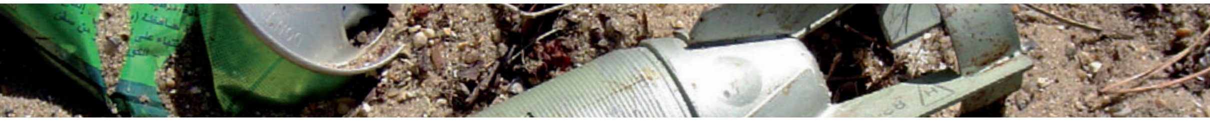
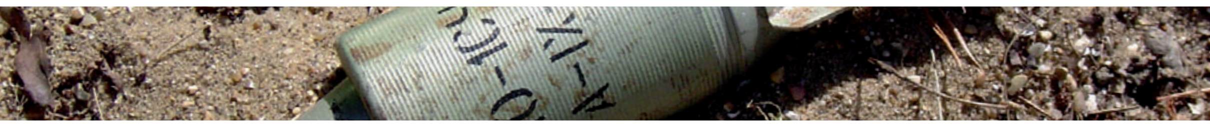
A Guide



to Cluster Munitions



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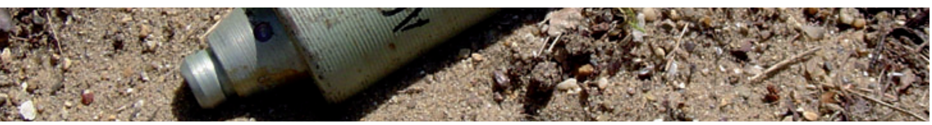
Guide to Cluster Munitions, First Edition, GICHD, Geneva, November 2007.
ISBN 2-940369-07-0



Acknowledgements
The GICHD would like to thank Austcare, Australia, Belgium, Canada, Finland, Germany, Handicap International, the International Committee of the Red Cross, Ireland, the UN Development Programme, the United States of America, Adrian Wilkinson, Head of the South Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons (SEESAC) and Colin King, a weapons expert, for their comments on an earlier draft of this Guide. They do not necessarily endorse any or all of the material presented in this publication and any errors remain the full responsibility of the GICHD.

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A GUIDE TO CLUSTER MUNITIONS

NOVEMBER 2007

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The international community has become increasingly aware of the need to deal with the hazards that all explosive remnants of war (ERW) pose to civilian populations. The recent entry into force of Protocol V on ERW of the Convention on Certain Conventional Weapons – on 12 November 2006 – and the worldwide expansion of explosive ordnance disposal (EOD) projects are indicative of this concern. Cluster munitions, which by design deliver submunitions over a wide area, are a specific and often significant post-conflict hazard to settled communities and returnees alike.

This Guide to Cluster Munitions provides practical information to those engaged in addressing the impact of unexploded cluster munitions on civilians. The Guide is intended particularly for States and their armed forces, as well as international and non-governmental organisations involved in clearance of cluster munitions or providing assistance to the victims. It reflects existing international legal obligations and provides background on recent moves to prohibit or restrict cluster munitions, but does not intend to supplement or expand on current international law.

The GICHD does not have a policy or advocacy role in this, or any other area. As such, the Guide is intended to support the work within both the Convention on Certain Conventional Weapons on cluster munitions, and also the "Oslo Process". The Guide should be considered a 'work in progress' and an updated and revised edition is planned to be released by early 2009.

We hope that the Guide will be a useful resource to States, international, regional organisations, and civil society and those involved in addressing the consequences of these weapons, as well as journalists, academics and newcomers to the issue. We would like to thank Lithuania and the United Kingdom for their generous support of this publication.

Ambassador Stephan Nellen
Director
Geneva International Centre for Humanitarian Demining

CHAPTER 1

WHAT ARE CLUSTER MUNITIONS?

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This chapter provides an overview of the types of cluster munitions in existence and reviews some of the different definitions of a cluster munition currently under discussion – none has yet found consensus under international law. For the purpose of this publication, it is considered that a "cluster munition" means both the dispenser or 'parent munition' and the explosive submunitions it disperses, however they are deployed.

A submunition is an individual item of explosive ordnance contained within the dispenser or 'parent munition' and which is ejected or dispersed at some point after the cluster munition is fired, launched or dropped. Submunitions can be delivered from the air, the ground or (much less commonly) the sea. Today, submunitions typically[1] include a high explosive content, and in many cases a dual method of attack: fragmenting metal (similar to a hand grenade) to inflict injury on personnel and damage to materiel, and a shaped charge to penetrate armour and other hard surfaces.

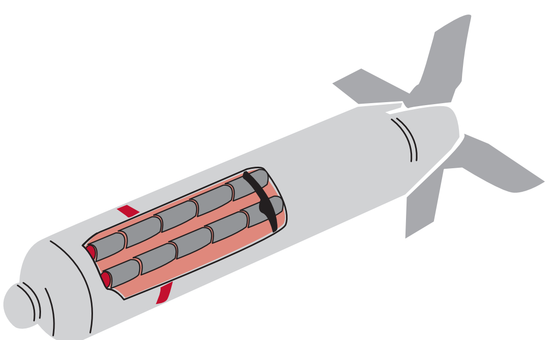
CLUSTER MUNITIONS: TYPES AND CAPABILITIES

The enormous diversity of these weapons makes it difficult to categorise them simply. According to Human Rights Watch, 33 countries have produced at least 208 different types of cluster munitions.[2] The main types are described in this chapter by their characteristics and effects.

The different types of cluster munitions are reviewed in five categories, depending on:

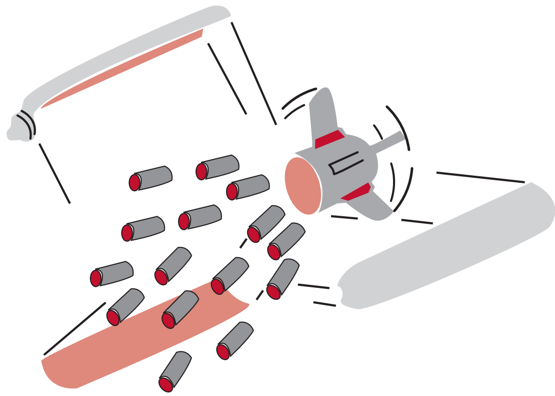
- their means of delivery;
- their intended effects;
- the type of fuzing system they contain (including sensor fuzing systems);[3]
- whether or not they have a target or guidance mechanism; and
- whether or not they have a self-destruct mechanism.

Figure 1 | Air-dropped cluster munition (before opening)



WHAT ARE CLUSTER MUNITIONS?

Figure 1 | Air-dropped cluster munition - dispersal of bomblets after opening



Means of delivery

There are four principal ways of delivering submunitions onto a target:

- tube-launched (e.g. shell, mortar or naval gun),
- bomb,
- aircraft dispenser, and
- rocket/missile.

Although most submunitions used to be air-dropped by bombs (e.g. in conflicts in Afghanistan, Cambodia, the former Federal Republic of Yugoslavia, the Lao People's Democratic Republic and Viet Nam), ground-based delivery has become increasingly prevalent, most notably in the First Gulf War, the conflict between the USA-led Coalition and Iraq in 2003 and the conflict in Southern Lebanon in 2006. Human Rights Watch have indicated that most of the cluster munitions in stockpiles are believed to be ground-based systems.[4]

Intended effects

Submunitions are intended for use against different targets and therefore their effects also differ. Some are fragmentation devices intended to kill or injure personnel. Others are anti-armour, typically a High Explosive Anti-Tank (HEAT) shaped charge designed to penetrate the armour of tanks and other protected vehicles.

The high explosive charge of a HEAT warhead incorporates a conical metal liner (usually made from copper). On detonation, the liner is forced into a high velocity molten jet, which is projected forwards into the target. The density and velocity of this jet give it the ability to penetrate armour and other hard surfaces to a far greater depth than high explosive could otherwise achieve.

Increasingly, there has been a trend towards combining effects in order to make submunitions more versatile; this allows the same submunition to be employed against multiple target types. This move towards multi-purpose ammunition is partially responsible for the increased employment of cluster munitions in recent conflicts. 'Dual-purpose improved conventional munitions' (DPICM) combine anti-armour and fragmentation effects, while 'combined effects munitions' (CEM), add an additional incendiary element.[5]

An example of an anti-personnel submunition

The Russian AO-1SCh bomblet, which weighs 1.2 kilograms and is 49 x 156 millimetres (see Figure 1), is an anti-personnel submunition.[6] One hundred and fifty bomblets are dispersed by the container (RBK 250-275) over an area of some 4,800 square metres. These submunitions have been used in Chad, Chechnya and Tajikistan.[7]

Figure 2 | Russian AO-1SCh bomblet | © Colin King

An example of an anti-armour submunition

The US Mk 118 'Rockeye' (see Figure 2) is an anti-armour bomblet developed in 1968, during the Vietnam War. The parent cluster bomb uses an Mk 7 dispenser known as a Tactical Munitions Dispenser containing 247 of the bomblets. The filled bomb, known as a Cluster Bomb Unit (CBU), weighs around 230 kilograms and is opened by explosively splitting the casing when the time-delay fuze functions. The dart-shaped submunitions are 316 millimetres long, weigh 600 grams and incorporate a 183-gram shaped charge to penetrate armour. When ejected at an altitude of 150 metres, the bomblets cover an area of approximately 4,800 square metres.

Figure 3 | Rockeye anti-armour submunition | © Colin King

An example of a combined effects munition

A widely-used combined effects munition is the CBU-87 cluster munition (see Box 1); the BLU-97 submunitions it disperses incorporate a HEAT warhead capable of penetrating more than 200 millimetres of armour. The body of the submunition, made from internally notched steel, shatters into approximately 300 fragments which are able to kill personnel, disable vehicles and damage to materiel over several dozen square metres. Also incorporated into the body of the submunition is a zirconium ring, which has an incendiary effect intended to ignite fuel and other combustible materials in the target area.

Box 1 | Overview of the CBU-87 Combined Effects Munition*

The CBU-87 Combined Effects Munition (CEM) cluster bomb was introduced in 1986 as a replacement for earlier, Vietnam War-era cluster bombs. The CBU-87 CEM comprises the SUU-64/B Tactical Munitions Dispenser, the FZU-39 proximity fuze, and 202 BLU-97/B Combined Effect Bomb submunitions.

The CBU-87 can be delivered at any altitude and at any airspeed. In addition, because the CBU-87 is proximity fuzed (i.e. set to explode at a pre-defined altitude), it can be "toss" delivered, to increase the target stand-off distance. The bomblet dispersal pattern and impact area can be modified by adjusting the rate of spin on the munition dispenser and the altitude at which it opens. Set to a low rate of spin (e.g. less than 500 rpm) and opened at low altitude (e.g. less than 300 feet – 90 metres) a single CBU-87 will dispense bomblets over an area of 120 by 200 feet (approx. 35 x 60 m), with an average of nine feet (2.7 m) between bomblets. Depending on spin rate and altitude of dispersal, the coverage pattern can range from 70 x 70 feet to 800 x 400 feet (21 x 21 m to 243 x 121 m).

The SUU-64/B dispenser is made of fibre glass, and is olive drab in colour. The dispenser is approximately 16 inches (40 cm) in diameter, 7.5 feet (2.3 m) long, weighs approximately 950 pounds (408 kg), and on deployment breaks apart into six separate pieces.

The BLU-97/B bomblet is yellow in colour, approximately 7 inches (18 cm) long, 2.5 inches (5 cm) in diameter, and weighs 3.41 pounds (1.5 kg). Prior to deployment the tail end of the bomblet is ringed with a series of copper metal drogue tabs. Once released, the drogue tabs orient the bomblet and deploy the munition's inflatable decelerator (essentially an air inflated pillow which both slows the munition down and orients the warhead.)

* Source: Military.com, accessed at: tech.military.com/equipment/view/88686/cbu-87-combined-effects-munition.html

An example of dual-purpose improved conventional munitions

Dual-purpose improved conventional munitions (DPICM) are dispensed in large numbers, generally from artillery or missiles. The tubular body of the submunition is normally made from steel with the open end housing a copper shaped charge liner. The other end of the body is usually domed and has a simple impact fuze fitted. The fuze incorporates a small threaded striker attached to a loop of fabric ribbon, folded over the fuze, allowing bomblets to be stacked closely, nose to tail, within the dispenser. The striker retains a spring-loaded slide fitted with a small stab-sensitive detonator.

On impact, inertia carries the striker forward into the detonator, beneath which is a small booster pellet and the main charge. The body is shattered and the shaped charge fired downwards into the target. In some bomblets, ball-bearings surround the body to enhance the anti-personnel fragmentation effect.

A Yugoslav DPICM submunition – the KB-1 – is delivered by the Orkan rocket (see Figure 3). It was designed to support to large army formations, by neutralising or suppressing[8] a variety of targets, from troops to armoured combat vehicles, as well as to provide anti-armour barrage fire.[9]

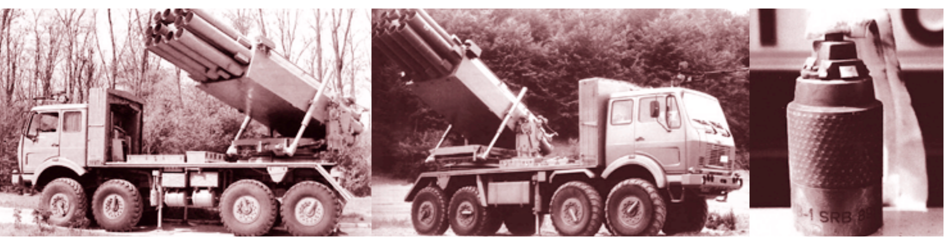


Figure 4 | M87 Orkan rocket [10]

When used with a cluster warhead, a single Orkan rocket contains 288 shaped-charge and fragmentation bomblets (see Figure 4), each containing 420 ball bearings of 3 millimetres diameter. The warhead casing is opened explosively, ejecting the submunitions from a height of 800 to 1,000 metres.[11] As they fall, the bomblets are stabilised by a fabric ribbon, which also arms a simple mechanical fuze; the bomblets are intended to detonate when they strike the ground (see below). The 288 bomblets are dispersed over an area of about two hectares (20,000 square metres); the lethal range of each steel fragment is about ten metres.[12]

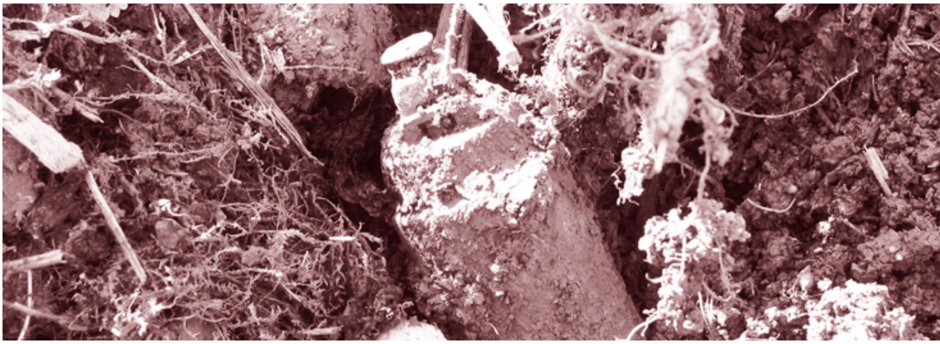


Figure 5 | KB-1 submunition

The fuzing of submunitions

There is a wide variety of ways to open the container, and to arm and initiate different submunitions. In general, submunitions use spin and air resistance to actuate their arming mechanisms, preparing them to explode on impact. This system is referred to as a fuzing mechanism and devices found in an unexploded state may be armed or unarmed depending on the effectiveness of the fuzing mechanism, as well as a large number of external and environmental factors.

