilian population or threatening with such action;
- Illegal capture and torment of personnel;
- Arson, looting, pillage, destruction without reason;
- Attacking political and other leaders not involved in this particular conflict;
- Attacks, assassinations against individuals and social groups not involved in this particular conflict.

In most cases members of terrorist groups look on their activities like a “heroic mission”. Typical features of terrorism are fanaticism and they strive for publicity. The majority of attempts especially suicide actions involving self sacrifice require strong religious zeal. It is a fact that these days by the number of casualties-bombings, assassinations, hijacking means of transportation and taking of hostages are the most dangerous aspects of terrorism. In the centre of terrorist acts is violence which can target states, social groups and population.

[5] Source: http://en.wikipedia.org/wiki/Improvised_explosive_device, Download: 16.09.2013.

They activate on the decision of the bomber by immediate, delayed or remote action. These types of devices require continuous observation of events. Either from long distance or from short range, or by using an observer activates the device indirectly. Because the bomber or the observer has to be close the scene in these types of terrorist actions the attacker can be found in most cases and there is a possibility to uncover their organization. The biggest advantage of devices planted into means of transportation is mobility and they are less conspicuous. Depending on the type of transport huge amounts of explosives can be hidden inside of both motor vehicles and two-wheeled types. In a dense traffic it is also quite difficult to identify them. Vehicles can get close vicinity to the designated target or victim easily due to their mobility. By initiation there are timer delayed, remote activated or self-activated vehicle borne devices triggered by a suicide bomber.

Vehicle-Borne Improvised Explosive Device

Vehicle borne Improvised Explosive Device are devices that use a vehicle as the package or container of the device. These IEDs come in all shapes, colors, and sizes which vary by the type of vehicles available small sedans to large cargo trucks. The explosive device or material can take the entire internal space of the vehicle.

The explosive ordnance can be from military sources (UXO), but home-made devices are also popular because the vehicle's structure functions as fragmentation body. The vehicle is driven to the location where the device has been planned to explode. Usually they leave the vehicle on the side of the road and wait till the target passes next to it then they set off the bomb. Functioning of devices can vary within the same methods as the package types and can have the same common characteristics or indicators as other Improvised Explosive Devices.

ATF	Vehicle Description	Maximum Explosives Capacity	Lethal Air Blast Range	Minimum Evacuation Distance	Falling Glass Hazard
	Compact Sedan	500 pounds 227 Kilos (In Trunk)	100 Feet 30 Meters	1,500 Feet 457 Meters	1,250 Feet 381 Meters
	Full Size Sedan	1,000 Pounds 455 Kilos (In Trunk)	125 Feet 38 Meters	1,750 Feet 534 Meters	1,750 Feet 534 Meters
	Passenger Van or Cargo Van	4,000 Pounds 1,818 Kilos	200 Feet 61 Meters	2,750 Feet 838 Meters	2,750 Feet 838 Meters
	Small Box Van (14 Ft. box)	10,000 Pounds 4,545 Kilos	300 Feet 91 Meters	3,750 Feet 1,143 Meters	3,750 Feet 1,143 Meters
	Box Van or Water/Fuel Truck	30,000 Pounds 13,636 Kilos	450 Feet 137 Meters	6,500 Feet 1,982 Meters	6,500 Feet 1,982 Meters
	Semi-Trailer	60,000 Pounds 27,273 Kilos	600 Feet 183 Meters	7,000 Feet 2,134 Meters	7,000 Feet 2,134 Meters

1. illustration BATF Explosive Standards[6]

Two wheeled Improvised Explosive Device

All parts of the vehicle can be used to plant explosives. The materials can be also from the military but home-made explosives are also common because the framework can be filled for

[6] Source: http://www.globalsecurity.org/military/intro/ied-vehicle.htm, Download: 16.09.2013.

increased splinter effect. Compared to motor vehicles two-wheeled devices contain far less material but these types can reach the target much easily and can get closer to the victim.

