

LAO PDR NATIONAL UXO/MINE ACTION STANDARDS (NS)



Chapter Four Marking Systems

National Regulatory Authority for
the UXO/Mine Action Sector in Lao PDR

15 October 2012

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Marking Systems

1. Introduction

Effective marking systems are essential to safe, efficient and effective UXO clearance operations. They provide clear, unambiguous warning of contaminated areas and aid in the control of UXO clearance operations. In some cases, marking systems also provide a permanent record on the ground of areas cleared.

The Lao PDR National Regulatory Authority (NRA), as the authority for UXO/mine action within the country, is responsible for developing standards for marking systems for use in UXO clearance in Lao PDR and ensuring that clearance organisations comply with the standards.

2. Scope

This chapter details the standards to be applied for marking systems used by all clearance organisations operating in Lao PDR.

The standards for marking systems for the marking of clearance worksites included in this chapter of NS only apply to UXO clearance operations. They do not apply to mine clearance operations. The marking system requirements for mine clearance operations are included in **Chapter 12 of NS, Mine Clearance Operations**.

3. International Treaties

3.1. Convention on Cluster Munitions (CCM)

On 3rd December 2008 the Lao PDR signed the Convention on Cluster Munitions (CCM) and then on 18th March 2009 ratified the Convention thus becoming a State Party to the Convention when it entered into force on 1 August 2010.

Article 4, paragraph 2 (c) of the Convention places specific obligations on States Party in relation to the marking of cluster munition contaminated areas. The paragraph states:

“2. In fulfilling its obligations under paragraph 1 of this Article, each State Party shall take the following measures as soon as possible....

- (c) Take all feasible steps to ensure that all cluster munition contaminated areas under its jurisdiction or control are perimeter-marked, monitored and protected by fencing or other means to ensure the effective exclusion of civilians. Warning signs based on methods of marking readily recognisable 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 cluster munition contaminated areas and which side is considered to be safe;”

3.2. Other International Treaties

Two other international treaties concerning mine affected countries place special obligations on the Governments of mine-affected countries (who are States Party to the treaties) regarding the survey and marking of mined areas.

Amended Protocol II (AP II) to the UN Conventional Weaponry Convention requires that ... all reasonable precautions should be taken to protect civilians from the impact of mines, booby-traps and other devices.

Article 5.2 of the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-personnel Mines and on their Destruction (commonly known as the Ottawa Convention or Mine Ban Treaty) requires each State Party to ... make every effort to identify all areas under its jurisdiction or control in which anti-personnel mines are known or suspected to be emplaced and (to) ensure as soon as possible that all anti-personnel mines in mined areas under its jurisdiction or control are perimeter-marked, monitored and protected by fencing or other means, to ensure the effective exclusion of civilians, until all anti-personnel mines contained therein have been destroyed.

AP II and the Ottawa Treaty both imply an obligation on the Governments of mine-affected countries, who are also States Party to one or both of the agreements, to ensure that all mined areas under their jurisdiction and control are accurately surveyed, and then perimeter-marked by fencing or other means.

Currently Lao PDR is not a State Party to either of these treaties, however if this changes then there will be an implied obligation to mark mined areas.

4. Movement on UXO Clearance Sites Prior to Clearance

For UXO clearance operations conducted in Lao PDR it is permissible for clearance personnel to enter and move around the task area prior to clearance being carried out. However, this is only permissible under the following conditions:

- a. The site has been confirmed as not having any hazards that would pose a risk to personnel such as mines, tripwires or high risk UXO. This confirmation may be by survey, local knowledge, current land use or other reliable information.
- b. Personnel moving on the site are to inspect the ground in front of them when moving around to avoid disturbing any surface UXOs.
- c. No digging or driving pegs into the ground is to occur unless the area has been checked with a metal detector and confirmed as clear first.

5. Responsibilities for Reporting and Marking

All UXO/mine action organisations have a general responsibility for reporting UXOs that they receive information about or find during their operations that they are not required, or unable to deal with. The requirements for reporting UXO are included in **Chapter 8 of NS, Explosive Ordnance Disposal (EOD)**. As part of the reporting requirements it is necessary to provide information about any marking systems used and who emplaced the systems.

UXO clearance organisations are responsible for the marking of UXOs that are not dealt with, subject to the provisions of section 8.3 below. Non clearance organisations are not permitted to carry out any marking. Any marking by clearance organisations is to be in accordance with the requirements of this NS.

Clearance organisations that carry out any marking of UXOs or contaminated areas are to provide details of such marking to the NRA provincial office during routine reporting.

6. Purpose of Marking Systems

Marking systems used within Lao PDR have three purposes:

- a. To provide a clear and unambiguous warning to people of the dangers of a UXO/mine contaminated area or point location and, in some cases, to install a physical barrier to reduce the risk of unintentional entry into a contaminated area.
- b. As a means for the safe and effective control of UXO clearance operations.
- c. To permanently mark areas that have been subject to UXO clearance operations and released for use.