Once the cluster munition has been fired, launched or dropped, the opening of the container is normally determined by a time delay or proximity fuze. The submunitions are normally dispensed by base ejection, nose ejection or case rupture. Base ejection is most common in projectiles, but is also used in other carriers and some cluster bombs. In both nose ejection and base ejection, the fuze usually initiates a small propellant charge, which ejects the base plug or nose and pushes the submunitions out.

Case rupture, used in some rocket and missile warheads, is achieved by small explosive linear cutting charges to blow open the container, and may also use a propellant charge to eject the submunitions.

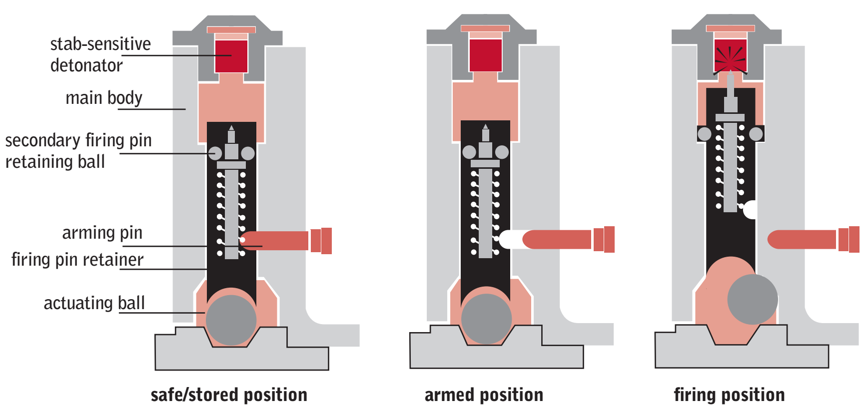
The majority of submunitions use some form of stabilisation (normally fins, a streamer or a chute) to bring them into a nose-down attitude, but some are designed to spin in the air stream and use this movement for arming. Since submunitions disperse after ejection, the density of the impact "footprint" (see Chapter 2) is mainly dependent on the speed and altitude at which the dispenser opens. Most submunitions are designed to detonate on impact, but some (such as scatterable mines) are victim-activated or incorporate delays.

Some of the more modern submunitions use small parachutes to stabilise their descent towards the target. Shortly after deployment from the container, a drag chute or small inflatable "air brake" is ejected from the rear. This is part of the process that allows a telescopic body to extend and arms the fuzing system.

When an anti-armour submunition strikes a hard object nose-first, the detonator at the rear of the shaped charge is initiated to produce the anti-armour effect. This can be achieved using a firing pin striking a stab-sensitive cap, or a 'piezoelectric' element, which generates an electric charge when mechanically deformed.

Secondary fuzing mechanisms may be incorporated to initiate the submunition if the primary fuze fails for any reason, such as impact at the wrong angle. Some use "all-ways acting" mechanisms that incorporate a ball-bearing housed in a chamber with sloping sides, meaning that they should function no matter what direction the subminition hits the ground. Sideways movement of the ball-bearing acts on the sloping surface to push a pin into a stab-sensitive composition. If these mechanisms are not actuated during impact, they can act like anti-handling devices when the submunition is subjected to further sudden movement. Like their fin-stabilised variants, most chute-stabilised submunitions produce an anti-personnel/ anti-materiel effect as the body is shattered, and many of the bomblets' exteriors are scored to produce consistent fragmentation.

Figure 6 | BLU-97 secondary "all-ways acting" fuze



Targeting of a cluster munition

Targeting of a cluster munition concerns both the capability of the parent munition to dispense submunitions over its target and the ability of the individual submunitions to fall and detonate where intended.

Humanitarian concerns have focused on the accuracy of targeting of submunitions. Most submunitions free-fall in a ballistic trajectory determined by a combination of factors, and can stray far from their intended target. Several anti-armour cluster munition systems now use independently targeted bomblets, which identify and fire at an individual vehicle. Improvements are also being made to the accuracy of air-launched and missile dispensers, which can incorporate wind correction, or inertial/GPS (Global Positioning System) guidance. However, such advanced systems are expensive.

The US BLU-108 Sensor-Fuzed Weapon (SFW) is an example of such a system, developed to detect and engage individual armoured vehicles without creating a wide-area antipersonnel effect. Features include advanced active and passive sensors (infrared, millimetre wave radar) and the ability to loiter above a target area. SFWs carry 40 submunitions, instead of several hundred. There are currently only a few types, although they are being researched, produced, or acquired by at least 14 countries. Their first and only use in combat is believed to have been in Iraq in 2003.[13] The US SFW is equipped with a self-destruction and self-deactivation mechanism.

Self-destruct or not self-destruct?

Self-destructing submunitions are designed to automatically detonate after a set period of time if they do not detonate on impact as intended. In the view of Colin King, a leading weapons expert, self-destruct mechanisms are incorporated in submunitions for two reasons. The first is to better protect friendly forces, which may need to move through or occupy an area where submunitions have been dropped (although they may also constitute a hazard to one's own forces). The second reason is to lessen the impact on civilians by reducing the number of unexploded submunitions (variously called "blinds" or "duds").[14]

The only DPICM incorporating SD to have seen significant operational use is the Israeli-designed M85. This was used by the UK during the 2003 conflict in Iraq, and then on a larger scale by Israel during the 2006 Lebanese conflict. In Southern Lebanon, the Israeli M85 was used alongside older DPICM. The self-destruct fuzes did not achieve the reliability claimed by the manufacturers but did have a significantly lower failure rate than the non-SD types. This showed that, at least in this case, incorporation of a self-destruct device reduced the overall failure rate, but was not a solution to submunition contamination. It also illustrated substantial difference between results obtained during testing, and the reality seen during operations.[15]

There are also cluster munitions that self-deactivate, which means that the fuze cannot operate through a chemical process within the submunition. According to Colin King, the Iraq conflict of 2003 saw the first major use of "sensor-fuzed" submunitions, designed to target and defeat armoured vehicles. An electronic fuze, which requires an electrical power supply, allows a sensor-fuzed munition to use a 'reserve battery', which is only activated when the weapon is deployed. If it fails to explode on impact, the short life span of the battery means that the power source soon becomes unavailable to initiate the warhead, providing a reliable method of "self-neutralisation". This does not make the weapon safe, but it does at least minimize the possibility of it functioning through accidental disturbance.[16] Within US and German cluster munitions stockpiles, 93 percent are said to be DPICM, 6 per cent are impact or time-delay fuzed bomblets and less than 1 per cent are sensor-fuzed weapons.[17]

DEFINITIONS

There is, as yet, no agreed definition of a 'cluster munition', 'cluster bomb' or 'submunition' under international law. Accordingly, this brief discussion of the definition of these devices is without prejudice to the ongoing and future development of international humanitarian law. The International Mine Action Standards (IMAS), issued by the United Nations,[18] define a submunition as *"any munition that, to perform its task, separates from a parent munition."* [19] (A munition in turn is defined in the IMAS as *"a complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions"*.)

As the UN has observed, its definition of submunition includes all munitions designed to explode at some point in time following dispersal, ejection or release from the parent cluster munition. These include "bomblets" (e.g. from air-dropped cluster munitions), "grenades" (e.g. from ground-launched artillery, rocket or missile systems), "remotely delivered landmines" and "improved conventional munitions".[20] The definition only refers to conventional weapons (i.e. it does not include atomic, biological or chemical weapons).[21]

There is no separate definition of a cluster munition in the IMAS. Within the context of the Convention on Certain Conventional Weapons,[22] three UN bodies (the UN Mine Action Service, UN Development Programme and UNICEF) have proposed a definition of cluster munitions as: *"Containers designed to disperse or release multiple submunitions."* [23] They state that this definition "includes containers or parents that are carried on or delivered by an aerial platform (e.g. an airplane or helicopter), or fired from ground or sea-based systems (e.g. a rocket launcher, artillery gun, naval gun, missile or mortar)." The definition further includes *"containers variously referred to as cluster bombs, cluster weapon systems, cluster dispensers, and cluster munitions shells"* but similarly only refers to conventional weapons.[24]

Standard NATO agreements (STANAGs) use the following definitions:

Submunition

"Submunitions are minelets or bomblets that form part of a cluster bomb or artillery shell payload"

"Any munition that, to perform its task, separates from a parent munition."

Cluster bomb unit

"An expendable aircraft store composed of a dispenser and submunitions." [25]

In May 2007, at the Lima Conference within the Oslo Process, the Chairs' discussion text contained in its Article 2 the follow definition:

"Air carried dispersal systems or air delivered, surface or sub-surface launched containers, that are designed to disperse explosive sub-munitions intended to detonate following separation from the container or dispenser, unless they are designed to, manually or automatically, aim, detect and engage point targets, or are meant for smoke or flaring, or unless their use is regulated or prohibited under other treaties."

In June 2007, within the Group of Governmental Experts of the Convention on Certain Conventional Weapons, Germany launched an initiative on a common understanding of cluster munitions.[26]

As of August 2007, Belgium was the only State to have adopted domestic legislation to prohibit cluster munitions. The Belgian law on Cluster Munitions of 9 June 2006 uses a broad general definition of submunitions (see Box 2), which excludes only those types containing smoke-producing material, illuminating material, or material exclusively conceived to create electric or electronic counter-measures. A second phrase excludes submunitions with the ability to discriminate soft targets, but it is believed that such systems have not yet entered into service.

Box 2 | Definition of submunition in Belgian legislation outlawing cluster munitions*

Submunitions means "any munition that, to perform its task, separates from a parent munition. This definition includes all munitions/explosive ordnances designed to explode at some point in time following dispersal or release from the parent cluster munition, except:

"dispensers that only contain smoke-producing material, or illuminating material, or material exclusively conceived to create electric or electronic counter-measures; and

"systems that contain several munitions only designed to pierce and destroy armoured vehicles, that can only be used to that end without any possibility to indiscriminately saturate combat zones, including by the obligatory control of their trajectory and destination, and that, if applicable, can only explode at the moment of the impact, and in any case cannot explode by the presence, proximity or contact of a person."

* Source: Loi complétant la loi du 3 janvier 1933 relative à la fabrication, au commerce et au port des armes et au commerce des munitions, en ce qui concerne l'interdiction des sous-munitions, Brussels, 18 May 2006 (unofficial translation).

Germany has proposed a more restrictive definition of the weapons. In April 2007, at a meeting of experts on the humanitarian, military, technical and legal challenges of cluster munitions hosted by the International Committee of the Red Cross, it proposed the following two definitions:

"Cluster munitions means an air-carried or ground-launched dispenser that contains submunitions with explosives. Each cluster munition is designed to eject submunitions over a pre-defined area target. Cluster munition does not mean a dispenser that contains: (a) direct-fire submunitions, (b) flare and smoke ammunitions, (c) landmines, (d) submunitions that are inert post impact, or (e) less than ten submunitions with explosives.

"Submunition of cluster munitions means a munition, which contains explosives and separates from a parent munition. Submunitions are designed to detonate on, prior to, or immediately after impact on the identified target."

This definition excludes sea-launched cluster munitions, direct-fire submunitions, those that are inert post-impact and those containing less than ten submunitions. These weapons, as well as target detecting submunitions, are defined as "alternative munitions":

"Alternative munitions means an air- or ground-launched dispenser that contains submunitions; the dispenser contains (a) submunitions that are inert post impact, or (b) less than ten submunitions with explosives. Alternative munitions are designed to eject submunitions over a pre-defined area target. They include multiple sensors with a capability to detect a target."

The German definition of cluster munitions and submunitions seems to cover types that have raised serious humanitarian concern so far (see Chapter 2).[27] It has, though, been questioned what is meant by "inert" post impact. Many argue that a high explosive munition that fails to function is not "inert" and recent tests (on the Israeli M85) have shown that unarmed duds can both arm and detonate if subjected to movement. It is also unclear what is meant by "direct fire" in this particular case and why this should be an exception. All cluster weapons are projected towards their target in some manner, directly or indirectly, but inaccuracy arising from dispersion still occurs once the submunitions have been ejected. Finally, there appears to be no restriction on the number of parent munitions containing fewer than 10 submunitions that can be used together.[28]

ENDNOTES

1 In this work we are mainly concerned with submunitions having high explosive (HE) fillings, although other types do exist.

2 "Human Rights Watch Memorandum to CCW Delegates: A Global Overview of Explosive Submunitions, Prepared for the Convention on Conventional Weapons (CCW) Group of Governmental Experts on the Explosive Remnants of War (ERW), May 21–24, 2002", Human Rights Watch, Washington DC, 2002, pp. 1–2.

3 See, for example, "Benchmarks for Alternative Munitions to Cluster Munitions 'Sensor Fused Area Munitions' (SEFAM), Additional explanatory information to the draft CCW Protocol on Cluster Munitions", UN doc. CCW/GGE/2007/WP.1/Add.1.

4 Human Rights Watch, Survey of Cluster Munitions Produced and Stockpiled, Briefing Paper Prepared for the ICRC Experts Meeting on Cluster Munitions, Montreux, Switzerland, April 2007, available at: hrw.org/backgrounder/arms/cluster0407/index.htm#_Toc165269835.

5 In this work, we do not consider landmines delivered by cluster munitions in any detail as they are covered by specific international agreements.

6 The letters "AO" stand for aviatsionnaya oskolochnaya, or "aircraft fragmentation". See Mennonite Central Committee report at: mcc.org/clusterbombs/resources/research/death/chapter2.html.

7 Handicap International, Circle of Impact: The Fatal Footprint of Cluster Munitions on People and Communities, Brussels, May 2007, pp. 48, 84, 90.

8 "Suppression" is an important role for cluster munitions – meaning to reduce the capability of a hostile force in order to defend, manoeuvre or counter-attack. Email from Colin King, 6 August 2007.

9 However, its use against the civilian population in Zagreb in 1995 led to the prosecution by the International Criminal Tribunal for the former Yugoslavia of Milan Martic, an ethnic Serb leader during the war in Croatia (see Chapter 8 of this Guide). See the Tribunal website (www.un.org/icty) and J. Poje, "Report on the Martic Case", p. 38.

10 www.geocities.com/Pentagon/7178/orkan.htm.

11 J. Poje, "Report on the Martic Case", p. 23.

12 ibid.

13 Human Rights Watch, Survey of Cluster Munitions Produced and Stockpiled, Briefing Paper Prepared for the ICRC Experts Meeting on Cluster Munitions, Montreux, Switzerland, April 2007, available at: hrw.org/backgrounder/arms/cluster0407/index.htm#_Toc165269835.

14 Colin King, in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 21. A submunition blind refers to a sub munition that fails to detonate or explode prior to, upon impact or immediately afterwards, and remains dormant on or under the surface of the ground, but which can be triggered when touched, moved or trodden on. See, for example, Norwegian People's Aid, Yellow Killers: The Impact of Cluster Munitions in Serbia and Montenegro, NPA, Belgrade, 2007, p. 8, although this uses the term 'dud' instead of 'blind'. Blind is more widely used by the professional EOD community.

ENDNOTES

15 Colin King, in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, pp. 12–13.

16 Colin King, "The Evolution of Cluster Munitions", in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 12.

17 Human Rights Watch, Survey of Cluster Munitions Produced and Stockpiled, Briefing Paper Prepared for the ICRC Experts Meeting on Cluster Munitions, Montreux, Switzerland, April 2007, available at: hrw.org/backgrounder/arms/cluster0407/index.htm#_Toc165269835.

18 The IMAS "are standards issued by the United Nations to guide the planning, implementation and management of mine action programmes. They have been developed to improve safety and efficiency in mine action." They can be accessed at: www.mineactionstandards.org. For an easy-to-read overview of the content of each of the IMAS, see, for example, A Guide to the International Mine Action Standards, Second Edition, GICHD, Geneva, April 2006, available at: www.gichd.org.