Donkey Born Improvised Explosive Device

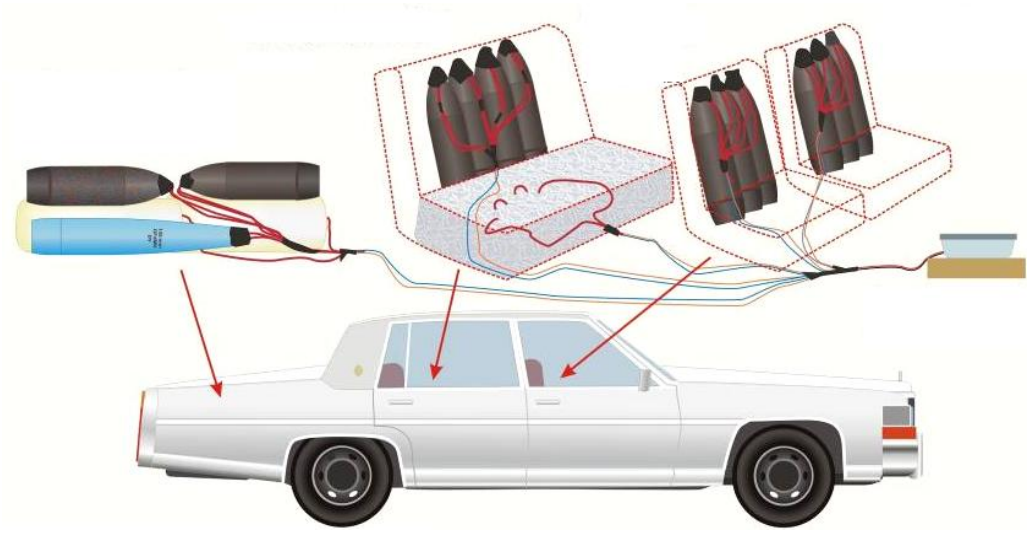
Besides the common methods home-made explosive devices can be camouflaged in various techniques. Many soldiers fell a victim to improvised devices hidden into carcasses of animals. There were cases when the device was mounted on livestock – a donkey.

Suicide Improvised Explosive Device

To plan a suicide bombing, collect the materials, and execute the attempt is never an individual action but a result of complex well organized team work. The explosive belt which can be attached on the body, the explosive vehicle and the construction of bombs are specialist's jobs. Such skills must be taught for personnel on specialist courses in training camps. The size, frequency and doctrines point out a new philosophy between terrorists groups. Groups are being organized in multiple countries and were trained – being trained at different locations. Current "passive" members have been chosen at young age their life is being spent with religious and later military training. These young people are full of very strong team spirit in which terrorists or suicide bombers qualify as ideals.

Suicide Vehicle Borne Improvised Explosive Device

The vehicle borne suicide bomber drives the explosive device equipped motor vehicle into its target – as we described earlier. In this case the vehicle is not parked and detonated at a designated target location but during movement it is driven into a preselected or target of opportunity. It is important to mention that with these types of devices there is a danger of dual initiation so if the bomber would change his mind, his faith would waver his group mate who observes the events would activate the explosive device remotely. Such vehicles are often equipped with external sensors, too.



2. illustration The opportunities of the placement of the explosive devices[7]

Even if the soldiers detect the attacker and possibly kill the driver the bomb activates even if the vehicle stops or crashes into something. There is a special variant of this attack, when more – usually three – vehicles are used in a coordinated follow up attack. The first suicide

[7] Source: Balázs BUKTA – Improvised Explosive Devices, HDF educational ingredient, 2009.

bomber penetrates any physical obstacle, road block. The second one clears the area for the third one which will strike the main target. Due to the three vehicles used the amount of explosives is huge and it is very effective. This is why this method is called the battering ram.

Suicide Personnel Borne Belt Improvised Explosive Device

The suicide bomber wears an explosive belt well hidden under his/her clothes equipped with materials for splinter effect. It is usually from an easy to form and hide statuesque material. They use military hand grenades very often due to their small size and relatively large splinter effect. By activation they can be mechanical, electrical, chemical or even remote, too. Similarly to the vehicle bomber in this case there is also a second person to perform the secondary activation. The belt carried by the person usually weighs about 5 kilos and contains several smaller separate charges. This quantity still provides the bomber a comfortable, safe, unobtrusive movement. The materials used to create splinter effect (ball bearings, nails, bolts, glass fragments) are included in the weight mentioned.

Suicide Personnel Borne Vest Improvised Explosive Device

Explosive vests are used in the same way. These provide more space for explosives to carry to and reach the target. Besides military grade explosives here they also use homemade materials. To create splinter they use metal fragments, steel balls. The purpose of this method is to kill target personnel in the close proximity of the bomber. This is a very simple device which can be activated mechanically, electrically, chemically or by remote detonator. In the Arabic countries they wear clothes that cover the entire body. This makes detecting and isolating individuals who attack with explosives an extremely hard task. A vest filled with explosive and splinter material can weight 15 kilos.

