

LAO PDR NATIONAL UXO/MINE ACTION
STANDARDS (NS)



Chapter Six
Survey

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

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Survey

1. Introduction

Survey is an integral part of the UXO clearance process providing information to support UXO clearance operations. Survey identifies contaminated areas that require marking or clearance, determines the type of clearance necessary and in some cases, provides marked clearance sites to support clearance efforts. Survey also identifies those areas that can be released without any further work. Survey operations ensure that UXO clearance resources are used efficiently and effectively on priority tasks where most benefit can be obtained.

2. Scope

This chapter covers the processes and requirements for survey operations carried out in Lao PDR.

The details included in this chapter apply to UXO clearance operations only; they do not apply to mine clearance operations. The specific requirements for survey for mine clearance operations are included in [Chapter 12 of NS, 'Mine Clearance Operations'](#).

3. General Responsibilities for Information Gathering

All UXO/mine action organisations operating in Lao PDR have a general responsibility for gathering information on the risks of UXO and their effect on communities. UXO/mine action organisations that receive information about any of the situations indicated below should report the details to the Lao PDR National Regulatory Authority (NRA):

- a. UXO/mine accidents. The '**UXO/Mine Accident Report**' and '**UXO/Mine Victim Report**' are to be used.
- b. Mined areas. The '**Mined Area Report**' is to be used.

Note: The details included in the '**Mined Area Report**' require some investigation of the areas, which are beyond the capability of UXO/Mine Risk Education (UXO/MRE) or UXO mine Victim Assistance (VA) organisations. UXO/MRE and UXO mine VA organisations are to fill out the general details parts of the report based on the information they receive and forward the incomplete report to the NRA.

- c. UXOs. Where UXO/mine action organisations have the capability and the authority to deal with the items they are permitted to do this and report the action taken as part of routine reporting. If the items are not dealt with the details should be reported as follows:
 - (1) Location of the item(s) by map reference or GPS reading. A sketch of the location should also be provided.
 - (2) Type and quantity of item(s). If known, the common name should be provided, if not a detailed description should be provided. If possible, photographs should also be provided.
 - (3) Details of the affect that the UXO is having i.e. restricting land use or posing a risk to communities.
 - (4) Any marking systems used and if known, who emplaced the marking systems.
 - (5) Contact details of local personnel who may assist in locating the item(s).

There is no designated format for the reporting of UXOs. This information is to be passed to the NRA by whatever means is available.

Clearance organisations should mark UXOs that they are not required, or unable to deal with, however this is dependant on the particular situation. In some cases marking may advertise the presence of UXO. Non clearance organisations should not mark UXOs. Details of the requirements for marking UXOs are included in [Chapter 4 of NS 'Marking Systems'](#).

In addition, all UXO/mine action organisations have a general responsibility for advising communities of the systems and procedures for the reporting of UXO. (See note in section 4 below).

4. NRA Provincial Responsibilities for Information Gathering

The NRA is responsible for ensuring the establishment and maintenance of systems within the provinces for the collection of UXO/mine action related information as indicated in section 3 above. These systems are to use provincial, district and local Government resources; the resources of UXO/mine action organisations operating within the province; and the village/community leaders to collect and pass on information.

Note: This responsibility also includes notifying all information gathering stakeholders, including local communities, of the systems for the collection of information.

The system should involve passing information, by whatever means are appropriate, through the various levels of provincial government to the responsible UXO coordination office. If necessary, information may also be passed through UXO/mine action organisations.

In addition, information is to be actively pursued as part of routine visits by provincial staff working on behalf of the NRA / UXO sector and other local government officials to localities, villages and organisations working within the province (not necessarily UXO/mine action organisations); and through visits to district and provincial facilities such as hospitals.

Except for information on UXOs, the information to be reported is indicated on the relevant reports (see section 3 above). On receipt of information that is not already in the report format, the NRA is ensure a system that can summarise the information in these reports. When information received is insufficient for the proper completion of the required report, the Provincial Office responsible is to follow up the matter to obtain a complete set of information.