19 IMAS 04.10: "Glossary of mine action terms, definitions and abbreviations", Second Edition, 1 January 2003 (Incorporating amendment numbers 1, 2 & 3), #3.246.

20 UNMAS, UNDP and UNICEF, "Proposed definitions for cluster munitions and submunitions", UN doc. CCW/GGE/X/WG.1/WP.3.

21 ibid.

22 The formal name of the Convention is the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects.

23 UNMAS, UNDP and UNICEF, "Proposed definitions for cluster munitions and submunitions", UN doc. CCW/GGE/X/WG.1/WP.3.

24 ibid.

25 See "Overview of Existing and Proposed Definitions, Submitted by the Geneva International Centre for Humanitarian Demining (GICHD)", UN doc. CCW/GGE/2007/WP.5, Geneva, 12 June 2007

26 "Initiative on a Common understanding of Cluster Munitions", CCW/GGE/XV/WG.1/WP.3, submitted by Germany

27 See also "Benchmarks for Alternative Munitions to Cluster Munitions "Sensor Fused Area Munitions" (SEFAM), Additional explanatory information to the draft CCW Protocol on Cluster Munitions", UN doc. CCW/GGE/2007/WP.1/Add.1, submitted by Germany.

28 For example: under the German proposal, the M73 'Hydra' submunition would be exempt since it is carried in a "direct fire" air-launched rocket containing 9 bomblets. However, one launcher contains 19 rocket tubes, and several launchers can be fitted to a single aircraft. Therefore, despite the suggested limitations, this weapon could deliver hundreds of submunitions in a single strike, potentially creating a serious residual UXO problem. Email from Colin King, 10 August 2007.

CHAPTER 2

USE AND IMPACT OF CLUSTER MUNITIONS IN ARMED CONFLICT

USE AND IMPACT OF CLUSTER MUNITIONS IN ARMED CONFLICT

This chapter provides an overview of the use, military utility and impact of cluster munitions in conflicts around the world. Cluster munitions were first developed and used during the 1939–45 War by the Soviet Union and Germany. Cluster munitions were used extensively as a primary tool of modern warfare for the first time by the USA in South-East Asia between 1965 and 1975.[1] In total, tens of millions of cluster munitions have been used in at least 27 countries and territories. Human Rights Watch believes that 56 countries have stockpiles of cluster munitions.[2]

HISTORY OF THE USE OF SUBMUNITIONS[3]

The first significant use of cluster weapons was during the Second World War, when German planes dropped SD-2 "Butterfly Bombs" on the British port of Grimsby. Although only 1,000 or so bomblets were dropped, there was chaos in the town for weeks and the subsequent clearance task took around 10,000 man-hours. Almost as many people were killed after the raid as during it, as they attempted to collect or move unexploded submunitions.

The next major use of submunitions was during the Vietnam War, where both mines and impact-fuzed bomblets were dropped by the millions by the USA. It was also in Vietnam that the first combined effects munitions were used. The MK118 Rockeye bomblet contains a shaped charge – an inverted copper cone – that is sufficient to penetrate armour.

The worst affected country, however, is the Lao People's Democratic Republic (Laos), where an estimated 80 million bomblets were dropped.[4] As in World War II, these were air-delivered in cluster bombs, had mechanical impact fuzes and used a fragmentation effect. Many of those used in Laos were 'spin-armed' and contained an "all-ways acting" fuze designed to operate at any impact angle. This type of fuze is particularly dangerous if it fails to function as intended. Some 40 years after they were dropped in Laos, these bomblets are still causing casualties on a regular basis.

In 1982, the United Kingdom used BL755 cluster munitions during the Falklands conflict against Argentine positions. It is reported by Landmine Action that the only civilian casualties of the conflict were caused by cluster munitions. They believe that, based on the number of bombs dropped and the number of submunitions cleared by British military explosive ordnance disposal teams working on the island after the conflict, the minimum failure rate was 9.6 per cent.[5]

Extensive deployment of both air and ground-delivered cluster munitions occurred during the First Gulf War of 1991. Iraqi units were both devastated and demoralised by the continual submunition strikes that occurred throughout the "air war" phase of the campaign. The fact that the ground war lasted only four days and met little resistance was largely attributed to the effect of cluster munitions. Since the Iraqi forces were mainly in open desert, there was little impact on civilians, although there were many post-conflict casualties among allied troops and explosive ordnance clearance workers.

The First Gulf War also highlighted the excessive failure rate of these munitions. More than 95,000 unexploded bomblets were recorded during the clearance of the US sector of Kuwait, which probably represented around one quarter of the unexploded ordnance throughout the whole country. Despite evidence of high failure rates and the risk of a significant post-conflict hazard, the same weapons types were used again in Kosovo, Afghanistan and Iraq.

In the wars in Chechnya, cluster munitions were extensively deployed by Russian forces in populated areas, particularly in and around Grozny. In a cluster strike on Grozny market in 1999, witnessed by staff from an international demining organisation,[6] 137 people were killed and many more injured.

The Eritrea-Ethiopia conflict of 1998–2000 saw use of cluster bombs by both parties. In June 1998, Eritrean aircraft dropped cluster bombs in the Ethiopian town of Mekele, hitting a school. Fifty three civilians were killed and a further 185 were injured in the attack. Ethiopian aircraft also dropped cluster munitions on civilians in Eritrea. On 9 May 2000, UK-manufactured BL755s were dropped on a camp for displaced people. In the period after the attack, 420 unexploded submunitions were disposed of by a clearance operator.[7]

In May and June 1999, allied forces dropped over 240,000 submunitions (BLU-97s, BL755s and MK118 Rockeyes) on Kosovo (tens of thousands more were dropped on Serbia and Montenegro), causing at least 75 deaths and injuries to civilians at the time of use and more than 150 post-conflict casualties, and resulted in $30 million worth of post-conflict clearance. According to Colin King, in Kosovo alone, it is believed that the BLU-97 submunitions caused more fatalities than all of the landmines put together. He considers that this is largely due to the presence of an "all-ways acting" secondary fuze; the cause of so many casualties in Laos. Cluster munitions are still being cleared in Kosovo.

The USA dropped more than 248,000 submunitions over Afghanistan between October 2001 and March 2002, causing casualties at the time of use, exacerbating an existing problem with cluster munitions following Soviet use in the 1990s.

During major hostilities in Iraq in 2003, both air delivered and artillery delivered cluster munitions were extensively used. Although use of air-dropped cluster munitions in populated areas had decreased in comparison to past wars, the widespread use of ground launched cluster munitions, including M26 rockets fired by MLRS, resulted in significant numbers of casualties.

During the 2006 conflict in Southern Lebanon, Israel may have fired as many as four million submunitions at the south of the country. Israel used a combination of air, artillery and rocket delivered cluster munitions. These ranged from those containing Vietnam-era BLU-63 bomblets, (large numbers of which failed to explode) to M77 submunitions ejected from MLRS rockets, (many of which also failed to explode and subsequently caused civilian casualties), to the latest artillery delivered M85 submunitions fitted with self-destruct fuzes, which again failed in significant numbers. As of 31 May 2007, 904 cluster munition strike locations had been recorded, contaminating an area of up to 36.6 square kilometres.[8] Research undertaken by Landmine Action in September 2006 found that in 60 per cent of cases the centre of the strike was within 500 metres of the centre of a residential area.

In total, cluster munitions are reported to have been used in at least 27 countries and territories since World War II (see Box 3).

Box 3 | Armed conflicts since World War II in which use of cluster munitions has been reported*

Afghanistan
Albania
Angola
Bosnia & Herzegovina
Cambodia
Chad
Croatia
DR Congo
Eritrea
Ethiopia
Iraq
Kuwait
Lao People's Democratic Republic
Lebanon
Montenegro
Morocco (Western Sahara)
Nagorno-Karabakh
Russia (Chechnya)
Saudi Arabia
Serbia (including Kosovo)
Sierra Leone
Sudan
Syria
Tajikistan
Uganda
UK / Argentina (Falkland Islands)
Vietnam

* Source: Human Rights Watch, Survey of Cluster Munition Policy and Practice, February 2007; and A Dirty Dozen Cluster Munitions, June 2007

USE AND IMPACT OF CLUSTER MUNITIONS IN ARMED CONFLICT

MILITARY UTILITY

In a military context, cluster bombs or containers are a means of carrying and delivering significant quantities of explosive devices to a wide area in a short space of time. They deliver a large number of submunitions per parent munition and are used to damage airfields or roads, and to attack targets, such as infantry, armour and surface-to-air missile sites. Box 4 summarises some of the reported military uses of cluster munitions in armed conflict. It should be noted, however, no detailed military study of the military utility of these weapons – if one has been conducted – has ever been made public. This section is not, therefore, exhaustive.

Box 4 | Military use of cluster munitions in armed conflicts*

Anti-electrical An anti-electrical cluster weapon, the CBU-94/B, was first used by the US in the Kosovo War in 1999. These consist of a TMD (Tactical Munitions Dispenser) filled with 202 BLU-114/B submunitions. Each submunition contains a small explosive charge that disperses 147 reels of fine conductive fibre, whose purpose is to disrupt and damage electric power transmission systems by producing short circuits in high-voltage power lines and electrical substations. It has been claimed that "anti-electrical" cluster munitions allow for quicker restoration of power and lesser humanitarian impact as compared to other options, such as precision-guided bombs, that would destroy the facilities.

Anti-personnel Anti-personnel cluster bombs use explosive fragmentation to kill troops and destroy "soft" (i.e. un-armoured) targets. Along with incendiary cluster bombs, these were among the first forms of cluster bombs produced by Germany during World War II. These weapons were most widely used during the Vietnam War when millions of tons of submunitions were dropped on Laos, Cambodia and Vietnam.

Anti-tank Most anti-armour munitions contain shaped charge warheads to pierce the armour of tanks and armoured fighting vehicles. In some cases, guidance is used to increase the likelihood of successfully hitting a vehicle. Modern guided submunitions can use either a shaped charge warhead or an explosively formed penetrator. Unguided shaped-charge submunitions are also designed to be effective against entrenchments that incorporate overhead cover.

Anti-runway Anti-runway submunitions are designed to penetrate concrete before detonating in order to crater runway surfaces, thereby preventing use by high-performance jet aircraft. Anti-runway submunitions are sometimes used along with anti-personnel submunitions equipped with delay or booby-trap fuzes that act as anti-personnel mines, in order to make repair more difficult.

Anti-vehicle According to the UK, cluster bombs are an effective weapon against area targets such as a group of soft-skinned military vehicles. Nevertheless, it learned from the Kosovo campaign that it would be useful to have a capability to strike single vehicles more accurately.

Box 4 | Military use of cluster munitions in armed conflicts*

Incendiary Incendiary cluster bombs are intended to start fires, using submunitions of white phosphorus or napalm; some World War II types incorporated a small high explosive charge to hamper clearance and fire-fighting efforts. When used in cities they have often been preceded by the use of conventional explosive bombs to break open the roofs and walls of buildings to expose flammable contents to the incendiaries. One of the earliest examples is the so-called Molotov bread basket first used by the Soviet Union in the Winter War of 1939-40. Bombs of this type were used to start firestorms in the bombing of Dresden and the firebombing of Tokyo in World War II.

Chemical weapons During the 1950s and 1960s, the United States and Soviet Union developed cluster weapons designed to deliver chemical weapons. The Chemical Weapons Convention of 1993 banned their use.

Leaflet dispensing The LBU-30 is designed for dropping large quantities of leaflets from aircraft operating at altitude. Enclosing the leaflets within the bomblets ensures that the leaflets will fall on the intended area without being dispersed excessively by the wind. The LBU-30 consists of SUU-30 cluster munition dispensers that have been adapted to leaflet dispersal.

Mine-laying When cluster munitions are used to disperse mines, their submunitions are intended to be detonated later by a person or vehicle. Some dispensers, such as the US Gator system, contain a combination of anti-personnel and anti-tank mines. Some 'scatterable' anti-personnel types deploy tripwires, both of which complicate clearance.

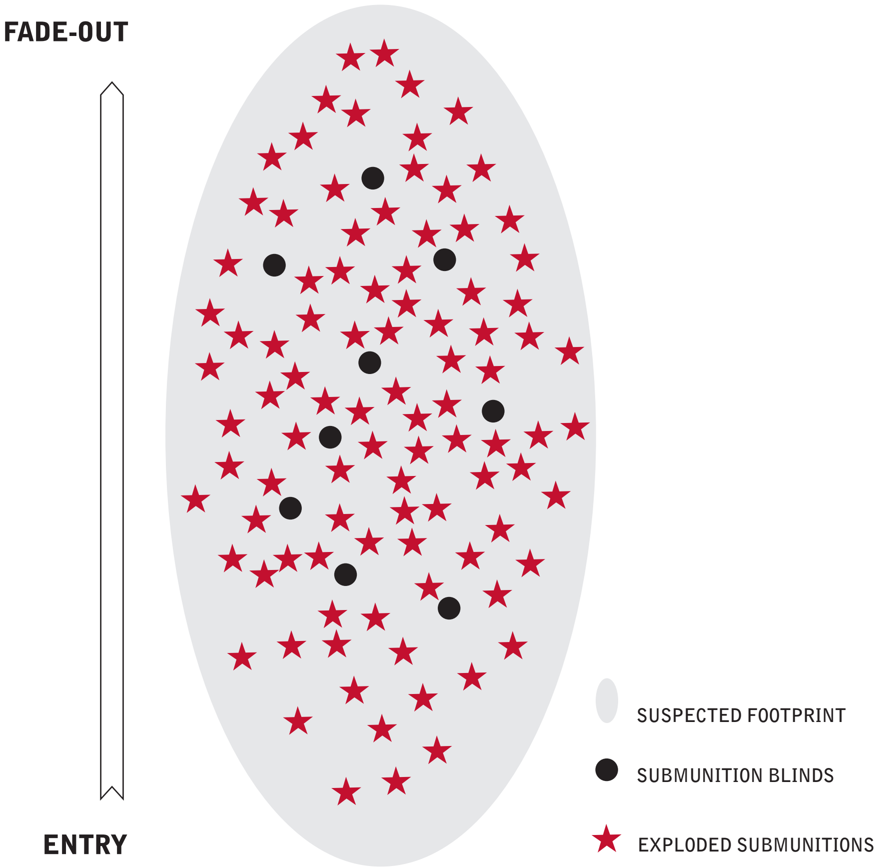
* Sources: Colin King; US, Report to Congress: Kosovo/Operation Allied Force, After Action Report and information provided by the US Department of State; UK Ministry of Defence, Lessons from the Crisis; and en.wikipedia.org/wiki/Cluster_bomb, updated on 12 July 2007 and 20 September 2007.

Cluster munitions are designed to disperse at altitude in order to target an often large area. Some cluster munitions engage individual targets dispersed over an area or concentrate their effects over a limited area. Columns of infantry, vehicles, armour, airfields, military installations, and roads can be targeted with relatively few strikes.

In addition to massed targets, the area effect of cluster munitions makes them suited for targets whose precise location cannot be fixed, such as moving targets or counter-battery fire in response to artillery attacks. The ability to engage these targets with fewer strikes has important force protection implications, as it reduces exposure to enemy counter-attack, as well as logistical and manpower implications, as reducing the number of strikes reduces the number of firing platforms, ammunition and personnel required.

A cluster strike leaves what is known as a "footprint" (see Figure 5), where the impact of up to hundreds of individual detonations are caused by the submunitions from the cluster munition.

