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Survey and Clearance of Unexploded Submunitions Versus Landmines and Other ERW

The authors argue that survey and clearance methods in areas contaminated solely by unexploded submunitions (from cluster munitions) should be different than those in areas contaminated by mines and other explosive remnants of war to achieve the most efficient outcome. This article seeks to explain how and why procedures are different, and proposes a land-release methodology for dealing with unexploded submunitions.

by Åsa Gilbert and Michael Creighton [ GICHD ]

Traditionally, the systematic clearance of explosive hazards is grouped into two main categories: landmine clearance and battle-area clearance.

While the land-release principles are similar for both, the operational methodologies applied to each category are different. Since mines are designed to be victim-activated, they pose a more direct risk to clearance technicians than do submunitions, which are designed to detonate before, upon or after impact. Thus, if mines and ERW are in the same area, the situation should first be treated as a mine-hazard problem and then as an ERW hazard.

Addressing areas contaminated by unexploded submunitions is classified as a BAC activity, but the operational procedures used are, in many ways, similar to mine clearance. Therefore, a truly efficient operational approach to the clearance of submunitions must incorporate aspects of BAC and mine-clearance procedures.

Characteristics of CMs and Explosive Submunitions

Because of the characteristics outlined below (pattern, metal content, failure rate and risk of accidental detonation of submunitions), the land-release methodology for submunitions can, and should be, distinct from mine clearance and other ERW clearance.

Pattern. The clearance of submunitions is distinct from the clearance of mines and other ERW, largely due to the unique patterns of dispersal and explosion exhibited by cluster munitions. Thus, in order to efficiently handle submunitions, clearance teams must not rely heavily on standard operating procedures used in mine clearance. Instead, techniques must be used for submunition identification and clearance that reflect the unique nature of cluster munitions, taking into account the scattering pattern, metal content, failure rate and risk for accidental detonation of submunitions.

- Cluster munitions/submunitions. Cluster munitions are distinct from other munitions. When fired, launched or dropped, the explosive submunitions are dispersed or released, and create a strike pattern or footprint on the ground. Unexploded submunitions will undoubtedly be within this footprint area, because of the high failure rate of explosive submunitions, as discussed later in this article. By identifying the footprint’s shape, the center...
Submunition survey and clearance, therefore, can generally be conducted using more rapid and effective procedures than for mine clearance. These procedures provide several advantages, including the following:

- **Quicker search procedures.** When the contamination type contains a high metal content and does not include pressure/victim-activated devices, the search can be faster. In most cases, it is considered safe to conduct a surface search by walking the suspected area, coupled with vegetation cutting (if needed), to allow a more thorough ground search.

- **Quicker marking.** Depending on which working procedures are used, a less comprehensive marking system may be justified. A systematic search below ground may require a more complex marking system; however, some techniques, such as a surface visual search, may allow for an expedited, less comprehensive marking system.

- **Quicker site set up and take down.** As a result of the less comprehensive marking system, the site set-up and take-down will be less time-consuming.

Although land-release methodologies for submunitions may be not as straightforward as for a patterned minefield, similar land-release principles, like the use of an evidence-based approach and the principle of all reasonable effort, should be applied. For instance, heavy contamination, intended land use or other factors may demand slower, more meticulous clearance procedures, which draw more heavily on mine-action principles.

### Evidence-based Approach

A proposed methodology for the survey and clearance of submunitions is an evidence-based approach, that is, when clear evidence indicates the presence of submunitions, this method can be used, including when:

- Evidence of a strike is confirmed by either physical debris or a strong claim (by an informant).
- An evidence point is created, and from this point further survey/clearance commences.

### Evidence-point criteria

The national mine-action authority and operators should develop and agree upon the criteria for the required level of evidence needed to create an evidence point. In general, however, when any of the following are present, an evidence point can be established:

- **Unexploded submunitions**
- **Fragmentation of submunitions**
- **Parts of the delivery systems**
- **Strike marks**
- **Fragmentation marks**
- **Burned areas**
- **A strong claim by an informant stating that unexploded submunitions are located in the area**

In some countries, suspected hazardous areas can be linked to boundaries that have been determined by the affected community. As people with no mine/ERW experience (local residents) tend to define these areas, however, civilians generally think the contaminated areas are larger than they actually are. As a result, assets are deployed to areas where no

### Summary table. Different characteristics of mines, submunitions and other UXO.

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evidence of contamination exists, instead of an evidence-based confirmed hazardous areas.

For effective use of resources and planning purposes, estimated areas may be attributed to each evidence point. The community should be closely involved in the process of identifying evidence points. However, this area should not be seen as an actual hazardous area, nor the boundaries as the extent of any contamination. Well-defined criteria will ensure that only land qualifying for further technical survey/clearance will be recorded and tasked for future activity. As stated previously, the local population should be involved in the process, but the final decision should be evidence-based and made by technically-qualified staff, following defined criteria.

Initial response. In the initial post-conflict phase, the rapid removal and destruction of surface-located submunitions is necessary in order to remove the immediate threat to the local inhabitants. During this process, there may not be enough time to gather and record all available information. Most importantly, a minimum record should be kept and entered into a database, such as the specific location (using a Global Positioning System) of each individual item, the munition type found and the number of items destroyed. These records will facilitate the analysis of the data at a later stage. Also, sufficient and accurate recording of each item's location enables the footprint of the strike to be identified later and technical survey/clearance assets to be efficiently deployed in contaminated areas.

Mine-action programs often have re-lying EOD or rapid-response teams that carry out spot tasks (removal of individually munitions found) on an as-needed basis. As with the above example, a detailed record is very important for keeping all tasks, and this record should be incorporated into the later planning and tasking of technical survey/clearance teams.