The NRA is to ensure that in reporting information that data is not inadvertently duplicated.

4.1. Acting on Information

The provincial offices will obtain information from their own information gathering efforts (see section 4 above), or information will be relayed to the province authorities from the NRA. NRA representative Provincial Offices are to act on information received as follows:

- a. UXO accidents and victims:
 - (1) Ensure that surviving victims or their families are advised about UXO/mine VA available, either within the province or nationally.
 - (2) Where applicable, notify any UXO/mine VA organisations operating in the province about surviving victims.

- (3) Forward original copies of '**UXO/Mine Accident Reports**' and '**UXO/Mine Victim Reports**' to the NRA after making comments on any action taken by the provincial office. This is only when the NRA representative offices gather this information themselves.
- (4) Input relevant information into the NRA database (see note below) and file copies of reports.

Note: It is still uncertain whether the NRA representative offices will have their own provincial database.

b. Mined areas:

- (1) Ensure that the mined area is marked and fenced in accordance with the requirements of [Chapter 4 of NS 'Marking Systems'](#). Technical assistance will be needed from a UXO clearance organisation for this task.
- (2) Forward the original copy of the '**Mined Area Report**' to the NRA after making comments on any action taken by the NRA representative provincial office. This is only when the NRA representative provincial office gather this information themselves.
- (3) Input the information into the NRA provincial database (if it exists) and file a copy of the report.

c. UXOs:

- (1) Determine if the reported UXO is affecting the use of land or posing a risk to communities.
- (2) Determine what action is required, marking or clearance. If clearance is necessary then it must be decided whether this is by EOD roving clearance or area clearance. The type and extent of contamination will influence this decision.

Note: Prior to any marking of UXO being carried out an assessment is to be made as to the likelihood of the UXO being touched or moved as a direct result of the marking. Guidance on this assessment is included in [Chapter 4 of NS, 'Marking Systems'](#).

- (3) Determine the urgency of the task i.e. whether immediate action is necessary or the work may be delayed.
- (4) Pass all information received to the UXO clearance organisation responsible for humanitarian clearance within the province, and task the organisation to carry out the necessary work. The urgency for such clearance is to be stated by the NRA representative office as immediate (within one month) or delayed (scheduled with other UXO clearance activities in the locality). If the information about the UXO originated from a village and there is to be a delay in the action taken, the village is to be notified of the situation.
- (5) Monitor the conduct of the task by the organisation concerned.

When contaminated areas have been marked and not prioritised for clearance then the NRA has responsibilities in regard to the maintenance of marking systems. Details of these responsibilities are included in [Chapter 4 of NS 'Marking Systems'](#).

5. Survey Standards

The survey standards for all survey operations in Lao PDR are:

- a. Measurements. Distance measurements are to be taken horizontally and accuracy must be to +/- 0.3 m.
- b. Bearings (Azimuths). Bearings are to be taken forward and back as a check against gross error and bearings are to be recorded to an accuracy of +/- 2 degrees.
- c. Global Positioning System (GPS). The map datum to be used is WGS 84. The coordinate system to be used is the Universal Transverse Mercator (UTM) system.

6. Task Numbering

There is no national UXO/mine action task numbering system. UXO/mine action organisations are to develop their own task numbering as required for the management of their UXO/mine action tasks.

Each UXO/mine action organisation will be allocated a three letter code by the NRA. This three letter code is to be prefixed to the organisation's task numbering system and used in all work plans and reports that originate from that organisation.

7. 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 technical survey (if a technical survey is done) or they may be established after UXO clearance operations 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 are to be located a short distance outside the marked area.
- 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.

8. Survey Operations

Survey operations are carried out in Lao PDR to provide information to support the prioritisation and planning for UXO clearance operations. Surveys are normally carried out when known or suspected UXO contaminated land is required for use (area clearance survey), or when UXO are reported that are affecting land use or posing a risk to communities.