Figure 6 | Cluster munitons strike footprint



The footprint is usually in an ellipse pattern, covering the entry (or beginning of the strike zone) and the "fade-out" (the end of the strike zone). Cluster strikes can deliver thousands of individual explosive devices (a single salvo of 12 MLRS rockets can deliver 7,728 bomblets), leaving a large area of potential contamination if submunitions fail to function as designed, and a confusing picture of overlapping "footprints" for clearance operators.

SUBMUNITIONS FAILURE RATES

One of the major humanitarian concerns regarding the use of cluster munitions is the numbers that fail to explode as intended and become 'blinds'.[9] Submunition failure rates are dependent on a number of factors, including:

- design (failures in design or assembly);
- length and condition of storage; (working parts deteriorated over time);
- drop height, angle, attitude and velocity (too high, too low, too slow, too fast);
- vegetation (heavy, dense, or soft);
- ground conditions at the impact area (soft, hilly, wet, etc.); and
- interaction (the effects of collisions, blast and fragmentation from other bomblets).

There are many individual factors and combinations which may influence whether a submunition will explode as designed or not. Also, submunition duds may be left in a highly dangerous state, partially or fully armed and often damaged. There are many instances of submunitions being moved several times, and then exploding on the last move. These weapons are extremely unpredictable. In essence, however, all submunitions are inherently dangerous once released from the delivery system and armed, and should be treated as such.

The rigorous design and manufacture of newer 'sensor-fuzed' munitions may make them less likely to malfunction than older mechanically fuzed types. Colin King has stated that electronic fuzes have proved more reliable than mechanical fuzes, primarily due to their lack of moving parts, the ability to test electronic circuits more thoroughly and the limitations of reserve batteries. In ammunition testing, it is impossible to check every single mechanical fuze, so sample lots are taken and tested. With electronic fuzes, each and every electronic circuit can be tested quickly and easily and this provides a better indication that the circuits are functioning properly.[10]

A study by the UN Institute for Disarmament Research (UNIDIR) concluded that post-conflict areas which are severely affected by unexploded submunition contamination (e.g. Laos) show that up to 15 per cent of submunitions failed to function. Given the high numbers of cluster bomb strikes typically made, this means that – even at the conservative estimates for failure rates in the range of 1 to 6 per cent – tens, if not hundreds, of thousands of submunitions or more remain unexploded posing a significant threat to communities, reconstruction and development opportunities post conflict.[11]

According to Chris Clark, the head of the UN clearance effort in Southern Lebanon, many of the actual areas targeted by cluster munitions are thickly vegetated with natural bush, citrus trees, banana plants and olive groves. This thick vegetation cover had the effect of slowing down the rate of descent of the submunitions and reducing the velocity of final impact. This in turn prevented the striker contacting the detonator with enough force to cause detonation. In such cases the striker may actually be in contact with the stab sensitive/friction activated detonator and any slight movement may cause the unexploded submunition to detonate.[12] The ribbons of some DPICM also became tangled in vegetation, catching the bomblets and suspending them above the ground in a nose-down attitude, ready to detonate should they become detached.

There is no common cause for the high failure rate of this weapon in the case of Lebanon. Unexploded items have been found: properly deployed and properly armed; properly deployed but not fully armed; and not properly deployed. These cause a significant post-conflict hazard that result in high levels of casualties for civilians and specialist clearance personnel (both civilian and military). They act as a lasting impediment to post-conflict rehabilitation and reconstruction.

IMPACT OF SUBMUNITIONS ON CIVILIAN POPULATIONS

The impact of submunitions during and after a cluster strike can be devastating to local communities. Even a low failure rate can result in a large number of submunition blinds because of the often high quantities delivered. That impact is felt directly and indirectly. In some countries and regions, submunitions are a major cause of deaths and injuries to civilians. Indeed, in a global study in November 2006, Handicap International concluded that 98 per cent of recorded cluster munition casualties were civilians.[13] This does not mean, of course, that this is representative of all submunition casualties. The study confirmed a total of 13,306 victims – killed and injured – from cluster munitions.[14]

At least as far as children are concerned, submunitions may be a greater threat than landmines. In 2001 in Kosovo, for example, the ICRC found that as compared to those killed or injured by anti-personnel mines, those injured or killed by cluster bomblets were 4.9 times as likely to be under age 14. Incidents involving cluster munitions were also much more likely than landmines to result in death or injury to several people.[15]

Although the most severe impact of cluster munitions is human, there can also be significant socio-economic consequences:

- Residential areas can be densely contaminated with large numbers of unexploded submunitions;
- Submunition blinds can endanger returning populations and prevent people from returning home;
- Cluster munitions can hinder relief efforts and impede work to rehabilitate communities;
- Unexploded cluster munitions can affect areas that are already subject to the highest levels of poverty;
- Cluster munitions can seriously affect livelihoods by blocking water supplies, disrupting work to restore power lines and preventing excavation of rubble and reconstruction efforts; and
- Unexploded cluster munitions can prevent or endanger the harvest of crops.[16]

In Laos, which suffered one of the heaviest bombardments in history, including massive use of submunitions, a study in 2006 by the UNIDIR concluded that: *"Economics and the impact of cluster submunitions are fundamentally bound together. The fact that these devices are still in the ground hinders development by restricting land use and delaying or adding to the costs of infrastructure projects. And because people are poor, they have no choice but to use the land or to collect UXO for the scrap metal, which then creates the possibility of deeper poverty resulting from UXO accidents."*[17] Indeed, cluster munitions are often encountered in affected nations in the search for scrap metal – a lucrative yet dangerous activity that puts the collectors in danger.

Following the 34-day conflict in Southern Lebanon in the summer of 2006, the south of the country remains littered with a huge number of unexploded submunitions. Since the end of the bombing through to April 2007, some 200 civilians were killed or injured by submunitions.[18] In addition, thousands more are denied access to their land and the ability to return to normal life. As at 13 April 2007, according to the head of the UN clearance effort in Southern Lebanon, the UN and its partners had located and destroyed 144,049 individual submunitions. But this major clearance effort had come at a cost: since the ceasefire on 14 August 2006, 29 specialist clearance personnel were injured while locating and clearing these weapons, of which eight subsequently died of their injuries.[19]

ENDNOTES

1 Handicap International, Circle of Impact: The Fatal Footprint of Cluster Munitions on People and Communities, Brussels, May 2007, p. 9.

2 "Human Rights Watch Memorandum to CCW Delegates: A Global Overview of Explosive Submunitions, Prepared for the Convention on Conventional Weapons (CCW) Group of Governmental Experts on the Explosive Remnants of War (ERW), May 21–24, 2002", Human Rights Watch, Washington DC, 2002, pp. 1–2.

3 This section is based on two excellent presentations to the ICRC's expert meeting on cluster munitions in April 2007 by Colin King and Simon Conway and the subsequent discussions. See International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, pp. 11–22.

4 Bounpheng Sisavath, "UXO Lao's Fight against Unexploded Ordnance", Journal of Mine Action, Vol 9.2, Harrisonburg, US, February 2006, accessed at: maic.jmu.edu/JOURNAL/9.2/focus/sisavath/sisavath.htm.

5 See International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 15.

6 HALO Trust.

7 HALO Trust.

8 Report of the Secretary-General on the Implementation of Security Council resolution 1701 (2006), S/2007/392, 28 June 2007, p. 10.

9 There is a further failure rate among submunitions equipped with self-destruct devices, some of which also typically fail to detonate as intended.

10 Colin King, reported in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 20.

11 Rosy Cave, Anthea Lawson and Andrew Sherriff, Cluster Munitions in Albania and Lao PDR: The Humanitarian and Socio-Economic Impact, UNIDIR, Geneva, 2006. UNIDIR Study Laos, 2006

12 Chris Clarke, "Unexploded Cluster Bombs and Submunitions in South Lebanon: Reliability from a Field Perspective", in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 43.

13 See Handicap International, Fatal Footprint: The Global Human Impact of Cluster Munitions, Preliminary report, Brussels, November 2006.

14 ibid., p. 136.

15 Explosive Remnants of War: Cluster Bombs and Landmines in Kosovo, ICRC, Revised Edition, Geneva, June 2001, p. 9.

16 See, for example, Landmine Action, Foreseeable Harm: The use and impact of cluster munitions in Lebanon: 2006, LMA, London, September 2006, p. 5.

ENDNOTES

[17] Rosy Cave, Anthea Lawson and Andrew Sherriff, Cluster Munitions in Albania and Lao PDR: The Humanitarian and Socio-Economic Impact, UNIDIR, Geneva, 2006, p. 35.

[18] Chris Clarke, "Unexploded Cluster Bombs and Submunitions in South Lebanon: Reliability from a Field Perspective", in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 41.

[19] Chris Clarke, "Unexploded Cluster Bombs and Submunitions in South Lebanon: Reliability from a Field Perspective", in International Committee of the Red Cross, Expert meeting: Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions, Montreux, Switzerland, 18 to 20 April 2007, ICRC, Geneva, May 2007, p. 42.

CHAPTER 3

CLEARANCE AND DISPOSAL OF CLUSTER MUNITIONS

CLEARANCE AND DISPOSAL OF CLUSTER MUNITIONS

This chapter considers the safe clearance and disposal of cluster munitions in accordance with the International Mine Action Standards (IMAS), taking into account the lessons learned in recent conflicts in which cluster munitions were used. The clearance of submunitions is a challenging and dangerous task, as explosive ordnance disposal (EOD) personnel will readily attest, but is urgently required if casualties from submunition duds are to be minimised. The sensitivity of many fuzing systems means that disposal *in situ* is the only safe option. In some countries, however, personnel have been required to pick up and carry submunitions for destruction elsewhere, sometimes with deadly consequences.

Mine action organisations generally refer to clearance of explosive ordnance other than landmines – i.e. explosive remnants of war (ERW) – as battle area clearance (BAC) or EOD. This chapter concentrates on BAC where submunitions are the main hazard rather than other ERW, although it is recognised that other munitions are likely to be found during the clearance process.[1]

CLEARANCE METHODOLOGY

Generally speaking, clearance methodology is a function of ongoing risk assessments made at both national planning and tasking level and on the ground by field operators. A submunition clearance task will normally be either:

- Visual / surface clearance; or
- Sub-surface clearance.

Visual / surface clearance

This method has been used on several occasions after conflict as a quick and effective means to remove the immediate hazard in an area, i.e. the visible threat. In many emergency response scenarios this is the kind of clearance methodology employed although it is hazard and terrain dependent. For example, it may be particularly appropriate in urban areas or on rocky hard ground where unexploded submunitions are lying on or above the surface. Surface clearance will normally include both the ground and also above it, e.g. in trees, fencing and/or caught in urban constructions.

Visual/surface clearance is often conducted during the emergency phase of a post-conflict clearance operation. The advantages are that it can be implemented quickly, with limited resources and can immediately lower the casualty rate. The disadvantages are that the local population tend to believe that the area is then safe, and may resume work there. The task may then be given a low priority for further clearance, or even deleted from the clearance schedule altogether.

In recent operations, many surface clearance tasks have left hazardous areas – in some cases (such as Kosovo) for many years – with inadequate or ambiguous official records and no local markings.

Where rapid surface clearance is conducted, it is therefore crucial that:

- the extent and limitations of the clearance are recorded;
- the local population are aware of the residual hazards;
- follow-on (sub-surface) operations must be planned as soon as possible.

In all instances where visual searches have been conducted, it is essential that accurate recording and reporting of the task is conducted for follow-up tasking if necessary.

Sub-surface clearance

At some point, all submunitions strike areas should be cleared using a sub-surface instrument search. It is much slower than a visual surface sweep, but provides a far more comprehensive solution. The choice of methodology is influenced by:

- Casualties;
- Ground use – urban, rural (grazing) or rural (agricultural);
- Terrain – access to the area, the type of terrain – hilly, rocky, soft, etc.;
- Impact on population – the population contained within the hazardous area or in the surrounding areas;
- Weather – both at the time of the cluster strike and at the time of the clearance task;
- Season – as above, it has bearing on the hazards posed by submunitions though vegetation, condition of ground, wind and rain, etc.
- Crop cycle – as above;
- Submunition hazard – especially important to the decision to make a surface clearance;
- Military data – access to official records of the number and type of cluster munition strikes; and
- Clearance history – important, especially dependent on the recording and reporting of clearance activities previously conducted.

Where possible, the clearance response should be conducted with a focus on first removing the immediate threat of unexploded submunitions to the population by clearing the surface threat; and following up the surface clearance with sub-surface clearance depending on the factors described above.

The extent and the depth of clearance should be decided by national authorities based on the particular situation they are facing. Generally, a standard should be set, for example to search 25–50 metres past the last seen submunition (to cover 'fade-out') and to search to a depth of 20 centimetres (for DPICM) and sometimes 50 centimetres or more for larger bomblets. This may change as a result of the risk assessment (taking account of soft ground, for example), but in any case, the decision making of this assessment should be fully documented.

RENDER SAFE PROCEDURES

Render Safe Procedures (RSP) are technical instructions for the destruction or neutralization of unexploded munitions. They are usually contained in technical manuals and are intended for use by trained EOD operators using specialized equipment. There are four general methods to destroy or neutralize a sub-munition:

- Destruction by detonation *in situ*;
- Destruction by deflagration (e.g. by the use of a point focal charge or pyrotechnic torch);
- Alternate methods to separate the fuze mechanism from the main charge;[2] and
- Manual neutralization of the fuze.

These are discussed briefly in turn. It should be stressed, however, that any RSP should only be carried out by appropriately qualified EOD technicians who are familiar with all aspects of the submunition and fuze mechanism design.

Detonation

Destruction by detonation *in situ* is usually the most appropriate RSP for submunition blinds. This means placing a high explosive "donor" charge beside the submunition where it fell, which also explodes the submunition. Of course, where clearance activities have to be conducted in or around populated areas or in areas of intense livelihood value, this may not be a popular decision among the local population. Where it is conducted, sandbags (or some other protective structure capable of containing the fragmentation) should be placed around the device and a high explosive charge placed beside it taking care not to disturb the submunition. In Lebanon, clearance operators have also reported using rubber tyres or a water-based "prill" sandbag system with some success in mitigating damage. Multiple submunitions may be disposed of using electric cable or detonating cord to link charges.

Deflagration

Destruction by deflagration is the rapid burning of the submunition explosive content without detonating it; this method is also conducted *in situ*. A purpose-designed shaped charge, (often referred to as a point focal charge), such as the Swiss RUAG SM-EOD system, may be used to induce deflagration of the main filling. It is generally safer than demolition as the charge can be deployed at a distance from the target (at least 80 millimetres), but it requires more training, tends to be more expensive and takes longer to set up.

The use of a pyrotechnic charge to induce deflagration of the submunition has been used with some success. There is, however, always a risk of the submunition detonating, and the same precautions are needed as for normal demolition. Deflagration may also leave live fragments of explosive and hazardous components, such as detonators, in the area.

Alternate techniques

Alternate techniques, such as the use of small linear cutting charges or explosively fired projectiles, are designed to separate the fuze mechanism from the main charge of the submunition. Once separated, the fuze well cavity of the munition should be inspected to ensure that no hazardous components of the fuze remain. If the fuze well cavity is clear of hazardous components then the munition can be moved and disposed of in a suitable location. It may even be possible to move the fuze, provided that all component parts can be positively identified and the EOD technician is certain that the initiation mechanism has been totally disrupted.

Manual neutralisation

Manual disarmament is rarely advisable but, in extremis, might be considered by EOD personnel for simple mechanical bomblets (such as the Russian AO-1SCh) in good condition. It should *not* be conducted for any submunition with electric or piezo-electrical fuze components. In particular, it should be considered only where a grave and immediate threat to human life exists.