Non-technical Survey. Before conducting a Non-technical Survey, a desk assessment should take place, analyzing previous survey records, EOD spot-task records and bombing data (if available). Then, the NTS teams should deploy to the field to investigate any previously recorded suspected-hazardous areas/evidence points and identify any new ones.

Fade-out. A fade-out is the agreed distance from a specific evidence point where the Technical Survey/clearance is carried out. The fade-out distance is determined by the conditions specific to the area (i.e., geographical conditions, hazard type, delivery methods, etc.) and should be based on operational experience.

Technical Clearance Process as Illustrated in Figures A and B:

1. Identify evidence of submunitions
   - Unexploded bomblets
   - Fragmentation
   - Strike mark
   - Strong claim
2. Start clearance at the location of the evidence.
3. Clear x meters in all directions according to the agreed distance for FADEOUT from evidence (wx. 50m).
4. If no further evidence has been found, stop clearance.
5. If no further evidence has been found/reported in the area, the CHA is released.

Figure A (top). One piece of evidence was found in the area. Clearance starts at the location of the evidence (red dot). If no further evidence is encountered within the fade-out (x meters in all directions from the evidence operationally conducted as a box search), no additional survey/clearance is required.

Figure B (bottom). Three separate locations with evidence were identified during the initial NTS. The survey team identified a hazardous area polygon based on the evidence. During the survey/clearance operation, all evidence was dealt with individually. When applying the fade-out and if additional evidence is found, the survey/clearance is extended. If no further evidence is found, the remaining area is released.

If credible evidence corresponding with the correct level outlined in national standards and standard operating procedures is not found, the survey team should not record an evidence point or a hazardous area. This is essential for the validity of an evidence-based methodology, and avoids inflating the problem by populating the database with hazardous areas based on vague information or weak claims not based on any actual evidence.

Conversely, if sound evidence is available and the NTS team can clearly identify evidence of cluster-munition remnants, an evidence point should be recorded. If enough clear evidence exists to determine which specific area is contaminated, then the survey team should document the boundaries of the contamination. This can provide better planning information for further Technical Survey and clearance. However, this should only be done if the boundaries of the contamination area can be clearly identified.

Technical Survey and clearance. Once an NTS team conducts a survey and if a hazardous area or an area identified by an evidence point is identified, the area is then subjected to Technical Survey and/or clearance. The two activities are generally conducted concurrently, even though some organizations employ separate specialized Technical Survey and clearance teams.

With an evidence-based approach, the task is carried out in the same manner, whether the area only requires a surface search or if items are below the surface. The team commences the Technical Survey/clearance at the evidence point’s location and then works its way outward to the agreed fade-out point.

If no other submunitions are found once the fade-out distance is applied and searched, it is reasonable to determine that no other submunitions remain from that strike/footprint. To give an example, if the fade-out is 50 meters (54.68...
NPA’s Survey and Clearance of Cluster Munitions Along the Thailand-Cambodia Border

The February conflict at the Thailand-Cambodia border over disputed territory has left Cambodia with the burden of clearing cluster munitions. By applying to the Thai-Cambodian conflict strategies for cluster munitions removal that were successful in other post-conflict areas, NPA is assisting the Cambodian Mine Action Centre in cleaning up the problem. Thailand and Cambodia have not acceded to the ban on cluster munitions established in the 2008 Convention on Cluster Munitions and are therefore not subject to its provisions. Both countries attended the CCM 2011 intersessional meeting in June, leaving many hopeful that the two countries will become States Parties.

by Atle Karlsen | Norwegian People’s Aid |

Thai and Cambodian troops exchanged fire 4-7 February 2011 over disputed territory along the border near the Preah Vihear temple in northern Cambodia, a UNESCO World Heritage site. On 10 February, the Cambodian Mine Action Centre reported it had evidence that Thai forces fired cluster munitions into areas in Preah Vihear province.

Funded by the Norwegian Ministry of Foreign Affairs, Norwegian People’s Aid began a new survey project in Cambodia in 2011 to establish the extent of the cluster-munition remnants problem across the country using methodologies developed through NPA’s work in Laos, Lebanon, Serbia and Vietnam. CMAC asked NPA to conduct an emergency survey of the affected areas. Simultaneously, in Thailand, in cooperation with the Thailand Mine Action Center, NPA conducted a survey of the sites on the Thai border that were attacked with Cambodian artillery during the February conflict.

Neither Thailand nor Cambodia has acceded to the Convention on Cluster Munitions, but positive statements by both nations during the CCM’s first intersessional meetings offered hope that they would join the CCM soon. Follow-up meetings in Cambodia and Thailand in mid-August 2011 included military-to-military dialogue on the obligations of the CCM and alternative, more cost-efficient ways to destroy cluster-munition stockpiles.

Assessment of the Situation

On 1 and 2 April 2011, a delegation from NPA, CMAC and the Landmine and Cluster Munition Monitor visited Cambodia’s affected areas. The objectives of the assessment were to confirm cluster-munition use in Preah Vihear province (number of sites contaminated/types of munitions used) and to assess the impact of cluster-munition contamination on the population. In Sen Chey village the assessment team found that cluster munitions had hit several houses and people were living among the unexploded submunitions.

The assessment team recorded the locations of all unexploded munitions found, and evidence from cluster-munition strikes was gathered (spacers/ribbons, fragments, etc.). It was confirmed that Thailand delivered the cluster munitions by artillery, namely the 155mm NR 269. The assessment also determined that unexploded M42/M46 contaminated the area.