8.1. Area Clearance Survey

Area clearance survey is carried out on areas of land identified for a particular use and the area is known or suspected to be contaminated by UXO to an extent that would affect the intended use. Area clearance survey is carried out to determine if clearance is necessary, and, if clearance is necessary, to determine the type of clearance required. Area clearance survey also provides information for the prioritisation of tasks.

Area clearance survey follows a process of general survey and technical survey.

Note: When the requirements for area clearance are specified in a commercial contract or other formal agreement, survey to determine the need for clearance as described in this section of NS is not necessary. Survey may still be carried out for marking and information gathering purposes.

8.1.1. General Survey

General surveys do not involve the searching for UXO using metal detection equipment, or any excavation for or movement of UXO. General survey may involve some or all of the following:

- a. Examining data such as bombing data, clearance records, UXO socio economic impact data and accident reports. Clearance records of adjacent or nearby land may assist in determining the likely scope and scale of UXO contamination on the area being surveyed.
- b. Visiting the location and talking to the landowners, land users, local authorities and communities about land use and the type and extent of contamination on the site.
- c. Visiting the site and conducting a visual inspection for evidence of UXO contamination. Evidence of UXO contamination does not have to include actual UXO, UXO fragments are sufficient to indicate UXO contamination.

General survey may also include checks by metal detection equipment to determine the extent of metal fragmentation contamination (no excavation involved) and the marking of boundaries of areas identified as requiring clearance.

The main aims of general survey as part of the area clearance survey process are to: Sub.

- d. Identify the areas of land that definitely require clearance. These are those areas that definitely have UXO contamination of a type and extent that would affect the intended use.
- e. Identify the areas of land that require further technical survey before any decision is made on clearance. The general survey may also provide information to determine the scope and scale of any technical survey.

Note: Even if a general survey identifies areas of land with UXO contamination of a type and extent that would affect the intended use, further technical survey may still be carried out to provide more detailed technical information or to facilitate area reduction.

- f. Provide information to determine the relative priorities of tasks and to permit planning for future operations.

In cases where clearance is definitely needed a decision should be made on the type of clearance required. Depending on the type and extent of UXO contamination and the intended land use, this may be an EOD roving task, surface or subsurface area clearance.

Note: EOD roving tasks may be carried out when the UXO contamination is of a type and extent that full area clearance is not required. This may occur if the contaminated area just contains land serviced ammunition posing a lesser risk to users than BLU contaminated land.

Internal procedures for reporting the results of general survey are to be included in clearance organisation's SOPs.

Land designated as 'not requiring clearance' as a result of general survey shall be completion surveyed and formally handed over in accordance with section 10 below.

Irrespective of the procedures or tools used in the conduct of general surveys, organisations will be held accountable for the safety of land released through the general survey process. The decision making process must be documented and be available to the NRA. This would normally be managed by formal marking, recording, reporting and handover of released land.

8.1.2. Technical Survey

Technical surveys involve the checking of areas of land using metal detection equipment and excavation for UXO. When technical survey is carried out, the following requirements are to be met:

- a. The technical survey is to be carried out on a representative sample which should be a minimum of 25% of the area presented for clearance. Changes from this percentage, higher or lower are permitted but lower percentage samples will need to be justified on a case by case basis..
- b. The depth of clearance achieved during technical survey is to be commensurate with the intended land use, or in the case of land use not being specified, the default depth of clearance for Lao PDR (25 cm).
- c. Land is **only** to be declared as 'not requiring clearance' if the following criteria is met:
 - (1) No UXOs equal to or greater in size than a half BLU 26 were found. Small arms munitions and spent shell cases are acceptable.
 - (2) No evidence of UXO equal to or greater in size than a half BLU 26 is found, however fragmentation from high explosive aircraft bombs or large land serviced ammunition that **obviously** originated from outside the surveyed area are acceptable. (See note below).

Note: Technical survey teams should use their experience and judgement when fragmentation from large aircraft bombs or large land serviced ammunition is found. With these munitions, fragmentation may travel a considerable distance and contaminate areas that are otherwise free from UXO.

