Cluster munitions and their submunitions—a personal view

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In 1975, a few months after the Viet Nam War ended, and two years after the last bomb fell on the Lao People's Democratic Republic (PDR), I joined the British Army. Not that I understood much of events in South-East Asia; it was thousands of miles away with very little British involvement. As for many 16-year-olds brought up in a socially deprived area, the army was a good option for me: reasonable wages, career opportunities, travel and adventure. I began training and at first it was quite mundane; learning to be a soldier in the mornings and education every afternoon. But after six months we began to train as combat engineers: bridge building, water supply, demolition, field defences, as well as airfield, road and camp construction.

We also learned the art of mine warfare, where we practised laying and breaching minefields as well as setting and clearing booby traps. There was no mention of cluster munitions, even though they had been used in Europe during the Second World War and more recently in South-East Asia. The SD2 "Butterfly Bombs" that fell on Belgium, France and the United Kingdom in the 1940s had been forgotten, even though the effect of these weapons on civilian populations had been widely reported: a British newspaper stated that on 13 June 1942 over 3,000 such submunitions had fallen on Grimsby and Cleethorpes, resulting in the deaths of 74 people and injuries to a further 88. The article said that "the wings are coloured black and yellow which makes them attractive to children". In contrast, the humanitarian impact of the use of cluster munitions in South-East Asia went unreported. Cambodia, Lao PDR and Viet Nam were under communist rule; the problems caused by these weapons were kept firmly behind closed borders.

My first real introduction to cluster munitions was during combat engineer training in the early 1980s. Only they were not referred to as cluster munitions, but as "area denial" or "runway denial" scatterable munitions systems. We were taught how to recognize the munitions and how to carry out rapid clearance of affected areas. This would generally employ some very bizarre techniques, such as shooting them from a distance with a large-calibre weapon, or moving them to one side using an armoured bulldozer or high-powered water hose.

Meanwhile, war was being fought in the Falkland Islands. The United Kingdom's Royal Air Force dropped BL755 cluster munitions on tactical targets. Argentine casualties from these attacks are not known; what is known is that there were no civilian casualties or humanitarian problems in the areas

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where the weapons were used. After the conflict, bomb disposal units quickly cleared (or in some cases fenced) unexploded submunitions so again no real lessons about these weapons were learned.

That was all to change in the late 1980s, as information became available from Afghanistan and South-East Asia. It was obvious that there was a real crisis in Afghanistan, Cambodia and Viet Nam—landmines were claiming hundreds of victims a year and the dangers of unexploded submunitions were becoming all too apparent, particularly in Afghanistan and Lao PDR. In the early 1990s, in the aftermath of the first Gulf War, the danger of unexploded submunitions would be confirmed once and for all. In Kuwait and Iraq, soldiers of all nationalities, as well as personnel from commercial and non-governmental organizations, were involved in post-conflict clearance, and all learned harsh lessons regarding the dangers of cluster munitions: the submunitions released by these weapons created both civilian and military casualties. It was apparent that failure rates were not always as predicted and unexploded submunitions were causing a real humanitarian problem. These findings were reinforced as conflict spread in Yugoslavia.

Training was adapted to encompass clearance techniques that were safe and effective for dealing with submunitions. And we were no longer referring to the weapons as "area denial" or "runway denial" scatterable munitions systems, but correctly calling them cluster munitions that release submunitions over an area. It was obvious that the weapons did not simply deny the enemy an area, they could also be used for area attack, and not just on aircraft runways, but on any military target.

It also became apparent that only *after* an attack could accuracy or failure rates be established. Often, when released by aircraft, the cluster-munition strike could be some distance from the intended target, and unexploded submunitions could total in excess of 50% of the payload. This could be down to any number of reasons, though flying at night, in bad weather, and over hostile territory were the most common.

As British soldiers we were told that these weapon systems were the best and most effective way of engaging an enemy whose assets were dispersed over an area. But as military Explosive Ordnance Disposal (EOD) Operators we were beginning to understand that the so-called "collateral damage" caused by unexploded submunitions was in fact a serious humanitarian problem—not to mention a significant personal danger to those of us responsible for post-conflict clearance.

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In 1999, I left the army and began to work for a commercial clearance company in Kosovo, where I had my first experience clearing submunitions. By November, when I arrived, there had already been plenty of casualties from unexploded submunitions. During the short conflict in Kosovo 1,765 cluster munitions containing more than 295,000 submunitions were used. Assuming failure rates of 5–30%, this left between 14,750 and 88,500 unexploded submunitions in the province. I was an EOD/Survey Team Leader with a clearance organization and my responsibilities included disposal of unexploded ordnance and survey of cluster-munition strike areas—though regular accidents involving submunitions meant that our small teams were instructed not just to mark strike areas but also to destroy visible submunitions to prevent further accidents.