OPERATIONAL PLANNING [3]

Planning for battle area clearance and submunitions disposal operations generally consists of three phases: pre-emergency planning; emergency planning; and post-emergency responses. Although the bulk of mine action programmes deal with planning in the post emergency context, it is necessary to be aware of the other phases of response planning. Some of the lessons learned from the Lebanon experience in particular are relevant to the pre- and emergency planning phases.

Pre-emergency responses

The pre-planning phase would typically occur during a conflict where there is known to be a threat of sub-munition use, or the possibility exists e.g. based on the capacities of either of the warring parties. Using the example of Southern Lebanon, the majority of the submunition contamination occurred in the last 72 hours of the conflict. There are of course many countries with submunition blinds where the actual contamination occurred decades ago, e.g. Vietnam and Laos, and so the principles of pre-emergency planning may not be so relevant.

Key elements of a pre-emergency planning process are the existence and the use of documents such as contingency planning models, a rapid response to landmine and ERW crisis previously tested through coordination exercises[4] and the use of model documents such as Concept of Operations papers which can be easily modified. This allows for the early development of calls for tender documents and the early issue of contracts allowing agencies to rapidly prepare and deploy on ceasefire. Contingency planning should be a key feature of any post conflict response to sub-munition contamination.

This should also be the time to discuss and develop strong liaison with various authorities, ministries and other agencies that may be involved in rapid returns of internally displaced persons and refugees. A coordinated approach to the emergency humanitarian interventions regarding submunitions clearance should be ensured. The provision of military data on strikes should also be arranged at the earliest opportunity. Clear responsibilities of coordination and reporting should be identified and resolved at this stage.

Emergency response

Emergency response, for example in natural disaster or post-conflict situations, will be a function of what the specialist assets available on the ground can achieve. As seen in Southern Lebanon, anyone who can do anything will respond and this often has consequences after the emergency is over if actions are not fully documented for future planning efforts.

Planning seeks to identify the hazard, the location and the impact of that hazard in order to plan an effective response. Emergency response to submunition contamination is typically influenced by issues such as opening up or clearing roads, working in conjunction with the returning or settled populations and responding to immediate needs. While obviously a humanitarian imperative it should be accompanied by clearly established reporting procedures of who did what and where, with accurate positioning of the finds.

This data should be maintained at a central location where the national planning staff can analyse what was done in the emergency phase with a view to supporting tasking in the post-emergency response. Even if this cannot be done during the emergency response period, the data should be collected to allow analysis at a later stage. All operators conducting submunition clearance should attempt to meet this need.

Post-emergency response

Once "tasking" (the allocation of affected sites to one or more clearance operators) has caught up with the operational intensity of the emergency phase, the mine action response moves into the post-emergency phase. It is essential to establish a system of prioritisation as well as an efficient and effective method of clearance. This can be considered as the post-emergency phase, where assets are generally in place; tasking is being conducted in a more deliberate manner and in accordance with the priorities identified nationally, within the regional and local context.

In this phase, the national planning authority should:

- Allocate areas of operation based on capacity of assets;
- Establish set priorities based on the community need and depending on the clearance hazard,
- Conduct a visual surface search (with instrument assistance where necessary); and
- Task sub-surface search clearance.

Priority-setting

Key to planning is the involvement of the community in the decision-making process about task prioritisation. One way to gain this involvement is through the establishment of a community liaison officer (CLO). Experience in Southern Lebanon in particular has shown that early involvement of a CLO with communities; the national or designated demining authority and the demining agencies has been instrumental in gaining full support from the community in the clearance efforts. All agencies or national authorities should include a CLO component in their planning.

The CLO should be provided with all the necessary means to conduct their role, including use of vehicles, access to telephones and full empowerment of the role as well as recognition of the importance of involving communities in decisions about their lives. Use of the CLO builds on existing knowledge and awareness of the need for a coordinated approach between community and clearance agency both at local and national level.

In addition, it is important to have a good understanding of livelihoods, especially in the rural areas, as that will affect the level of priority allocated to different types of land. In Lebanon, priority was given to land currently used for the movement of population, cultivation and grazing. It is the "current" use of the land that influences the prioritisation of tasking. In addition, an analysis of the crop cycle of the affected areas may also be used to provide further data for the prioritisation process, affecting what might be current and future task planning. The involvement of the CLO in this process is vital to ensure an integrated community, national authority and humanitarian mine action response. The definition of "usable land" may change over time, which will have an impact on current and future operational tasks.

Recording and reporting

Accurate recording and reporting of clearance conducted along with an auditable record of risk assessments made on site are essential to follow up with either sub-surface clearance plans. In general, all suspected submunition strike areas should be recorded with a view to identifying the footprint and the centre point of the ellipse (if possible to ascertain) would be recorded. This would generally be the basis of the strike zone grid reference. This information should be recorded by the central data collection facility (generally the information management section in the national mine action authority or mine action centre).

Cluster munitions strikes are generally recorded as a Suspected Hazard Area (SHA).[5] In the first instances of response, several individual cluster munition strikes may be recorded as a single SHA. This may have a distorting effect on the actual situation of contamination on the ground as the aim of recording the initial hazard would be to record the centre of the ellipse of a single cluster strike or the pattern of strikes. The disposal of individual submunitions over an area may also have a distorting effect.

Generally, on level ground, the initial cluster strike releasing the submunitions will have created an elliptical pattern of impacts. Whether the submunitions have functioned or not, the pattern may usually be seen either by discovery of unexploded submunitions, signatures (such as packing pieces or parts of the parent munition) or evidence of explosion of individual or multiple submunitions. This was described in Chapter 1 where the cluster munitions strike has both an entry and an exit point. Clearance organisations will normally search out to an agreed distance (e.g. 25 metres in Albania, 50 metres in Lebanon, etc.) from the fade-out (last munition found), with the basic shape of the ellipse forming as finds are recorded.

Where there is a lack of accurate recording of actions and hazards, the true "picture" of the particular strike is lost. This is called "cherry picking" indicating that there has been a haphazard clearance that has not been properly recorded. Several strikes over a particular area also have a distorting effect where the patterns merge together. This could also be the case where a surface (visual) search is conducted but not adequately recorded and reported. This can make subsequent tasking extremely difficult.

When many individual strikes have been reported, it may be found, upon completion of the task, that several SHAs have been covered in the clearance of a certain area. This takes careful review and management by planning and operational tasking staff to ensure the accurate data is collected, that SHAs are removed and that the true picture is reflected.

Although, in general, all completed surface clearance tasks should be recorded as Suspensions, in some cases completion reports may be provided which include all three variants of search; surface, instrument assisted and sub-surface. Suspension and completion reports where submunitions clearance activity is recorded should make a clear statement of:

- Type of clearance;
- Depth of clearance;
- Findings;
- Equipment used;
- All clearance activity;
- The location of individual submunitions (supporting the general picture of the strike zone – or ellipse);
- Marking;
- Fencing;
- Digital mapping / sketch;
- CLO comments, including usable land, and community needs; and
- Process of follow-up for the suspension task.

As with suspension reports, the recording of the risk management process and the clear demarcation of what was done where and how, will be important elements of the completion report. Completion and suspension reports should be the basis for further planning, analysis and tasking. As such, they should place emphasis on community needs.

CLEARANCE AND DISPOSAL OF CLUSTER MUNITIONS

Box 5 | Clearance of submunitions in Serbia and Montenegro in 1999*

During the bombing campaign of the Federal Republic of Yugoslavia in 1999, clearance of visible submunition duds in Serbia and Montenegro was usually carried out within 24 to 48 hours after an attack, but in cases of urban areas, such as Niš, clearance had to be done far more quickly. Indeed, despite the problems outlined below, the rapid removal or destruction of blinds was a very important reason why the number of victims after the attacks has remained relatively low in Serbia and Montenegro.

Each of the responsible institutions operated with limited human resources and an acute lack of equipment. All available trained personnel were mobilised during the bombing, as well as army volunteers and the police and even civilians, who received rapid training in detection and identification of submunitions. Clearance teams operated on a hectic schedule, moving from one location to the other.

Inter-team coordination was symbolic: teams would appear at a recently bombed location or react to a call from local authorities almost randomly, despite the attempt to give priority to locations with high civilian density or a higher level of hazard. All these factors led to inconsistency in clearance procedures and infrequent record-keeping. In some cases, locations were visited on several occasions in the course of few months (both during and after the campaign). On each visit by an explosive ordnance disposal team, a certain number of submunitions visible on the surface were destroyed, leaving the area with dozens of undetected ones, which were uncovered following a change of season or the burning of grass.

Moreover, clearance personnel generally had no clear understanding of the specific characteristics of submunitions during the bombing campaign. The first encounter most of them had with cluster munitions was during the actual air strikes. Some army specialists were acquainted with the BL755 submunition, which had previously been imported from the United Kingdom, but they had never carried out disposal of submunitions in wartime.

This lack of experience, when combined with precious little equipment and the rapid movement of teams from one affected location to another between air strikes, led to the development of special operating procedures. Typically, this meant clearance procedures involved visual detection of ordnance only and the collection/piling up of submunitions prior to disposal, which exposed the clearance personnel to considerable risk. During the conflict, at least one EOD technician was killed and another injured, while two more have been injured after the conflict.

* Taken from Yellow Killers: The Impact of Cluster Munitions in Serbia and Montenegro, Norwegian People's Aid, Belgrade, 2007, p. 47.

ENDNOTES

1 A new IMAS on BAC was issued in 2007: IMAS 09.11: Battle Area Clearance.

2 For example, mini disrupters as used in improvised explosive device disposal, the use of explosively projected flat steel plates or ballistic disc attack.

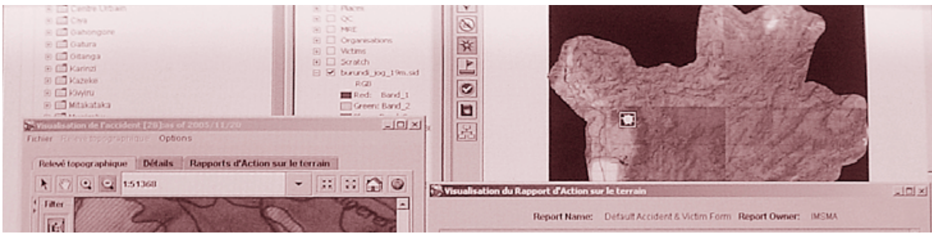
3 Although many of the concepts can and are applied to all facets of humanitarian demining, this section looks specifically at submunitions clearance.

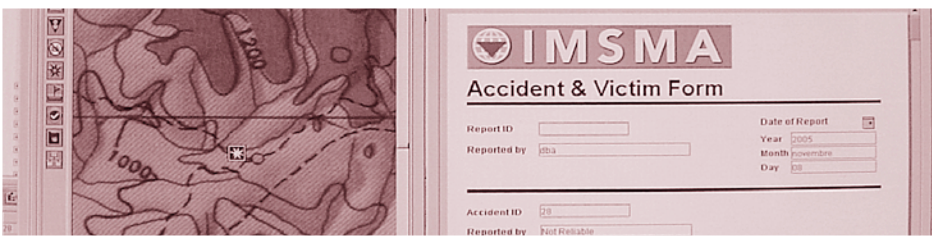
4 SWEDEC in conjunction with UNMAS run an annual coordination exercise where these responses are rehearsed and trialled.

5 Information Management System for Mine Action.

CHAPTER 4

INFORMATION MANAGEMENT





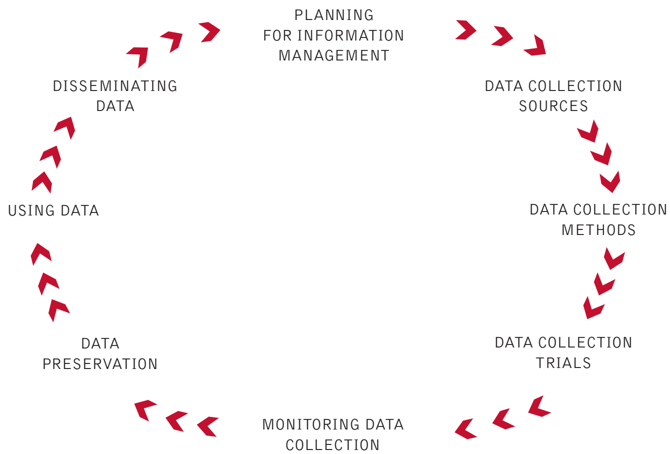
INFORMATION MANAGEMENT

This chapter addresses information needs in support of the clearance of submunition blinds, as well as the appropriate storage, analysis and use of cluster-munition-related data. Effective information management is one of the key elements required for success in addressing the threat of cluster munitions. The chapter begins by reviewing the "cycle" of information management, including the data that should be recorded and the activities needed to turn that data into information, notably exchange, storage, analysis and use.

THE INFORMATION MANAGEMENT CYCLE

The first step in the information management process is collection of the necessary data (or receipt from others, such as the users of cluster munitions). Once the necessary data has been collected or received, turning data into information requires that it be stored, analysed, shared and, above all, used. Figure 6 illustrates the information management life cycle.

Figure 7 | The Information Management Cycle



To be successful, this cycle requires a *systematic* approach to data and data quality. Mistakes at any stage to understand the overriding need for data quality – especially when it is being collected, stored or analysed – can jeopardise the reliability of the data and hence its usability. Information management systems too often fail to work properly because the people engaged in the process lack the necessary training, discipline and understanding about the critical importance of data accuracy.

DATA RECORDING NEEDS

The clearance of submunition blinds is greatly facilitated by the provision of data from the user on the types and quantities of cluster munitions used and their area target data. Difficulties in the release of relevant data are discussed briefly below, but a prerequisite for data exchange is that it first be recorded, and in a format that enables its subsequent sharing with other relevant parties.

The Protocol V non-binding technical annex sets out in more detail some of the data that should be recorded in order to facilitate future clearance efforts. With respect to submunition blinds, a State should record the following:

- the location of areas targeted;
- the approximate number of cluster munitions used in those areas;
- the type and nature of cluster munitions used in areas, including technical information relevant to clearance; and
- the general location of known and probable submunition blinds.[1]

Where a State has been obliged to abandon cluster munitions in the course of operations, it should endeavour to leave the weapons safe and secure, and record information on their location – the approximate amount at each specific site and the types abandoned at each specific site.

There is no internationally agreed format for recording this data. What is important is that it is both clear and accurate with, if possible, GPS coordinates of point targets. While submunitions may not have landed at these coordinates, this will be a useful starting point for a survey of contaminated areas. Similarly, where a State has recorded information related to its use of cluster munitions, it should be stored in a manner which permits retrieval and subsequent release.

RELEASE OF DATA

The release or exchange of data on the use of cluster munitions has been a contentious issue in several armed conflicts over the past decade, but a qualified obligation to share relevant data, subject to a caveat as to the legitimate security interests of the user, has now been enshrined in international law.[2]

The information should be released to the party (or parties) in control of the affected territory and others engaged in clearance of the affected areas or in the provision of risk education. If the State that has used cluster munitions does not wish to provide the relevant data directly to the party in control of the affected areas, it can make use of mechanisms established internationally or locally for the release of information, such as through the UN Mine Action Service, and other expert agencies.

According to the Technical Annex to CCW Protocol V the information should be released *"as soon as possible, taking into account such matters as any ongoing military and humanitarian operations in the affected areas, the availability and reliability of information and relevant security issues."*

STORAGE DATA

When the party that intends to conduct clearance of contaminated areas is in possession of the necessary data, it in turn must store it safely. It is critical that all the available data is regularly entered into a single master database, which is open to all interested parties. This database should contain all of the data relevant to cluster munitions collected at all levels for the entire area being serviced. The establishment and regular update and dissemination of this single master data-set greatly improves the chances that all those engaged in addressing the threat from cluster munitions will be working from a common picture of both the hazard and the progress being made to address it.