7. General Requirements of Marking Systems

Marking systems used in UXO/mine action in Lao PDR are to conform to the following general requirements:

- a. They must be uncomplicated, logical and easy to follow.
- b. Maximum use is to be made of locally available materials.
- c. Materials used for marking systems should have little or no value.
- d. They should be appropriate for their intended purpose and the duration they are expected to last.

8. Marking of UXO/Mine Contaminated Areas

When the marking of UXO/mine contaminated areas in Lao PDR is necessary, the requirements in the following sections are to be complied with.

8.1. UXO Contaminated Areas

Marking of UXO contaminated areas is not normally carried out in Lao PDR however, if such marking is required the standards in this section are to be followed.

Marking systems for UXO contaminated areas are to consist of markers and warning signs spaced no greater than 30 m apart around the perimeter of the contaminated areas. Markers may be posts placed into the ground at the required intervals or existing vegetation (trees). Warning signs may be manufactured signs fitted to marker posts/trees or a message written or sprayed onto trees. Marking systems are to conform to the following requirements:

- a. They are to be outside the perimeter of the known contaminated area.
- b. Warning signs are to face away from the contaminated area.
- c. Written information is to be in the local language and clearly readable from 5 m.
- d. Marking systems are to be clearly visible from 30 m.
- e. Written information and/or symbols used are to indicate danger and the nature of the hazard within the contaminated area.
- f. Any colour may be used.

Fencing off of a UXO contaminated area is not required.

8.2. Mine Contaminated Areas

Mine contaminated areas are to be marked as for UXO contaminated areas except that the nature of the hazard is to be indicated as mines.

Mine contaminated areas are to be fenced off to prevent the entry of people and domestic animals into the area. Fencing may be of any suitable materials provided that the fence forms a clear physical barrier that has to be crossed to enter the contaminated area, and extends around the complete perimeter of the contaminated area.

Details of minefield boundary and fencing/marketing systems are to be included on a **Mined Area Report** and sent to the NRA head office and the NRA provincial office in accordance with **Chapter 24 of NS, Information Management**.

8.3. Marking UXO Point Locations

Marking of UXO point locations warns local communities about the presence of a UXO and also assists clearance organisations with the future locating of UXO for disposal. However, in some situations the marking of UXO may lead to the UXO being tampered with or collected for scrap.

Prior to any marking of UXO point locations taking place the clearance organisation concerned is to do an assessment as to the likelihood of the UXO being touched or moved as a direct result of the marking. The assessment is to take into account factors such as:

- a. Prevalence of UXO collection in the locality.
- b. Type of UXO (some UXO such as BLU 26s are not collected for scrap).
- c. Location of the UXO in relation to communities.
- d. Ease with which the UXO may be located at a future time for disposal.
- e. Danger posed if the UXO is unmarked.

As a minimum, details of the UXO are to be reported in accordance with **Chapter 8 of NS, Explosive Ordnance Disposal**.

When carried out, the marking of UXO point locations is to conform to the general requirements for the marking of contaminated areas:

- a. Markers and warning signs are to be used.
- b. Written information is to be in the local language and clearly readable from 5 m.
- c. Marking systems are to be clearly visible from 30 m.
- d. Written information and/or symbols used are to indicate danger and the nature of the UXO hazard.
- e. Any colour may be used.
- f. No fencing is required.

8.4. Briefing Local Communities on Marking Systems

Clearance organisations establishing marking systems are responsible for ensuring that local communities are briefed on the location and meaning of the systems.

8.5. Maintenance of UXO/Mine Contaminated Area Marking Systems

When marking of UXO/minecontaminated areas has been carried out but clearance is not going to proceed immediately, systems for the maintenance of marking should to be put in place as follows:

- a. When the UXO/mine contaminated areas are located on community/private owned land, the community/private owner should be made responsible for the ongoing maintenance of the marking systems. This should be arranged and confirmed through the NRA provincial office.
- b. When the UXO/mine contaminated areas are located on public land the NRA provincial office should ensure the ongoing maintenance of the marking systems through local Government.

Particular emphasis should be placed on the maintenance of fences and marking systems established around mine contaminated areas.

9. Clearance Marking Systems

The following sections provide the minimum requirements for clearance marking systems to be used on UXO area clearance operations conducted in Lao PDR.

The proper marking of clearance areas in accordance with these standards is the responsibility of the clearance organisation undertaking the task.

9.1. Purpose of Clearance Marking Systems

UXO clearance marking systems in Lao PDR have two purposes:

- a. Boundary marking to mark the perimeter of the area to be cleared.
- b. Clearance area marking to provide a safe and effective means of controlling the UXO clearance operation.

9.2. Boundary Marking

The marking of boundaries is to conform to the following requirements:

- a. Boundary markings are to provide a clear delineation between the area to be cleared and area not to be cleared.
- b. Any materials or colours may be used provided that the marking systems are clearly visible from within the clearance area, from a distance of 30 m and there is no possible confusion between the boundary marking system and the clearance marking system.
- c. Lines between turning points on boundaries are to be straight.
- d. Individual boundary markers must be visible from adjacent boundary markers.

- e. On large clearance sites, boundary marking systems must be in place around the boundaries of the current area being cleared. Future areas to be cleared should be marked as work progresses.
- f. Where the area to be cleared is bounded on one or more sides by a fence or other topographical feature that clearly delineates the clearance area and complies with the other requirements of this section, no other boundary markings are needed.