When conducting the technical survey all soundings from metal detection equipment are to be investigated to the extent required to confirm that no UXO, or hazardous components thereof, are present down to the required depth of clearance.

These are the minimum requirements for technical surveys that may result in land being designated as 'not requiring clearance'. Donors or client organisations may specify more stringent criteria for such technical surveys.

Technical surveys as described above require the same operational support as teams carrying out UXO clearance operations.

Land designated as 'not requiring clearance' as a result of technical survey is to be completion surveyed and formally handed over in accordance with section 10 below.

8.1.3. Area Reduction

Area reduction may be carried out during technical survey when the physical inspection of the land reveals that part of the area requires clearance while other parts can be released without clearance.

When area reduction is carried out the following requirements are to be met:

- a. Technical survey procedures as indicated in section 8.1.2 above are to be applied over the whole area presented for clearance.
- b. An appropriate sized buffer zone is to be cleared into the area designated as 'not requiring clearance'.
- c. The area designated as 'not requiring clearance' is to be marked, completion surveyed and handed over as indicated in section 8.1.2 above.

The area designated as requiring clearance will be marked, completion surveyed and handed over once clearance has taken place.

8.1.4. Surveyed Land Not Included on Work Plans

There may be situations when clearance organisations complete surveys, determine that the land requires clearance but for certain reasons the task is not included on clearance work plans. Such reasons may include:

- a. Tasks being considered low priority.
- b. Tasks being cancelled by client organisations.

When such situations occur the clearance organisation is to ensure that the relevant landowner, land user or local authority is informed of the reasons why the land is not being cleared, and is not left under any misapprehension that the land is safe to use.

8.1.5. Reporting Technical Survey Information

Except for the general details included in '[Monthly Progress Reports](#)', (see [Chapter 24 of NS, 'Information Management'](#)), specific technical survey information is not required to be reported to the NRA. The information is used internally within a clearance organisation for their own planning and prioritisation purposes. **However, there is one exception to this.**

If a task has been technically surveyed, identified as requiring clearance but is not going to be included in the work plan (for whatever reason), then the results of the technical survey are to be recorded and reported to the NRA. The information is to be reported on a **'Technical Survey Report'** on an 'as required' basis and forwarded direct to the NRA.

8.2. UXO Affecting Land Use or Posing a Risk to Communities

Surveys carried out for UXO that are affecting the use of land or posing a risk to communities normally lead to EOD roving tasks, however this is not always the case. The survey teams must assess the situation and determine the type and extent of contamination before any decision is made on the work required.

When the UXO is affecting an area of land required for use, and the contamination is of a type and extent that would affect this land use (BLUs for example), then area clearance may be required. Alternately, if the contamination is solely land serviced ammunition, which poses a lesser risk to the land users, then EOD roving may be carried out on the area concerned.

If the UXO contamination involves single or small numbers of UXO in one location then an EOD roving task would be appropriate. However, clearance organisations should not exclude the use of marking and UXO/MRE to reduce the risk.

Clearance organisations should also consider the option of survey teams disposing of or recovering 'safe to move' UXO provided these tasks are carried out in accordance with the requirements of these NS.

When a survey in accordance with this section of NS is being carried out and the survey team finds that the UXO contamination is such that full area clearance may be necessary, the team should apply the relevant area clearance survey procedures indicated in section 8.1 above.

8.3. Standard Operating Procedures (SOPs)

Clearance organisations carrying out surveys are to have survey procedures included in their SOPs. These procedures are to ensure that the tasks are able to be carried out safely and efficiently and in accordance with the requirements of these NS. This is particularly important in the case of the operational support requirements for medical support and communications.

9. Disposal of UXO

All UXOs located on areas of land being surveyed are to be disposed of by the clearance organisation conducting the survey in accordance with the requirements of [Chapter 8 of NS 'Explosive Ordnance Disposal \(EOD\)'](#).