Explosives placed into implants[8]

Perhaps it is astounding to refer to terrorist attempts in conjunction of implants. We have to admit honestly that a healthy man will certainly not associate on bombing actions when talking about implants. But these „instruments" can be a real threat. By secret service sources radical surgeons learn the ways of plastic surgery in Europe then they return home and perform the lethal operations. We should note that plastic surgeons do not have to be extremists. Some implants are filled with simple saline fluids which can be drained with a needle later when the patient has already recovered. Then the implant is filled with liquid explosives. The most capable of those is PETN[9], injected in the implant it can cause huge damage even in small amounts especially on an airplane. It is almost impossible to detect explosives in a breast with regular airport security scanners. If the implant was done correctly the implant is not detected by body scanners only by a sensitive x-ray device. Since the explosives were put in a hermetically closed plastic bag it is impossible to detect with a normal scanner. It was known so far that people have hidden explosives they wanted to use into their vests and belts. Unsuccessful attempts have revealed that terrorists used women's bras, too to hide their explosive materials.

Command Wire Improvised Explosive Device

Between the starter unit and the explosive charge there is wire connection that closes the electric circuit. The person who activates the device has to see the target or to rely on another

[8] See more: DARUKA N. – Terroristák és taktikák, avagy védekezz, ha tudsz, Repüléstudományi Közlemények On-line folyóirat XXIV. évfolyam 2012/2. szám., HU ISSN 1789-770X, pp.: 33.
[9] PETN – pentaeritrit-tetranitrate – $C_5H_8N_4O_{12}$

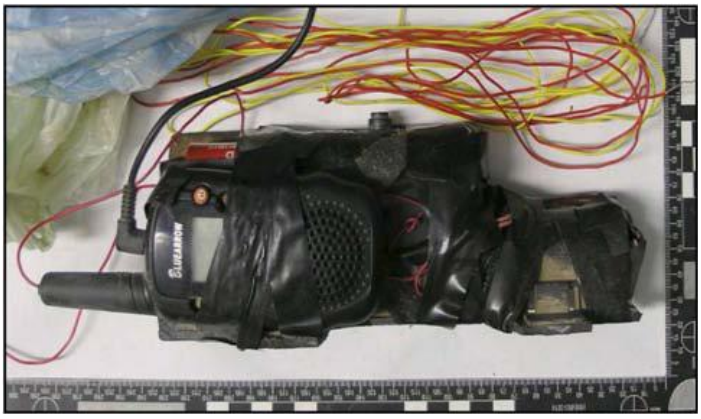
person who gives signal. This method became advantageous because of the radio jammers. It is fairly easy to detect, since both the starter's location and the observer should be within a few hundred meters.

Command Pull Improvised Explosive Device

Into the closed circuit home-made explosive device structure they put an interrupter which breaks the circuit. It functions the same way like a tripwire mine but in this case the wire is pulled by the terrorist manually. When the victim or target arrives close to the device – depends on the type of device used – the person pulls the string or wire to remove the interrupter. The circuit closes and initiates the explosion.

Remote Control Improvised Explosive Device

Both the transmitter and the receiver are either a mobile phone or radio device. The advantage of this type of starter device is the long distance from the receiver unit. The observing person does not have to be close to the target which increases his safety. Its biggest drawback is however the presence of radio jammers. Mobile phones use their own network frequency to transmit signals.



2. picture Personal Mobile Radio than construction setting off [10]

The base of RCIEDs is a signal emitted from a radio transmitter which is capable to activate the explosive device which is equipped a proper receiver. The bomber owns the transmitter the RCIED has the receiver. For this system to work, the receiver must be in the range of the transmitter. The output of the transmitter determines the distance from which the device can be detonated. The equipment they can acquire can have different capabilities. Toy remote controllers are better than wireless door bell switches – not to mention CB radios. Radio remote controllers are produced by different standards in different regions. This means that who can construct such remote device has to be an expert in this field and this makes it easier to find them.