Information Management System for Mine Action

The Geneva International Centre for Humanitarian Demining has supported the development and deployment of the Information Management System for Mine Action (IMSMA). The system is currently in use in more than 40 mine action programmes around the world.[3]

Based on requirements submitted by users in the field, the system has been continuously revised and upgraded since its initial release in the summer of 1999 and has become the *de facto* standard in mine action information management. It was field tested in Kosovo, where the use of cluster munitions was prevalent, and has demonstrated its capacity from the outset to enable the storage and manipulation of the requisite data.

The latest version of the IMSMA software has undergone a complete redesign. The new system combines a full-featured Geographic Information System (GIS) with a powerful relational database to produce an easy-to-use and maintain information management tool. The most noticeable of innovations in the latest version of IMSMA is the inclusion of a map driven navigation system that significantly improves both data entry and retrieval operations.

Distribution of the system is managed by the GICHD. It is provided free of charge to affected countries and to the governments of countries actively involved in peacekeeping and mine action support operations.

Practically, IMSMA can be used to:

- Plan, manage, report and map cluster munition clearance activities;
- Plan, manage, report and map risk education activities;
- Record, report on, and map information on the assistance needs of submunition victims; and
- Record, report on, and map relevant socio-economic information.

A general Hazard Data Collection Form for ERW is already in use, which includes the ability to record various types of cluster munitions along with more than 5,000 other types of explosive ordnance. A cluster-munition-specific Hazard Data Collection Form could be easily developed, with assistance from the GICHD or independently by system users, with the data collected, based on requirements submitted by users in the field.

According to Adrian Wilkinson, an international weapons expert, an alternative to the IMSMA is EOD Frontline (see Box 6), which is said by one expert to be easier to use and quicker to train people on.[4]

Box 6 | EOD Frontline*

EOD Frontline is an explosive ordnance disposal (EOD) risk management software application. It is designed to assist EOD Operators with the management of EOD incidents, by providing accurate real time information. It can be used to assist the operational tasking of both military and civil emergency agencies. It was developed by Bruhn Newton, a UK company.

EOD Frontline provides the ability to record danger areas (explosive remnants of war and mines) and surveys of regions. The system contains a database of danger area details, making a list of danger areas available to the operator for creating, editing, and drawing or deleting danger areas. The system can record data on items found in the danger area.

EOD Frontline is currently in operational use with defence agencies, armed forces and forensic units in several countries and international organisations. It has been used operationally in areas, such as Afghanistan, Bosnia and Herzegovina, Denmark, Iraq, Kosovo and the United Kingdom.

* Source: www.bnl-cbrn.co.uk/Downloads/EOD-CBRN/EODF.pdf

DATA ENTRY AND ANALYSIS

Errors inevitably creep into any information management system at the data entry point. This means that monitoring of data entry and the resultant database to minimise those errors is necessary. Point target data for cluster munitions may – rightly – be entered on the database, but then subsequent survey activities may identify the actual strike data at different coordinates. This can result in duplication of suspected hazard areas and lead to inefficient use of clearance assets. A regular cross-check of target data against actual strike areas can save valuable time and money.

Similarly, the data entry phase also provides a valuable opportunity to check the accuracy of the data that has been provided. There may be mistakes in recording or duplication of suspected hazard areas as a result of one or more surveys conducted. For example, where a survey of several impacted communities has identified multiple strike zones close to one another, it is worth trying to verify whether it is not actually one single strike zone that is affecting the different community members. This can help save time and resources.

ENDNOTES

1 It is also important to identify and record the level of tolerable risk in the event of major contamination as this will help to guide clearance plans. What is deemed tolerable should be led by the affected communities themselves.

2 See Article 4, CCW Protocol V.

3 See www.gichd.org/operational-assistance-research/information-management/imsma/overview/.

4 Email from Adrian Wilkinson, Head, SEESAC, Belgrade, 17 July 2007.

CHAPTER 5

RISK EDUCATION | MARKING AND FENCING

This chapter proposes how to reduce the risk to civilians through marking and fencing of areas affected by cluster munitions where clearance is not immediately feasible. While clearance of abandoned cluster munitions and submunition blinds is ongoing or not immediately feasible, other measures can help to reduce the risk to the civilian population. These are, notably, through the marking and – where appropriate – fencing of contaminated areas and the provision of warnings and risk education.

According to Article 5 of CCW Protocol V, States Parties and parties to an armed conflict must take "all feasible precautions" in territory under their control that is affected by ERW to protect civilians and civilian objects from the threat.[1] These precautions may include warnings, risk education to the civilian population, marking, fencing and monitoring of territory affected by explosive remnants of war, as set out in the Technical Annex. This chapter reviews good practice in these activities in support of the legal obligations that exist under CCW Protocol V.

MARKING AND FENCING OF CONTAMINATED AREAS

Increasing attention is being paid to the role of marking and fencing of areas contaminated with explosive remnants of war as a medium- to long-term risk reduction technique in mine action. This has proved necessary because of the high cost and slow pace of clearance of explosive ordnance – thus forcing mine action programmes to consider other ways of reducing the risk of death or injury to the civilian population.

As noted in the IMAS,[2] mine and other explosive ordnance hazards are marked to provide a clear and unambiguous warning of danger to the local population. Marking of contaminated areas tends to be carried out either immediately prior to clearance (often called "temporary marking") or in situations where formal clearance is unlikely to occur for a considerable time, often measured in years (sometimes rather misleadingly referred to as "permanent marking"). Fencing of contaminated areas, where it is possible to do so, involves installing a physical barrier to reduce the risk of unintentional entry into hazardous areas.

As set out in Box 7, the Technical Annex of CCW Protocol V provides limited guidance on the marking and fencing of explosive remnants of war, including abandoned cluster munitions and submunition blinds. The guidance is general in nature, recommending that recognised warning signs should be used, which should be:

- visible,
- legible,
- durable, and
- resistant to environmental effects.

Box 7 | International law on the marking and fencing of explosive remnants of war

Technical Annex | CCW Protocol V on Explosive Remnants of War

Article 2 | Warnings, risk education, marking, fencing and monitoring

(h) When possible, at any time during the course of a conflict and thereafter, where explosive remnants of war exist the parties to a conflict should, at the earliest possible time and to the maximum extent possible, ensure that areas containing explosive remnants of war are marked, fenced and monitored so as to ensure the effective exclusion of civilians, in accordance with the following provisions.

(i) Warning signs based on methods of marking recognised by the affected community should be utilised in the marking of suspected hazardous areas. Signs and other hazardous area boundary markers should as far as possible be visible, legible, durable and resistant to environmental effects and should clearly identify which side of the marked boundary is considered to be within the explosive remnants of war affected area and which side is considered to be safe.

(j) An appropriate structure should be put in place with responsibility for the monitoring and maintenance of permanent and temporary marking systems, integrated with national and local risk education programmes.

The signs should also clearly identify which side of the marked boundary is considered to be hazardous and which side is considered to be safe.

Finally, an appropriate structure should be put in place to monitor and maintain permanent and temporary marking systems, which should be "integrated" with national and local risk education programmes.

The IMAS provides more detailed guidance on appropriate marking and fencing of contaminated areas (see Box 8).

Marking of areas contaminated with cluster munitions

Based on legal obligations and the IMAS, as well as research by the GICHD, this section suggests a ten-step approach to maximise the contribution of medium- to long-term marking of contaminated areas to casualty reduction.

Step 1 Make marking part of an overall strategy

Step 2 Concentrate on marking areas where returnees are expected

Step 3 Combine marking with risk education

Step 4 Involve the local community in marking efforts

Step 5 Make sure the markings can be seen

Step 6 Use durable markings of minimal value

Step 7 Record the location of markings

Step 8 Maintain the markings

Step 9 Monitor the status of the markings and any casualties

Step 10 Remove the markings when they are no longer needed

Box 8 | Summary of IMAS requirements for marking and fencing battle areas*

The design of permanent UXO hazard marking systems shall include a combination of markers, signs and physical barriers that clearly identify the boundary of the hazard area.

Hazard marking symbols shall be clearly visible. Markers and signs shall clearly identify which side of the marked boundary is considered to be within the hazard area and which side is considered to be safe. The warning sign should be clearly displayed facing outwards from the suspected hazardous area.

The words on the warning sign should represent the predominant hazard (mines or UXO) and the symbol should indicate "danger" in a form which will be recognised nationally and locally.

Hazard signs and markers should be clearly visible in daylight at a distance of 30 metres, and from adjacent signs and markers. If markers are masked by vegetation or terrain, the use of a physical barrier should be considered.

The design of UXO hazard marking systems should take account of local materials freely available in the contaminated region and the period for which the marking system will be in place. It is generally accepted that materials used in marking systems should have little, if any, value or practical use for purposes other than UXO hazard area marking. If material of any value is used, then it is likely to be removed. Hazard signs and markers should not be constructed of munition casings, materials that may have contained explosives, or discarded weapon systems.

* IMAS 08.40: Marking mine and UXO hazards, Second Edition (incorporating amendment number 1), 1 January 2003

Marking can and does save lives. It should be borne in mind, however, that evidence exists that marking will *not* be successful in reducing risk-taking if the local population is impoverished. In Afghanistan, for example, poverty sometimes causes people to ignore the danger and knowingly enter contaminated areas in search of food, vegetables, firewood, or to graze their animals. In a single village in Kabul province, more than 30 casualties have been recorded in one nearby minefield. After interviews with several of the survivors, it was found that the contaminated area had a lot of fruit trees, so young villagers ignored the risk and entered the area to collect walnuts, cherries, apricots, or to cut trees and collect wood.

Fencing of areas contaminated with cluster munitions

There is a general conviction that, assuming it is not removed, fencing can make an important additional contribution to casualty reduction. In Croatia, for example, there have been no incidents within fenced areas. In Kosovo, permanent fencing is erected in areas where it is not possible to conduct mine or UXO clearance operations in the immediate future due, for example, to poor access to the site, heavy snow or flooding.

But fencing is generally not an effective means to reduce the risk of *intentional* entry into a dangerous area; it is also expensive. Indeed, there is broad agreement that while marking of affected areas can prove worthwhile – where it is feasible – the erection of fencing should be much more selective. Fencing can be usefully erected around military installations or heavily UXO/submunition-contaminated sites close to heavily populated areas. It is recommended that such fenced areas be guarded. In Kosovo, for example, although UXO-affected sites were marked with specific warning signs (differing from those used to mark mined areas), permanent fencing is only used today in Lukare (Pristina) around a previous ammunition storage depot and military barracks.

ENDNOTES

1 Feasible precautions are defined as those precautions "which are practicable or practicably possible, taking into account all circumstances ruling at the time, including humanitarian and military considerations". Art. 5, Protocol V.

2 IMAS 08.40: Marking mine and UXO hazards, Second Edition (incorporating amendment number 1), 1 January 2003.

CHAPTER 6

RISK EDUCATION | EDUCATION AND WARNINGS

This chapter looks at how to reduce the risk to civilians through warnings and risk education. Warnings and risk education can also help to minimise civilian casualties prior to and during clearance operations. Cluster munitions, especially submunition blinds, can represent a specific and significant threat to civilians, particularly to children. Indeed, statistics have shown that children are generally at far greater risk from submunition blinds than they are from landmines. This should demand a response that highlights the threat from these weapons over and above other initiatives. Although the discipline is generally called mine risk education, its basic principles and methodologies are equally applicable to explosive remnants of war.[1]

BEST PRACTICE IN WARNINGS AND RISK EDUCATION

Warnings are defined in the Technical Annex, rather than the body, of CCW Protocol V as *"the punctual provision of cautionary information to the civilian population, intended to minimise risks caused by explosive remnants of war in affected territories."* In contrast, risk education is defined indirectly, by reference to how it should be conducted: *"Risk education to the civilian population should consist of risk education programmes to facilitate information exchange between affected communities, government authorities and humanitarian organisations so that affected communities are informed about the threat from explosive remnants of war. Risk education programmes are usually a long term activity."*

Warnings are primarily intended to raise urgent awareness about the threat from submunitions (or other explosive ordnance), whereas risk education is seen as a longer-term process designed to instil safer behaviour in target populations. Warnings will often be conducted while armed conflict is still ongoing (immediately following an attack, for instance). When the conflict is over (or security allows), more in-depth and sustained communication activities, especially through dialogue with affected communities, will characterise risk education. The aim should be to address people's vulnerabilities to reduce risk, rather than simply educating people about risk and hazard.

The non-legally binding Technical Annex to Protocol V outlines a number of "best practice elements" of warnings and risk education. These are discussed below.

Follow national and international standards

"All programmes of warnings and risk education should, where possible, take into account prevailing national and international standards, including the International Mine Action Standards." [2]

Only a small number of affected countries have so far adopted national standards based on the IMAS, although the number is growing. Where national standards exist, these should of course be followed.

Standards for mine risk education (MRE) have been approved as IMAS. In total, seven standards deal with MRE, namely:

- IMAS 07.11 Guide for the management of MRE;
- IMAS 07.31 Accreditation of MRE organisations and operations;
- IMAS 07.41 Monitoring of MRE programmes and projects;
- IMAS 08.50 Data collection and needs assessment for MRE;
- IMAS 12.10 Planning for MRE programmes and projects;
- IMAS 12.20 Implementation of MRE programmes and projects; and
- IMAS 14.20 Evaluation of MRE programmes and projects.

MRE has three components: public information dissemination, education and training, and community mine action liaison. They are complementary and mutually reinforcing. Descriptions of the three components are given below.

Public information dissemination

Public information dissemination as part of MRE refers primarily to public information activities, which seek to reduce the risk of injury from mines and ERW by raising awareness of the risk to individuals and communities, and by promoting behavioural change. It is primarily a one-way form of communication transmitted through mass media. This may provide relevant information and advice in a cost-effective and timely manner. In an emergency post-conflict situation, due to time constraints and lack of accurate data, public information dissemination is often the most practical means of communicating safety information to reduce risk.

Education and training

Education and training is a two-way process, which involves the imparting and acquiring of knowledge, attitude and practice through teaching and learning. Education and training activities may be conducted in formal and non-formal environments. This may include teacher-to-child education in schools, parent-to-children and children-to-parent education in the home, child-to-child education, peer-to-peer education in work and recreational environments, landmine safety training for humanitarian aid workers and the incorporation of landmine safety messages in regular occupational heath and safety practices.

Community liaison

Community liaison[3] refers to the system and processes used to exchange information between national authorities, mine action organisations and communities on the presence of mines and explosive remnants of war, and of their potential risk. It enables communities to be informed when a demining activity is planned to take place, the nature and duration of the task, and the exact locations of areas that have been marked or cleared.

Target efforts at those at risk

"Warnings and risk education should be provided to the affected civilian population which comprises civilians living in or around areas containing explosive remnants of war and civilians who transit such areas." [4]

Defining the at-risk groups for warnings is one of the starting points for any effective intervention. The displaced, including refugees, as well as those already living in affected areas, often fall victim to submunition blinds on or following their return. In order to be effective, risk education should be given prior to, if possible during, and following return or repatriation.

The return of refugees and/or internally displaced persons could be a planned activity or spontaneously decided by the population themselves. Regardless, experience has shown that population movements are one of the main triggering factors for an increase in incidents involving explosive ordnance. There are two key reasons for this. First, the areas that displaced populations evacuated are sometimes deserted until their return. If they are, this means there will be a lack of knowledge about where and when the clashes took place, what weapons were used and whether there have been any earlier incidents involving ERW. Where areas are not entirely deserted, of course, there may be a reliable local source of knowledge for returnees.