I remember my team being sent to a site south of Pristina in early 2000. A cluster-munition strike had occurred on an isolated farm several kilometres away from where the nearest Serbian military unit had been positioned. We met with the farmer, who sadly explained that his 13-year-old son had died after an accident with a "Serbian mine" a month earlier. On hearing an explosion the farmer had run from the house to the field where his son lay. The boy died in his father's arms before any help could arrive. When I asked about the mine the farmer went into an outbuilding and brought out some shrapnel that he had collected from the scene. I saw immediately that the boy had not been killed by

a mine, but by a US-made BLU97 submunition. The farmer probably knew what the shrapnel came from but could not bring himself to believe that the forces who had come to liberate his people had also brought about the terrible death of his son … it was better to blame the enemy. After two months of hard work his land was cleared and other children were safe.

On 23 April 2002, when I was working in southern Lebanon, there had been an accident in the small village of At Tiri, resulting in the death of one young boy, serious injuries to another and minor injuries to a third. The boys were all brothers. I went to the village to conduct a survey and report on the accident. The boys' uncle told me that the three brothers had been playing about 100m from the family home. The rest of the family was sitting outside drinking tea when an explosion rocked the house. They all raced to the scene to find the oldest boy seriously hurt and the youngest bleeding from small fragmentation wounds; the middle child had been torn apart and was already dead. After the accident, the younger boy told his uncle that they had found a metal "ball". Noticing that it was two spheres joined together, the brothers decided to open it. The dead boy had taken the "ball" from his brother and struck it quite hard against a rock. Nothing happened so he struck it again, and this time it exploded. It was, of course, a submunition, and from the fragmentation most likely a BLU63. We later found out that the village had been bombed in 1978 by the Israeli Air Force, and that since then over 300 submunitions had been found. Incredibly, many had been thrown down an old well to prevent the children from playing with them. These submunitions, dropped 24 years previously, had found a new generation of unwitting victims.

The dangers of unexploded submunitions are not only faced by civilians. There have been many soldier and deminer casualties worldwide, especially during post-conflict clearance. In Kosovo, two British Gurkha soldiers were blown to pieces on 21 June 1999 while trying to remove submunitions from a school in the village of Orlate; and on 6 April 2001, during the clearance of a site in the town of Grebnik, a BLU97 detonated, killing one deminer instantly and disabling another for life.

The problem with submunitions

The difficulties of clearing unexploded submunitions are associated with the inherent problems of the weapon. Comparisons have been made between landmines and submunitions and there are indeed similarities. But there are also fundamental differences. Landmines are primarily "area defence" weapons: they are usually laid deliberately and hidden. This "hidden hazard" promotes fear, as we are naturally afraid of what we do not see. Generally, people will avoid areas where they know landmines to be hidden (although this is usually only after an accident). Submunitions, on the other hand, are delivered remotely in an indiscriminate manner and often fail to explode. They are usually visible and remain on the surface, but in certain conditions, such as soft, wet or sandy soil, some will be buried. They thus present an "exposed hazard", which generally promotes curiosity. The unusual shapes, sizes and colours of the submunitions simply heighten this curiosity—particularly in children. (It is strange that this phenomenon, reported as long ago as 1942, never altered subsequent submunition designs.) Unlike landmines, people will not avoid an area even after an accident involving a submunition, because they can see the hazard and therefore believe they understand how to avoid the danger. Unfortunately, however, they may not understand that submunitions may have been buried, posing a hazard when ploughing, excavating, hunting, collecting firewood and undertaking many other normal activities.

Despite their inherent problems, in future, more cluster munitions are likely to be used more often. In recent conflicts, cluster munitions have more frequently been delivered to their targets by artillery or rocket than by aircraft: it is less risky (and less expensive) than committing an aircraft to fly over a battlefield, and means the munitions can be delivered more quickly from a distance. For

example, UK artillery fired approximately 2,000 L20 cluster munitions during the battle of Basra from a distance of around 30km. They released 98,000 M85 submunitions. During the same battle, British aircraft dropped only 66 BL755 cluster munitions containing 9,702 submunitions. As the artillery-fired cluster-munition weapon system is known to suffer a 2% failure rate, at the very minimum there would have been close to 2,000 unexploded M85 submunitions remaining after the attack.

The countries that possess these weapons claim that they are necessary for the military to carry out effective and decisive operations. This is not strictly true, however, as recent conflicts, particularly in Kosovo, demonstrate that the weapons are not entirely effective in suppressing a well-disciplined enemy force. Cluster munitions are not target-specific and are neither aimed nor guided. They are in fact a "dumb weapon" that can only be aimed "in the general direction" of the enemy, and once the submunitions are released it is a matter of luck whether they hit a target or not. Their use is similar to carpet bombing, which is inefficient and very often ineffective.

There have been efforts to improve submunitions: later models of submunition are more effective, with a failure rate of just 1% (again, this failure rate is determined during trials rather than "live" operations). This has been achieved by increasing the sensitivity of the fuzes: meaning that the 1% of failed submunitions have more sensitive fuzes and therefore present even more of a hazard than the 5–30% of older-generation weapons. This "improvement" clearly does not reduce the danger posed by unexploded submunitions.