Unless it is clearly impractical, boundary markings are to remain in place until the cleared area has been permanently marked.

9.3. Clearance Area Marking

Clearance area marking is to conform to the following requirements:

- a. Clearance markings systems are to provide a clear delineation between cleared areas and uncleared areas.
- b. Any materials or colours may be used provided that the marking systems are clearly visible from within the clearance area from a distance of 10 m.
- c. When lanes are used, the sides of lanes are to be parallel and straight.
- d. When boxes (or similar regular shapes) are used, the sides between turning points are to be straight.
- e. An effective system for marking progress as work proceeds down a lane or within a box is to be used. This system must ensure that no areas are missed, particularly during breaks (overnight) or changeovers between personnel.
- f. When tape or string is used as part of a marking system, sufficient tie-down points must be used to ensure that the tape or string remains straight and fixed to the ground.
- g. A safe and effective system is to be used for the marking of any UXO that are located and are unable to be dealt with immediately.

Note: There may be situations where UXO clearance operations take place adjacent to construction work and the safety markings used during construction are similar to the clearance marking systems used. If this situation occurs, to eliminate confusion, the clearance organisation is to use additional signs to clearly indicate their marking systems.

9.4. Explosive Detection Dog (EDD) and Mechanical Operations

When UXO clearance operations are being carried out by EDD or supported by machines there are some additional requirements for clearance marking systems that must be complied with. These are:

- a. When setting out search areas (boxes) for EDD operations, the EDD handler must be able to see the whole area within the box and the perimeter markings.
- b. During mechanical operations involving crewed machines, the machine operator must be able to clearly see the clearance marking systems from within the machine.

9.5. Marking Control and Administrative Areas

Except for the requirements indicated in **Chapter 5 of NS, Worksite Preparation**, control and administrative areas do not need to be marked for UXO clearance operations in Lao PDR.

10. Survey Marking

Survey is a process that leads to land being released for use or designated as requiring clearance. Irrespective of whether land is released for use or identified as requiring clearance, survey marking is required.

10.1. Survey Markers

Survey markers are used to provide points of reference to locate other survey markers, or to mark the boundaries of areas of land for UXO clearance operations. Survey markers may be established during survey to support future clearance, or they may be established as part of the completion survey. Survey markers include:

- a. Reference Point (RP). A RP is a fixed point of reference located a suitable distance outside the marked area. The RP is to be a permanent and easily recognisable landmark or feature in the general area. The position of the RP must be such that Bench Marks (BMs) are able to be located from it.
- b. Benchmarks (BMs). BMs are fixed points of reference used to locate the points on the boundary of a marked area. On large sites more than one BM may be established covering different areas on a site. BMs may be established within the boundaries of a marked area provided they are not going to be disturbed by the planned land use. If the RP is close to the boundary of a marked area, there is no need to have BMs.
- c. Start Point (SP). A SP is the turning point on the boundary of the marked area from which the survey of the boundary starts.
- d. Turning Points (TPs). TPs are all the points on the boundary of a marked area where the boundary changes direction.
- e. Intermediate Points (IPs). If the distance between two TPs is more than 50 m, IPs are to be used to ensure that the direction between TPs can be easily and accurately followed.

10.2. Survey Marking Requirements

Clearance organisations may use any systems for the marking of SPs, TPs and IPs during clearance, provided that the requirements for boundary marking (see section 9.2 above) are complied with.

The requirements for the marking of SPs, TPs and IPs after clearance are covered in section 11 below.

Systems for the marking of RPs and BMs are, where practicable, to conform to the general requirements for other marking systems. These include:

- a. Marking systems being clearly visible from 30 m.
- b. Written information is to be in the local language and clearly readable from 5 m.

- c. Written information and/or symbols used are to indicate what the survey marker is, an RP or BM and its unique designation (as designated by the clearance organisation).
- d. If a RP or BM is not located at the same point as the marking, the marking is to clearly indicate the location of the survey mark.
- e. Any colour may be used.

11. Marking Released Land

All clearance organisations releasing land for use, either through survey or clearance, are responsible for the marking, surveying and recording of the areas they have released. Marking released land is to conform to the following requirements:

- a. Markings are to be placed at the SP and all TPs on the perimeter of the released land.
- b. A RP and BMs are to be established to ensure that the boundary markings (SP and TPs) are able to be located.

Note: Due to the likelihood of boundary markings being moved or lost after handover, it is extremely important that the RP and BMs are permanent features.

- c. Marking systems are to be as permanent as practically possible, or as necessary for the land use.
- d. Marking systems should be able to be located at a future time.
- e. Marking the positions of UXOs located is not required although information on UXO locations is to be included on **Completion Survey Reports**.
- f. Marking of uncleared areas within the area being released is not required although the information on the uncleared area location is to be included on **Completion Survey Reports**.

Boundary markings are to be in place during the handover of the released land.

Details of the marking systems used for the marking of released land, including the RP and BMs, are to be recorded on **Completion Survey Reports** submitted by the clearance organisation.