Second, there is a naturally strong will to investigate the normal habitat. Even though returning populations may have been warned about possible dangers and advised to obtain local knowledge about the situation before approaching their own home, they often go directly home into their deserted gardens and houses to see what has happened while they were gone. This frequently results in tragic incidents in the first days after return.

Time is of the essence

"Warnings should be given, as soon as possible, depending on the context and the information available. A risk education programme should replace a warnings programme as soon as possible. Warnings and risk education always should be provided to the affected communities at the earliest possible time." [5]

It is clear that speed is crucial in any warnings or other risk education initiative. Warnings should be considered a subset of risk education, not a completely separate discipline as is often believed. What distinguishes the two is that warnings are delivered by inherently one-way communication channels in an emergency, whereas risk education is (or should be) a more long-term and participatory process.

The name of the generic subject is "risk education" (usually called mine risk education, as it is under the IMAS, even when the ordnance in question is ERW and not mines). Risk education covers all initiatives based on information, education and training intended to instil safe behaviour and thereby reduce the risk to the civilian population from landmines, abandoned and unexploded ordnance.

Use available expertise

"Parties to a conflict should employ third parties such as international organisations and non-governmental organisations when they do not have the resources and skills to deliver efficient risk education. The best-placed entity to deliver warnings should be assessed on a case-by-case basis." [6]

Some of the issues to consider in decision-making on this include the community perception of the militaries involved (e.g. are they considered an impartial authority or is what they say automatically deemed to be propaganda?), their expertise in risk education and their logistical set-up. Of course, it may not necessarily be an either/or situation: the military, civil defence and humanitarian organisations may all be able to contribute to saving lives and limbs.

It is important to keep the issue of time in mind when deciding who should be involved. The national authorities (military units, civil defence, etc.) have the resources and skills to deliver an effective programme in the long run. Humanitarian organisations can also be usefully involved at the outset of a warnings and risk education campaign, as their experience gained in other contexts may save valuable time and avoid the need to "reinvent the wheel".

Users of cluster munitions should fund warnings and risk education

"Parties to a conflict should, if possible, provide additional resources for warnings and risk education. Such items might include: provision of logistical support, production of risk education materials, financial support and general cartographic information." [7]

Here, it is implicit that in situations where the military is not best placed to deliver warnings or risk education directly, it can still support others in doing so. Caution must be applied, however. Although this part of the Technical Annex refers to the production of risk education materials, care must be taken not to just adapt materials taken from another context. Cultural and linguistic factors must be taken into account otherwise the entire venture may be a waste of time and effort.

One of the best ways to support an international organisation to conduct the warnings is to ensure or facilitate access to public information sources without having to go through unnecessarily complicated administrative procedures and, if possible, at no cost. This could be access to broadcasting times on government media (TV and radio stations), the opportunity to include public announcements in newspapers or to facilitate delivery of warnings through the national postal service, and by putting up public warning announcements in public institutions. In the long run this would also mean that the Ministry of Education would facilitate the inclusion of warnings and risk education in the national educational curriculum.

ENDNOTES

1 This chapter is based on Protecting Civilians from Explosive Remnants of War, A Guide to Providing Warnings under CCW Protocol V, Landmine Action, London, 2004; and A Project Manager's Guide to Mine Risk Education, GICHD, forthcoming.

2 Technical Annex, article 2 (a), Protocol V.

3 Called community mine action liaison in the IMAS.

4 Technical Annex, article 2 (d), Protocol V.

5 Technical Annex, article 2 (e), Protocol V.

6 Technical Annex, article 2 (f), Protocol V.

7 Technical Annex, article 2 (g), Protocol V.

CHAPTER 7

ASSISTING THE SURVIVORS

ASSISTING THE SURVIVORS

As stated in Chapter 2, the explosion of a submunition can cause multiple victims. Some are killed but others survive the explosion and need urgent medical assistance and likely ongoing medical care and rehabilitation. This chapter assesses the typical assistance needs of the survivors of cluster munition strikes and summarises the major challenges in ensuring that those needs are met.

According to Article 8, paragraph 2 of CCW Protocol V, *"Each High Contracting Party in a position to do so shall provide assistance for the care and rehabilitation and social and economic reintegration of victims of explosive remnants of war."* This obligation is similar to the framework developed in the context of anti-personnel landmines, which is relevant for all types of weapons injuries.[1] However, based on its global research through the Landmine Monitor, the International Campaign to Ban Landmines reported five main challenges impeding effective assistance to mine and ERW survivors in 2005 – 2006:

- access to care,
- variety and effectiveness of services provided,
- capacity,
- rights implementation, and
- financial resources.[2]

As the International Committee of the Red Cross has observed, only the most fortunate receive the necessary level of assistance, and many victims of ERW do not receive adequate medical treatment. In many affected areas, health care systems are either inadequate or non-existent. The victims or their families may not be able to pay for appropriate care and rehabilitation. Many never get help because they live in highly insecure environments. Travel may be restricted because the conflict is still going on, or because hospitals are in zones held by the adversary. To make matters worse, many affected areas may simply be too dangerous for humanitarian agencies to operate in.[3]

AT-RISK GROUPS

Boys and young men are typically a very high risk group as far as submunitions are concerned. Playing with ERW is typical of these groups, but the sensitivity of many fuzing systems of submunitions means that the results are more often tragic than with other unexploded ordnance. Moreover, disability among this pool of existing or future manpower clearly has consequences that reverberate more broadly within communities.

The link between displacement and propensity to injury is less marked with submunitions than is the case with anti-personnel mines, but is clearly still a factor as returnees often fall victim to these weapons. Of course those engaged in clearing submunitions are also at serious and obvious risk, see Box 10.

Along with disability, gender is an important issue as women and girls have differing vulnerabilities, particularly as their role in the family significantly changes when a male member of the family is injured or killed.

TYPICAL INJURIES AND MEDICAL NEEDS

The extent of injuries suffered – typically as a result of fragmentation – obviously depends on the type of submunition that has detonated, as well as the proximity to the explosion.[4] However, for the survivors of a submunition explosion, long-term injury and disability is a likely outcome, even if, statistically, they are less likely than anti-personnel mine victims to suffer traumatic amputation of one or more limbs. Instead, many survivors will be left with fragmentation injuries and burns that may be life-threatening. Survivors may also suffer abdominal, chest and spinal injuries, blindness, deafness, and less visible psychological trauma.

The medical needs of survivors of submunition explosions are similar to those injured by other explosive devices, namely first aid to stop the bleeding, antibiotics to prevent infection (where these are available) and transport to a medical facility for treatment as soon as possible. This facility should be stocked with blood for an infusion or transfusion and antibiotics. Surgical intervention will likely then be a priority, and will often include a need for skin grafts but may not extend to a requirement for surgical amputation. In some cases, pieces of fragmentation are too difficult to remove and the survivor must live out the rest of his or her life with the metal remnants of a cluster munition inside them.[10]

REHABILITATION NEEDS

Indeed, although the physical wounds caused by submunitions can be horrific, the psychological and social impact is also extremely significant. Individual difficulty in relationships and daily functioning can be considerable and the survivor sometimes faces social stigmatisation, rejection and unemployment. Surviving a submunition explosion is about more than overcoming a physical injury. Society often adds to the trauma in myriad ways – being afraid of the bad luck of survivors, being shocked at the un-wholeness of an amputee's body, and seeing the person as not just traumatised but as somehow lesser in all ways. Therefore, in addition to requiring assistance coping with a permanent disability, survivors need support as they struggle to re-establish a place in society – societies that often reject them.

Box 9 | Victim assistance challenges: the reality*

Handicap International tells the story of a 33-year-old woman in Laos who is married with four children. She lives in Villabury district, Savannakhet province. She earns a living as a rice farmer.

In February 2006, she and six other people were sitting around a fire because it was still chilly. The fire was built in a place where they had made a fire many times before. All of a sudden, a hidden cluster submunition exploded, giving her severe shrapnel injuries in the waist area.

Within 25 minutes she was transported to the nearest local health care post, where she received only minor treatment. She was advised to go to the district hospital for specialized care, but her husband said they could not afford this and they went back to the village. However, she continued to bleed, and eventually they had to go to the district hospital, almost one and a half hours away.

By that time she could not be treated there either and had to move on to the inter-district hospital, which was again one hour of travel in a private car. She was treated there, but the remaining shrapnel can only be removed at the better-equipped provincial hospital. The family does not have the resources for this and she still feels pain in her waist when she walks or sits. Her eyes and ears are still affected as well, and she feels nervous and scared when making fires.

The total cost of treatment was 500,000 Lao Kip (KAP, US$55) and the inter-district hospital provided 150,000 KAP (US$16) for transportation.

* Taken from Handicap International, Circle of Impact: The Fatal Footprint of Cluster Munitions on People and Communities, Brussels, May 2007, p. 38.

ASSISTING THE SURVIVORS

As Handicap International has noted,[5] ensuring assistance is provided to the victims of cluster munitions is the primary responsibility of the affected state, but consistent and long-term support by the international community is needed. In turn, assistance can only be sustainable and efficient if it builds on national ownership and systematic coordination between all stakeholders.

The main challenges for victim assistance that HI has identified are the following:

Access to care. This includes physical access, economic accessibility, and access to information, all of which must be provided in a culturally appropriate manner.

Variety and effectiveness of assistance. All components of victim assistance should be considered interrelated and equally important. Referral systems need to be in place and reinforced.

Capacity and sustainability. This includes infrastructure and human resource capacity, reinforced by training and increased retention of staff. National and local services should gradually replace international ones, for which states should seek increasingly diversified funding.

Rights implementation. Implementation of general and specific rights-based legislation addressing discrimination against people with disabilities should be reinforced.

Monitoring of progress. Due to the diverse nature of victim assistance and to the voluntary nature of reporting on it, progress for both victim assistance-specific and cross-cutting programmes beneficial to all person with disabilities is not being adequately mapped.

Prioritisation. Victim assistance is often not seen as a priority in comparison to other emergencies, such as conflicts and HIV/AIDS; this is especially the case for cluster submunitions victim assistance.[6]

As the ICRC has pointed out, after leaving the hospital, a survivor must rebuild his/her life. To do this, the survivor will first need to recover his/her mobility, and then reintegrate into society and the economy. Physical rehabilitation and socio-economic reintegration are closely linked needs. Enabling a person with disabilities to walk and move about is in itself a great achievement. But it is also an indispensable pre-condition for the person's participation in family and community life, work and education.[7]

Physiotherapy is a critical – and often neglected – contribution to this process. Unfortunately, suitably qualified physiotherapists are typically in short supply in areas affected by submunitions and other explosive remnants of war.

ASSISTING THE SURVIVORS

It is important to ensure that all persons with disabilities, including victims of weapons, should be treated equally and without discrimination in their needs for medical care, rehabilitation and reintegration into society. Moreover, victim assistance should not be carried out in isolation, but, where appropriate, as part of initiatives for war-wounded and other people with disabilities. The increased awareness within the mine action community of the importance of linking assistance to public health, rehabilitation and poverty reduction strategies is of growing significance.[8]

In conclusion, as Handicap International has observed, victim assistance programming can only be effective if it is based on the needs identified by the victims themselves and if they have direct input into policy-making and planning at the local, national and international levels.[9] This remains a significant challenge.

Box 10 | Story of a deminer casualty from a submunition in Serbia*

Branislav Kapetanovic, born in 1965, was an EOD operative working for the army during the 1999 conflict. He received limited special training in cluster-bomb disposal two months prior to the NATO air campaign. During the campaign and for one year after he was working on submunition clearance in almost all the affected areas in the country – Kuršumlija, Kraljevo, Sjenica and Niš.

On 9 November 2000, Branislav was accompanying a group of engineers during a routine visit to Dubinje airport in Sjenica. Their job was to assess the damage to airport facilities. Six new submunitions had been reported, having been seen lying on the ground. Not wanting to put off disposal of the duds, Branislav went to the marked location. The first one he approached exploded with terrible force after he "barely" touched it.

He suffered cardiac arrest upon arrival at hospital. Both his arms and legs had to be amputated; he has had more than 20 operations in total. His eyes were damaged by the explosion, leaving him completely blind for five months after the event. He spent four years at a medical facility in rehabilitation. One of his eyes is still seriously damaged and he has lost the hearing in his left ear.

Today, Branislav Kapetanovic lives in Belgrade, where he must cope on his own. He was given the status of a civilian war victim, since the accident took place after the war and the current provisions within the army did not provide for him to be awarded the status of war veteran. He says that his greatest wish is to see cluster munitions banned forever.

* Taken from Yellow Killers: The Impact of Cluster Munitions in Serbia and Montenegro, Norwegian People's Aid, Belgrade, 2007, p. 49.

ENDNOTES

1 For more information see GICHD, A Guide to Mine Action and Explosive Remnants of War, Geneva, April 2007, pp. 117-131.

2 See ICBL, Landmine Monitor Report 2006, Toward a Mine-Free World, Mines Action Canada, 2006, pp. 51–52.

3 ICRC, Explosive remnants of War: The lethal legacy of modern armed conflict, Second Edition, July 2004, Geneva, p. 9.

4 The IMAS define a victim as "an individual who has suffered harm as a result of a mine or ERW accident." The definition further notes that in the context of victim assistance, the term victim may include dependants of a casualty, hence having a broader meaning than survivor." For the purposes of this publication we are focusing on the needs of those injured by submunitions.

5 Handicap International, Circle of Impact: The Fatal Footprint of Cluster Munitions on People and Communities, Brussels, May 2007, p. 12.

6 ibid., pp. 12–13.

7 ICRC, Caring for Landmine Victims, Geneva, 2004, p. 8.

8 For more information see GICHD, A Guide to Mine Action and Explosive Remnants of War, Geneva, April 2007, pp. 117-131.

9 Handicap International, Circle of Impact: The Fatal Footprint of Cluster Munitions on People and Communities, Brussels, May 2007, p. 12.

10 See, for example, Yellow Killers: The Impact of Cluster Munitions in Serbia and Montenegro, Norwegian People's Aid, Belgrade, 2007, p. 22.

CHAPTER 8

INTERNATIONAL LAW AND CLUSTER MUNITIONS

INTERNATIONAL LAW AND CLUSTER MUNITIONS

This final chapter reviews existing international law governing the use of cluster munitions during armed conflict, as well as obligations to mark and clear submunition blinds following the cessation of hostilities. It also identifies additional efforts by States and non-governmental organisations to strengthen international law in this field.

USE OF CLUSTER MUNITIONS IN ARMED CONFLICT

As the International Committee of the Red Cross has observed, no international humanitarian law treaty has specific rules for cluster munitions. However, like all other weapons used in armed conflict, their use is regulated by the general rules of international humanitarian that govern the conduct of hostilities. These rules restrict how weapons may be used and outline measures which need to be taken so as to limit their impact on civilians and civilian objects. The most relevant rules include:

- The rule of distinction,
- The rule prohibiting indiscriminate attacks,
- The rule of proportionality, and
- The rule on feasible precautions.[1]

According to the 1977 Additional Protocol I to the 1949 Geneva Conventions, which governs international armed conflicts, the civilian population is entitled to "general protection against dangers arising from military operations". Similar obligations are included in the 1977 Additional Protocol II to the Geneva Conventions, which governs non-international armed conflicts.

These obligations demand that parties to a conflict – whether a State or an armed opposition group – at all times "distinguish" between the civilian population and civilian objects (e.g. homes, schools and hospitals) and military objectives, meaning they must direct their operations only against military objectives. States or armed opposition groups may not intentionally target cluster munitions against civilians. This would be a war crime.[2]

In addition, the ICRC has stated that: *"There are questions as to whether cluster munitions can be used in populated areas in accordance with the rule of distinction and the prohibition of indiscriminate attacks. These rules are intended to ensure that attacks are directed at military objectives and are not of a nature to strike military objects and civilians or civilian objects without distinction."*[3]

International law also requires that parties to a conflict take precautions in any attack to minimise civilian deaths and injuries. It is not lawful to use cluster munitions in a particular attack if excessive harm is likely to be inflicted on civilians either during or subsequent to the attack in relation to the expected military advantage. In such cases, a weapon that is less prone to killing or injuring civilians must be selected.

