Survey and Clearance of Unexploded Submunitions Versus Landmines and Other ERW

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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), land-release methodology for submunitions should be distinct from mine clearance and other ERW.

- **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 account the scattering pattern, metal content, failure rate and risk for accidental detonation of submunitions.
- **Explosive Submunition:** a conventional munition that is designed to disperse or release explosive submunitions, each weighing less than 20 kilograms, and includes those explosive submunitions.

Convention on Cluster Munitions Article 2 definitions as used in this article:

- **Cluster Munition:** a conventional munition that in order to perform its task is dispersed or released by a cluster munition and is designed to function by detonating an explosive charge prior to, on or after impact.
- **Unexploded Submunition:** an explosive submunition that has been dispersed or released by, or otherwise separated from, a cluster munition and has failed to explode as intended.

**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

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and outer edge of the strike can be better determined. This facilitates a more precise, systematic search of the hazardous area.

- ERW. In general, explosive remnants of war such as air-craft bombs, mortars and artillery shells, do not create a predictable pattern or footprint after being fired or delivered but may be concentrated in certain areas.

- Mines. Mines are often laid in rows and set patterns, so methodologies can be developed to assist clearing patterned minefields. Even when mines are laid randomly (generally known as nuisance minefields), it may still be viable to identify and analyze the laying tactics. Therefore, it is possible to determine areas likely to be mined and release areas that have no evidence of mines.

**Metal content.** Normally, submunitions contain significantly more metal than regular anti-personnel mines or non-metal cased anti-vehicle mines. This means that less sensitive detectors/locators, such as magnetometers, that are not sensitive enough to the point where the footprint could be used effectively to detect the more metallic submunitions.

**Failure rate.** Research indicates that the failure rate of submunitions varies, but could be as high as 30 percent. Compared to other ERW types, this is considered high. The high failure rate and dispersal characteristics are designed to be victim-activated.

- As a result of the less predictable pattern and greater number of submunitions, submunitions are more likely to be detonated by unexploded submunitions when compared to other ERW types. This is considered high. The high failure rate and dispersal characteristics are designed to be victim-activated.

**Land-release Methodology.** The footprints, or dispersal patterns, of submunitions can be used for more efficient survey of contaminated land. Teams can use the identification of one submunition as an indication of the presence of more submunitions in the same area, due to their high failure rate and dispersal characteristics. Even if the conflict occurred several years earlier, or if a large number of the submunitions were moved and/or destroyed, the presence of one submunition remains a reliable indication of other submunitions in the area. In the case of overlapping strikes, locating the point where the footprints end is necessary. This requires clear and agreed working procedures on how to plan and conduct survey and clearance.

- Sometimes the drills and equipment used during submunition survey and clearance are similar to those used in mine clearance, e.g., a systematic search below ground using detectors. However, using mine-clearance procedures and equipment during the survey and clearance of submunitions is highly inefficient, and should be avoided whenever possible. This is because the metal content is significantly higher in submunitions than in mines, and submunitions are not designed to be detonated by applying pressure. Nevertheless, because of the cost and logistical challenges involved in purchasing new equipment, when an organization undertakes the survey and clearance of submunitions, it may have to employ detectors designed to detect minimum-metal mines and use procedures developed for mine clearance.

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 almost all 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 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 not be 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, unintended land use or other factors may demand slower, more meticulous clearance procedures, which draw more heavily on mine-action principles.
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 reusing 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.

Focused on technical surveys, clearance efforts have been mainly carried out in post-conflict areas where the destruction of submunitions is a priority. This destruction can be achieved through different clearing processes, such as the explosive ordnance disposal (EOD) and non-technical survey (NTS). The technical surveys are conducted in post-conflict areas where the destruction of submunitions is a priority.
that the most efficient approach is used. Survey and clearance of submunitions so that the evidence point is located. If no further evidence is found, the survey/clearance will stop. A total of 10,000 square meters (2.47 acres) will have been technically surveyed/cleared.

Conclusion

Surface Search - Visual.

Although some mine-clearance procedures are also suitable for submunition survey and clearance, it is important that more efficient procedures specifically tailored to cluster-munitions identification and removal, including establishing the submunitions footprint, are used when possible. See endnotes page 82

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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.

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 Lao PDR, 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.

The assessment team recorded the locations of all unexploded M42/M46 contaminated the area. The assessment also determined that unexploded M42/M46 contaminated the area.

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 Ser 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.