Command Operated Improvised Explosive Devices

Remote controllers and wireless doorbells use relatively short range signals. Since the operation of these units is not safe they usually turn on the device just before the explosion reducing the chance of premature activation. The transmitter and receiver must be within 2–100 meters. Normal remote controllers cannot transmit to a distance of 100 meters they

[10] Source: IED SMART BOOK – COMBINED EXPLOSIVES EXPLOITATION CELL – AFGHANISTAN, 1st Edition, Current as of: 13 SEP 2006.

usually build in a signal amplifier. This is the only modification between normal remote controllers which can be found in commercial stores. The power source is small, so this equipment can only operate for a short time.

„There is no protection against all threats, but a protection suit not worn does not protect and gives no chance of survival."[11]

AVAILABLE METHODS OF PROTECTION

„Our best friend in the fight against explosive devices is distance." – a bomb technician.

We have a wide choice of protection, if we are prepared to the possibility of bombing attempt. It is highly unlikely that we go for shopping in a splinter-proof vest. But if we live in a territory where bombings were committed there any means of protection can be vital. In such territories the military can provide the biggest help. Soldiers are prepared to filter out existing hazardous elements within the given territory.

The military like other armed forces worldwide use search dogs to find explosives. The dogs are trained and prepared for this task on a strict training where the demand for accuracy is great – there is no place for mistakes.

Search dogs can be trained to find military, industrial and home-made explosives as well as multiple types of narcotics. Besides the keen nose of dogs trainers utilize their good ability of learning, too to find explosive materials since materials cannot be found in the nature and they have to be taught to recognize their unusual scent. The dogs meet these scents gradually which they have to recognize later. The amount of material the search dog has to find depends on the terrorists what they want to blow up. It is possible that they put explosives into a pen, or a parking car but they can also undermine a building. The dogs are trained to recognize and signal an amount between 10 dkg and 10 kg. Also important to teach the dogs that the material they find (narcotics, explosives) must not be eaten or bitten. In case the dogs trained to search for narcotics find something they signal their master by scratching or barking. But explosive searching dogs must not make noise or touch anything any of these can initiate explosion. Instead of these they either sit or lay down to signal the dog handling officer. It has a meaning why the dogs use different ways of signal. If the signal is sitting it means the material is higher than the level of her nose. A prone position can mean the material is on the ground. Therefore dogs are capable of finding and tracking suspicious materials in a crowd of people and marking the spot or person who carries it. After the person has been successfully identified and we know how the person wants to activate the explosive device then we also have to take defensive actions to avoid falling a victim ourselves as well. The best choice for this purpose is a blast suit. The EOD–9 suit was constructed in such way to provide protection for the personnel performing EOD[12]/IEDD[13] tasks against the primary physical effects created by the explosion such as pressure, blast, heat, and fragmentation. The EOD–9 suit has been designed to provide maximum protection and comfort to the user to perform all operation tasks easily. In case of an explosion we can have adequate protection. Robots can help our work as well also they increase the distance. The primary task of robots is to help handling improvised explosive devices but they are also used to search inside buildings, aircraft and motor vehicles. The utilization of robots more and more reduce but does not exclude the human factor in defusing jobs in direct contact with explosives. With their help the distance between explosive devices and the bomb technicians working to defuse them can be considerably increased and accidents taking human lives can be avoided.

[11] UNION PLUS Kft. www.unionplus.hu/lap1.htm, 2009.10.23.
[12] EOD – Explosive Ordnance Disposal.
[13] IEDD – Improvised Explosive Device Disposal.

SUMMARY

Nowadays, the terrorist threat and the fight against it can be a concern all of us, anytime. The obligations arising from international treaties constantly carry the possibility of an aggressive attack. The events in our country in the past few years even if painful are good examples that we have to change. In this case the possibilities of the creation of explosive devices, the development of active and passive defensive methods and also the modernization of security technologies play important roles. It is vital for all of us to unite against terrorism that has now grown global. This is a fight or war which differs from all previous conflicts because it is being fought against an invisible enemy. This enemy usually has neither its own country nor their own government. They are not organized into a military force, they do not wear uniforms, there is no government which takes the responsibility for their actions. They do not comply to international treaties, and it can happen that the person who sits down next to us on the bus follows the same ideology. The protective equipments which can prevent a possible tragedy are the most important. By the usage of such protective equipment, by complying to security procedures and thorough preparations we can receive the opportunity to assure the safety for the people and for ourselves as well.

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