These general rules are customary international law, which binds every party to a conflict – government or armed opposition group – whether or not the relevant State has ratified the relevant Protocol.[4]

The application of those rules to cluster munitions has proved even more challenging, especially given the difficulties in foreseeing beyond any immediate threat to civilians. In a further study, conducted in 2006, Timothy McCormack and Paramdeep Mtharu argue that: *"Although precise numbers of munitions or submunitions which will fail to explode cannot be known and precise numbers of civilian deaths and civilian casualties cannot be predicted, it does not follow that civilian damage from UXO is unexpected. Damage to civilian property and civilian deaths will inexorably flow from the use of such weapons and must be taken into account in the proportionality equation."*[5]

In addition, Article 36 of 1977 Additional Protocol I stipulates that new weapons must be tested to ensure that they meet the requirements of international law, e.g. that they not be inherently indiscriminate or inflict superfluous injury or unnecessary suffering.

Box 11 | The Martic case*

In June 2007, Milan Martic was convicted by the International Criminal Tribunal for the former Yugoslavia of war crimes and crimes against humanity and sentenced to 35 years' imprisonment. His crimes included the targeting of civilians in Zagreb using cluster munitions delivered by the Orkan rocket in early May 1995. These cluster munition attacks were reported to have killed seven civilians and injured 196 others.*

According to the judgment of the tribunal: "The evidence shows that the M-87 Orkan was fired on 2 and 3 May 1995 from the Vojnic area, near Slavsko Polje, between 47 and 51 kilometres from Zagreb. However, the Trial Chamber notes in this respect that the weapon was fired from the extreme of its range. Moreover, the Trial Chamber notes the characteristics of the weapon, it being a non-guided high dispersion weapon. The Trial Chamber therefore concludes that the M-87 Orkan, by virtue of its characteristics and the firing range in this specific instance, was incapable of hitting specific targets. For these reasons, the Trial Chamber also finds that the M-87 Orkan is an indiscriminate weapon, the use of which in densely populated civilian areas, such as Zagreb, will result in the infliction of severe casualties. By 2 May 1995, the effects of firing the M-87 Orkan on Zagreb were known to those involved. Furthermore, before the decision was made to once again use this weapon on Zagreb on 3 May 1995, the full impact of using such an indiscriminate weapon was known beyond doubt as a result of the extensive media coverage on 2 May 1995 of the effects of the attack on Zagreb." **

* See, for example, "International Criminal Tribunal: Milan Martic guilty of indiscriminate use of cluster munitions in Zagreb war crime verdict", Landmine Action UK, London, 12 June 2007.

** ICTY, Prosecutor v Milan Martic, Judgement, 12 June 2007, p. 166, available at: www.un.org/icty/martic/trialc/judgement/mar-tcjud070612e.pdf.

CLEARANCE OF CLUSTER MUNITIONS

Legal obligations regarding the clearance of all ERW, including cluster munitions, as well as risk reduction measures and assistance to survivors, are currently contained within the Convention on Certain Conventional Weapons. Protocol V on ERW to the CCW was adopted in November 2003 after a year of formal negotiations, and entered into force on 12 November 2006 following adherence to the Protocol by 20 States Parties to the CCW. As of 2 October 2007, 35 States had ratified Protocol V (see Box 12).

CCW Protocol V on ERW addresses submunitions in three ways:

> During the design and manufacturing phase;

> As abandoned explosive ordnance (AXO) linked to an armed conflict; and

> As unexploded ordnance (UXO) linked to an armed conflict.

Box 12 | States Parties to CCW Protocol V on Explosive Remnants of War*

Albania	Hungary	Slovakia
Australia	India	Slovenia
Austria	Ireland	Spain
Bulgaria	Liberia	Sweden
Croatia	Liechtenstein	Switzerland
Czech Republic	Lithuania	Tajikistan
Denmark	Luxembourg	The former Yugoslav Republic of Macedonia
El Salvador	Malta	Uruguay
Estonia	The Netherlands	Ukraine
Finland	New Zealand	
France	Nicaragua	
Germany	Norway	
Holy See	Sierra Leone	

* As of 2 October 2007

Minimising the occurrence of ERW

Under Article 9 of Protocol V, and "bearing in mind the different situations and capacities", each State Party is "encouraged to take generic preventive measures aimed at minimizing the occurrence of explosive remnants of war", including cluster munitions. The non-binding Technical Annex to the Protocol suggests ways in which this can be achieved.

States producing or procuring explosive ordnance should seek the greatest reliability of munitions through certified quality control measures and internationally recognised quality assurance standards. Periodically, a sample of stockpiled explosive ordnance should undergo live-firing testing to ensure that munitions function correctly. Testing under controlled or ideal conditions usually produces different results to combat. A State should examine ways of maximising the reliability of explosive ordnance that it intends to produce or procure.

The risk of explosions in stockpiles should be minimised by the use of appropriate stockpile arrangements. In managing stockpiles, States should store unused cluster munitions in secure facilities or appropriate containers that protect the explosive ordnance and its components in a controlled atmosphere. States should apply appropriate explosive ordnance logging, tracking and testing procedures. This should include information on:

- the date of manufacture of each number, lot or batch of explosive ordnance,
- under what conditions it has been stored; and
- to what environmental factors it has been exposed.

Finally, the Annex notes that proper training of all personnel involved in the handling, transporting and use of explosive ordnance is an important factor in ensuring its reliable operations. States should therefore adopt and maintain suitable training programmes to ensure that personnel are properly trained for the munitions with which they work.

Clearing ERW

Under Article 3 of Protocol V, States Parties, as well as parties to an armed conflict within the territory of a State Party, have obligations to address the threat posed by abandoned cluster munitions or submunition blinds on territory under their control after the cessation of active hostilities and "as soon as feasible". There are four obligations, to:

- Survey and assess the threat posed by explosive remnants of war;
- Identify priorities for marking and clearance;
- Mark and clear, remove or destroy ERW; and
- Take steps to mobilise the necessary resources.

Similarly, any State Party that has used cluster munitions on territory controlled by another State Party is required to provide "where feasible" technical, financial, material or human resources to facilitate the marking and clearance, removal or destruction of abandoned cluster munitions or submunition blinds. This assistance can be provided bilaterally or through a mutually agreed third party, such as the UN or other "relevant organisations".

THE CCW

In December 2001, the Second Review Conference of the 1980 Convention on Certain Conventional Weapons (CCW) sought to address growing international concern about the threat to civilians from cluster munitions and other explosive remnants of war. It agreed on a mandate for an open-ended Group of Governmental Experts to discuss ways to address the issue of Explosive Remnants of War (ERW), including technical improvements and other measures for relevant types of munitions, including submunitions. This could reduce the risk of such munitions becoming ERW. The Group were also tasked to examine the adequacy of existing international humanitarian law in minimising post-conflict risks of ERW, both to civilians and to the military.[6] As a result, Protocol V on ERW was adopted in November 2003.

At the Third Review Conference of the CCW, States Parties decided in November 2006 to convene in June 2007, "as a matter of urgency", an intersessional meeting of governmental experts to consider further the application and implementation of existing international humanitarian law to specific munitions that may cause explosive remnants of war, with a "particular focus on cluster munitions."

As a result of the meeting in June, the governmental experts decided to recommend to the 2007 Meeting of the States Parties to the CCW to determine how best to address the humanitarian impact of cluster munitions, "including the possibility of a new instrument." Numerous technical papers were presented and discussed by the governmental experts during the course of their deliberations, which have broader relevance for those concerned with cluster munitions.[7] This included the draft of a protocol on cluster munitions.[8]

The next meeting of the States Parties was scheduled to take place in Geneva in November 2007.

THE "OSLO PROCESS"

In late 2006, concerned that existing international obligations did not sufficiently address the threat posed by cluster munitions,[9] Norway declared its intention to work towards an international ban on those cluster munitions that have an unacceptable humanitarian impact. In February 2007, a group of States, the UN, the International Committee of the Red Cross, the Cluster Munition Coalition (see Box 12) and other humanitarian organisations met in Oslo to discuss how to effectively address the humanitarian problems caused by cluster munitions. The meeting concluded with the adoption of the Oslo Declaration, which forms the basis of what has become known as the "Oslo Process".

Under the Oslo Declaration, States have committed themselves to conclude by 2008 a legally binding international instrument that will:

(i) Prohibit the use, production, transfer and stockpiling of cluster munitions that cause unacceptable harm to civilians; and

(ii) Establish a framework for cooperation and assistance that ensures adequate provision of care and rehabilitation to survivors and their communities, clearance of contaminated areas, risk education and destruction of stockpiles of prohibited cluster munitions.

Box 13 | Cluster Munitions Coalition*

The Cluster Munitions Coalition (CMC) is a network of some 200 civil society organisations whose goal is to protect civilians from the effects of cluster munitions.

The Cluster Munition Coalition calls for the conclusion of an international treaty banning cluster munitions by 2008.

Cluster munitions are understood to be unreliable and inaccurate weapons that are prone to indiscriminate use and that pose severe and lasting risks to civilians from unexploded submunitions.

Therefore the CMC urges all States to:

- join the international process launched in Oslo in February 2007 toward an effective and comprehensive treaty;
- take immediate national steps to stop the use, production and transfer of cluster munitions;
- commit resources and capacities to assist communities and individuals affected by cluster munitions.

In May 2007, the Lima Conference on Cluster Munitions – the first follow-up meeting in the Oslo Process – was held in Peru. Twenty-eight new countries joined the 46 states that launched the process in Oslo in February 2007, pledging to conclude a treaty by 2008. The Conference discussed a draft text for a *"legally binding international instrument that will prohibit the use, production, transfer and stockpiling of cluster munitions that cause unacceptable harm to civilians"*.

In San Jose, on 4–5 September 2007, a Latin American Conference on Cluster Munitions was hosted by the government of Costa Rica. Four additional countries pledged their support for the Oslo Process: El Salvador, Honduras, Nicaragua and Uruguay, bringing the total number of countries now participating in the process worldwide to 80, according to the Cluster Munitions Coalition.[10]

The next meeting of States within the Oslo Process took place in Belgrade, Serbia, on 3-4 October 2007. Representatives of affected nations, survivors and human rights groups said at the end of the gathering in Belgrade that the process leading to the deal was “unstoppable.” Eventhough some of the worlds biggest producers had not yet joined.[11] According to the Cluster Munitions Coalition, *“during the conference, Albania announced it would not produce or trade in cluster bombs, pending the negotiation of a new treaty. Uganda and Montenegro announced they will destroy their stockpiles.*
Serbia declared it is considering a moratorium.” [12]

The schedule for meeting of states within the Oslo Process includes: Brussels, Belgium, on 30 October 2007; Vienna, Austria, on 5-7 December 2007; Wellington, New Zealand, on 18-22 February 2008; and Dublin, Ireland, on 19-30 May 2008.

ENDNOTES

1 Observations on the Legal Issues related to the Use of Cluster Munitions, CCW/GGE/2007/WP.8, 25 June 2007, submitted by the ICRC, Point 3.

2 In addition, in a March 2006 study of State practice based on responses to questionnaires, Timothy McCormack, Paramdeep Mtharu and Sarah Finnan concluded that "It is clear that any attack involving munitions deliberately intended to create an ERW threat to the civilian population would be in violation of the prohibition of deliberate targeting of civilians and would constitute a war crime." Timothy McCormack, Paramdeep Mtharu and Sarah Finnan, "Report on States Parties' Responses to the Questionnaire, International Humanitarian Law & Explosive Remnants of War", Asia Pacific Centre for Military Law and University of Melbourne Law School, Australia, March 2006, p. 15.

3 Observations on the Legal Issues related to the Use of Cluster Munitions, CCW/GGE/2007/WP.8, 25 June 2007, submitted by the ICRC, Point 6.

4 See, for example, International Committee of the Red Cross, Customary International Humanitarian Law, Volume I: Rules, Cambridge University Press, Cambridge, 2005.

5 Timothy McCormack and Paramdeep Mtharu, "Expected Civilian Damage and the Proportionality Equation", Asia Pacific Centre for Military Law and University of Melbourne Law School, Australia, November 2006, p. 13.

6 Final Document of the Second Review Conference, UN doc. CCW/CONF.II/2.

7 See "Draft CCW Protocol on Cluster Munitions", CCW/GGE/2007/WP.1, submitted by Germany; "Benchmarks for alternative munitions to cluster munitions, 'Sensor Fused Area Munitions' (SEFAM)", CCW/GGE/2007/WP.1/Add.1; submitted by Germany; "Cluster Munitions", CCW/GE/2007/WP.2, submitted by France; "Draft CCW negotiating mandate on cluster munitions", CCW/GGE/2007WP.3, submitted by Germany on behalf of the European Union, "Excerpts from the Report of the Expert Meeting on the Humanitarian, Military, Technical and Legal Challenges of Cluster Munitions held in Montreux, Switzerland, 18 to 20 April 2007", CCW/GGE/2007/WP.4/Excerpts, submitted by the ICRC; "Overview of existing and proposed definitions", CCW/GGE/2007/WP.5, submitted by the GICHD; "Position paper on cluster munitions", CCW/GGE/2007/WP.6, submitted by the Russian Federation; and "Treaty Principles", CCW/GGE/2007/WP.7, submitted by the Cluster Munitions Coalition.

8 "Draft CCW Protocol on Cluster Munitions", CCW/GGE/2007/WP.1, 1 May 2007, submitted by Germany.

9 Similarly, the ICRC has, after substantial consultations on the characteristics of cluster munitions, concluded that existing rules of international humanitarian law are not adequate to address the threat from cluster munitions.

10 Cluster Munitions Coalition, "Support for Ban on Cluster Munitions Grows in Latin America", Press release, San José, 6 September 2007, accessed at: www.stopcluster-munitions.org/news.asp?id=87.

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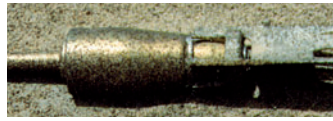
GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AXO	abandoned explosive ordnance
BAC	Battle Area Clearance
CBU	Cluster Bomb Unit
CCW	Convention on Certain Conventional Weapons (1980)
CEM	Combined effects munition
CLO	community liaison officer
CMC	Cluster Munitions Coalition
DPICM	Dual-purpose improved conventional munitions
EOD	explosive ordnance disposal
ERW	explosive remnants of war
EVD	explosive vapour detection
EU	European Union
GICHD	Geneva International Centre for Humanitarian Demining
GIS	Geographic Information System
GPS	global positioning system
HEAT	High Explosive Anti-Tank
ICRC	International Committee of the Red Cross
IMAS	International Mine Action Standards
IMSMA	Information Management System for Mine Action
Laos	Lao People's Democratic Republic
MLRS	Multiple Launch Rocket System
MRE	mine risk education
NGO	non-governmental organisation
RSP	Render Safe Procedure
SD	self-destruct
SFW	Sensor-Fuzed Weapon
SHA	Suspected Hazard Area
STANAG	Standard NATO agreements
TMD	Tactical Munition Dispenser
UK	United Kingdom
UN	United Nations
UNICEF	United Nations Children's Fund
UNIDIR	United Nations Institute for Disarmament Research
UNDP	United Nations Development Programme
UNMAS	United Nations Mine Action Service
USA	United States of America
UXO	unexploded ordnance



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