Even newer submunitions can be fitted with self-neutralization or self-destruct mechanisms. But these are subject to failure during manufacture, storage or use—submunitions hit the ground at high velocity from a considerable height, so if they do not explode they are likely to be damaged. Only an expert would know if the self-neutralizing mechanism was damaged; an untrained individual could easily pick up such a munition in the belief that it was neutralized. Thus, an unexploded submunition of this type could have two mechanisms that would cause it to detonate when handled.

The BLU97 was also an "improved" submunition: it was fitted with an "always acting" fuze, which would function no matter how the munition landed. We now know that this "always acting" submunition fails between 5 to 30 times per hundred, but we only found out the hard way—after it had been used on live targets.

The challenge of clearance

Most deminers have a healthy respect for all unexploded ordnance, but especially for those with sensitive fuzes. As we know, manual landmine clearance is a time-consuming and expensive activity. But we back up the clearance using the "toolbox approach", deploying machines and dogs either to supplement manual clearance or reduce the size of the area to be cleared. Most mines that we encounter are laid by hand and concealed under the ground. Very few are delivered remotely. This can make the survey of suspect mined areas simpler in that we can think "tactically" and sometimes determine what the layer of the mines wanted to achieve and therefore have a good idea of where the mines will be. Mined areas are cleared systematically, employing well-practised and accepted procedures. When mines are found they are carefully excavated and either made safe and removed, or destroyed by placing an explosive charge next to them, which is then detonated from a safe distance.

When clearing cluster-munition strike areas we cannot think tactically; we can react to intelligence received from the military (if they are inclined to give it and if it is accurate) or to local information. Surveys can usually be carried out far more easily than for a mined area as there is generally more evidence above ground. This evidence includes such things as remnants of the container, packaging, craters and even "surface" unexploded submunitions. The survey is also safer—although care needs to

be taken not to disturb any unexploded submunitions—because any "subsurface" unexploded submunitions will not normally detonate by the pressure exerted by a footstep, allowing the survey team to move around the area more freely. Of course there are exceptions, and the survey can be extremely hazardous. In Kosovo, surveys were often carried out on steep, wooded terrain with dense foliage cover and leaf debris; slipping down a wet slope in a wood is no fun when there is a possibility of disturbing a concealed, armed BLU97 or BL755.

A cluster-munition strike area can also be marked out fairly safely. This is carried out in much the same way as for a minefield: the area is divided into boxes and each box is systematically searched by deminers working in lanes. This is achieved more quickly than for a mined area as there is usually no trip-wire threat (depending on the submunitions present) and, due to their high metal content, unexploded submunitions are easy to find with a detector or locator. Many will be found quickly as they will either be on the surface or only partially buried.

There is no making safe of unexploded submunitions, however. They are marked and then destroyed by placing an explosive charge next to them. The main problem comes with subsurface munitions, as these need to be very carefully excavated. This is most hazardous when excavating in hardened soil or clay, as the sensitivity of the munition is such that it is likely to detonate if it moves even slightly. Accidentally striking it with the excavation tool could also cause detonation. Due to the deminer's body position during excavation, any detonation will usually have serious, if not fatal, consequences. In addition, unexploded submunitions will be found damaged or in dangerous conditions. Apart from those on or under the surface, others may be found caught up in trees and vegetation or on buildings and structures. Some are prone to problems related to weather conditions and it is possible that, as the day warms up, these may unexpectedly detonate while deminers are searching.

There is no making safe of unexploded submunitions.

In my experience, the clearance of unexploded submunitions is far more hazardous than clearing mines, although others consider that clearing submunitions is no more hazardous than clearing other items of unexploded ordnance (UXO). Indeed, some very sensitive fuze systems do exist, particularly on certain rifle and rocket grenades, air-delivered rockets, missiles and large bombs. But these are never found in large concentrations in small areas and, because of their small numbers, they are generally dealt with by small, highly qualified EOD teams with specialist training.

My views on the challenges of clearing unexploded submunitions may not be shared by all deminers, either; some will say that they prefer clearing these munitions to mines. In fact, some deminers might even consider that the clearance of submunitions is safer. But my opinion is based on reflection post-accident. There can be no worse experience for an EOD technician or deminer than to suddenly discover that he is not "bomb proof". I spent much time in my hospital bed considering the past, and my work in Kosovo and Lebanon. I carried out some pretty deep analysis of what I had done, and there was no retrospective fear regarding the hundreds of mines I had made safe or destroyed, even though one had just taken my lower leg. Nor was there fear of the multitude of UXO or sophisticated booby traps cleared. But memories of clearing unexploded submunitions left me thinking how lucky I had been; remembering losing my footing and sliding down a wet, leaf-strewn slope and coming to a halt with a BL755 submunition between my legs; or digging in rock-hard soil and hearing the trowel strike the fuze end of a fully armed BLU97.

I was once told by a colleague: "If you have an accident with a landmine you would hope to live … if you have an accident with a submunition and survive, you will probably wish you hadn't". It took me many years to realize the truth of this statement and I consider myself fortunate that I still have hands, my sight, a mind that works and a heart that beats.