Such disposal does not have to occur on a daily basis, disposal may occur at a future time depending on work commitments/disposition of the clearance organisation concerned. When UXO is not going to be disposed of immediately they may be marked in accordance with the requirements of [Chapter 4 of NS 'Marking Systems'](#).

Note: Prior to any marking of UXO being carried out an assessment is to be made as to the likelihood of the UXO being touched or moved as a direct result of the marking. Guidance on this assessment is included in [Chapter 4 of NS, 'Marking Systems'](#).

The responsibility for the disposal of UXO located on areas of land being surveyed may be passed to another clearance organisation subject to the agreement of that organisation. Details should be recorded in writing.

On no account are UXOs located on areas of land being surveyed to be left without being disposed of.

Other UXOs located during surveys that are **not on** areas of land being surveyed, should, where possible, be dealt with by the clearance organisation conducting the survey. Provisions for marking and dealing with UXO at a later date also apply. However, if clearance organisations are unable to deal with these UXOs then they may be marked in accordance with [Chapter 4 of NS 'Marking Systems'](#) and must be reported to the NRA in accordance with section 3 to this NS.

10. Completion Survey

All clearance organisations releasing land for use, either through technical survey or clearance, are responsible for the marking, surveying, recording and reporting the details, for the areas they have released, prior to the land being handed over. The surveying, recording and reporting are all part of the completion survey.

Marking released land is covered in [Chapter 4 of NS 'Marking Systems'](#) and the handover of released land is covered in [Chapter 11 of NS, 'Released Land Handover Procedures'](#).

Completion surveys are to include the following:

- a. The establishment of a Reference Point (RP) and Bench Marks (BMs).

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. It is also important that the accuracy of survey work is of the highest standard so that actual positions of boundary points can be located in the future.

- b. A survey of the RP, BMs, SP, TPs and IPs. The survey should include the following:
 - (1) GPS readings of all survey markers i.e. RP, BMs, SP, TPs and IPs.
 - (2) Bearings and distances surveyed between the BM(s) and at least two TPs (the SP and IPs may be used) on the boundary of the released land. If two BMs are used, bearings and distances should be surveyed from both BMs to the selected TPs (at least two) on the boundary.
 - (3) Bearings and distances surveyed between the SP, TPs and IPs on the boundary of the released land.
- c. A survey of the position of all UXOs located during the clearance or technical survey. This includes:
 - (1) A GPS reading at each point where a UXO was located.
 - (2) Bearings and distances taken from at least two survey markers to each point where a UXO was located.

Note: Statistical data about UXOs will provide information to assist the future planning and survey of clearance tasks.

- d. Filling in of the '**Completion Survey Report**'. This includes all the data recorded during the survey and a detailed sketch map of the site. The sketch map is to show the position of each survey marker and each UXO located during the work. The sketch map should also state the type(s) of UXO and the depth that the upper surface of the UXO was below the ground. Details of the marking systems used for the marking of the survey markers are to be included on the '**Completion Survey Report**'.

Completion surveys are to be carried out as soon as a clearance task, or a technical survey that deem land 'not requiring clearance', is completed. The '**Completion Survey Report**' is to be combined with other task documentation and submitted to the NRA in accordance with Chapter 24 of NS 'Information Management'. Details for the submission of task completion documentation are included in [Chapter 11 of NS 'Released Land Handover Procedures'](#).

10.1. Long Term Tasks

When clearance organisations carry out long term area clearance tasks i.e. tasks are expected to exceed 3 months duration, marking, completion survey and reporting is to be carried out on the areas cleared as a minimum, every 2 months. This is so that NRA records remain up to date in terms of areas cleared.

If the cleared land is required for use, then formal hand over of the part area of land should also occur at the same time as the completion survey.

10.2. Mining Tasks

When land is to be used for open cast mining purposes and area clearance is carried out repeatedly on the same land but in layers as the mining proceeds, completion survey is not required until all clearance work has been completed.