

SLNMAS 04.60

First Edition
2010

Battle Area Clearance

National Steering Committee for Mine Action
Ministry of Economic Development
177 Galle Road
Colombo
Sri Lanka

E-mail:
Telephone: + 94 1 2392236
Fax: + 94 1 2392852

Warning

This document is current with effect from the date shown on the cover page. As the Sri Lankan National Mine Action Standards (SLNMAS) are subject to regular review and revision, users should consult the Sri Lankan National Mine Action Centre.

Copyright notice

This document is a Sri Lankan National Mine Action Standard (SLNMAS) and is copyright protected by the National Steering Committee for Mine Action in Sri Lanka. Neither this document, nor any extract from it, may be reproduced, stored or transmitted in any form, or by any means, for any other purpose without prior written permission from the National Steering Committee for Mine Action, acting on behalf of the National Government.

Contents

Contents	i
Introduction	ii
Battle Area Clearance.....	1
1 Scope	1
2 General Requirements	1
2.1 Training.....	1
2.2 Working hours	1
2.3 Personal Protective Equipment (PPE)	1
2.4 Medical Support	2
2.5 Accident Planning.....	2
2.6 Clearance Requirements.....	2
2.6.1. The specified depth	2
2.7 Standard Operating Procedures (SOP)	3
3 The Battle Area Clearance Process	3
3.1 Setting out of the clearance site	3
3.2 Visual search stage	4
3.3 Manual subsurface search stage	4
3.4 Marking and recording.....	5
3.5 Areas unable to clear	5
4 ERW Debris.....	5
Annex A BAC Site Layout.....	6
Annex B Sub-surface search process (using handheld metal detectors)	7
Amendment record	8

Introduction

The landmine and Explosives Remnants of War (ERW) threat in Sri Lanka consists mainly of hazardous areas that contain landmines that were laid randomly or according to a certain pattern and hazardous areas that contain a large number of unexploded ordnance and other ERW due to heavy fighting that took place. In some landmine hazardous areas a high probability exists that ERW will also be found.

The clearance of landmine hazardous areas is clearly defined in SLNMAS 04.20, SLNMAS 04.30 and SLNMAS 04.40.

Hazardous areas containing ERW and no landmines shall be cleared by conducting Battle Area Clearance techniques in accordance with this national standard.

In Sri Lanka there are also some training areas and ranges that are not being utilised anymore and the land need to be returned to normal use. The clearance of the contaminated training areas shall also be cleared by conducting Battle Area Clearance techniques in accordance with this standard.

Battle Area Clearance

1 Scope

This document provides the necessary guidelines and requirements for the systematic detection and removal of all items of ordnance and munitions from a given area, where the area contains no landmine threat.

The majority of the ERW detected during the BAC process will required to be destroyed in-situ and others could be moved to a predetermined site for destruction. The term used for the destruction of ERW is Explosive Ordnance Disposal (EOD) and is fully described in SLNMAS 06.

2 General Requirements

2.1 Training

Personnel employed as searchers and immediate supervisors shall have successfully completed the following minimum training before commencing with clearance of an area:

- a. Searcher Training. This training shall include identification and recognition of the UXO that could be expected in the specific area to be cleared, methods of visual search, marking of hazards, subsurface search methods, deep-search equipment, basic veld-fire fighting, wear and care of PPE, excavation tools and methods, and basic first aid.
- b. Supervisor Training. In addition to the successful completion of the searcher training, personnel identified as immediate supervisors shall also be trained in dividing up areas into search blocks, advanced identification and recognition of UXO, supervising a search team, recording of a marked hazard, basic map reading, and operating a GPS and a two-way radio.

2.2 Working hours

No UXO searcher shall work for longer than 60 minutes before taking a break. The working time may change, depending on the climate (heat, cold and rain) and the vegetation. The working time is subject to the supervisor's judgement in each situation.

A normal working day for a UXO searcher should not exceed 9 hours. During hot, cold or rainy days, the overall working period should be reduced. In uncomfortable weather conditions (cold or rainy days), clearance should cease or only be undertaken in short sequences with frequent breaks. The senior supervisor should use sound judgement when establishing or modifying the regular working hours.

2.3 Personal Protective Equipment (PPE)

PPE should not be worn by the search teams during the visual search phase, but shall be worn by the individual searchers when conducting excavation during the subsurface search phase.

EOD personnel should wear, when practical and deemed necessary, PPE during the placement of demolition charges as well as when they conduct excavation of semi-buried UXO.

2.4 Medical Support

Appropriate medical support and a workable casualty evacuation procedure are one of the principles of ERW clearance and shall always be a compulsory requirement for BAC tasks. No BAC activity shall commence without an acceptable medical support and casualty evacuation plan that is fully understood and has been practised by everyone involved. SLNMAS 09 is also applicable to BAC activities.

2.5 Accident Planning

The clearance organisation shall develop and maintain a UXO accident response plan for each clearance worksite. The plan shall identify:

- a. the training and qualification needs of all employees at the clearance worksite, in particular of clearance workers and medical support staff with responsibilities for casualty evacuation and initial treatment;
- b. the equipment and materials required to implement the UXO accident response plan, including:
 - i. first-aid and medical equipment, supplies and drugs;
 - ii. transportation required to move victims from the accident site to medical facilities offering treatment;
 - iii. communications to call forward assistance and/or to provide details of the nature and extent of injuries; and
- c. the location of a suitably equipped and staffed hospital. UXO injuries are usually severe, and specialist surgery is often required. The nearest suitably equipped and staffed hospital may be in the nearest main city or in the capital.

2.6 Clearance Requirements

The target of BAC is the identification and removal or destruction of all ERW hazards from a specified area to a specified depth. The area to be cleared and the depth of clearance shall be specified in the task dossier, and agreed with the clearance organisation. The clearance requirements should be achievable and affordable, and should be consistent with the clearance requirements being applied to similar categories and uses of land.

The Government of Sri Lanka shall accept an area as 'cleared' when the clearance organisation has ensured and reported the removal and/or destruction of all ERW hazards from the specified area to the specified depth.

2.6.1. The specified depth

The specified depth of clearance of each area should be determined from reliable information which establishes the depth of the ERW hazards and an assessment of the intended land use. A specific task might require that individual areas be cleared to different depths and these requirements shall be specified in the tasking dossier to a clearance organisation or in the contract document to commercial clearance companies. Clearance depth will depend on the intended land use, the likely UXO hazard in the area to be cleared, and other environmental factors. For example:

- a. UXO may be on the surface of the ground. In this case, the specification should call for the removal and/or destruction of surface UXO hazards only.

- b. Clearance in urban areas may require the removal of large quantities of cubic metres of rubble as part of the clearance process, or that areas to be used for the foundations of structures are cleared to the depth specified in the construction plans.
- c. In the case where the cleared land is going to be cultivated, the land should be cleared to cultivating depth (± 40 cm).
- d. Where holes are to be dug for construction purposes or to cultivate fruit orchards or coconut plantations, the land should be cleared to the required depth.
- e. In the case where the area to be cleared is to be used to construct national roads, railway lines, airports or large infrastructure, and where large bombs and missiles were used, the depth of clearance may be several metres.

The required clearance depth may be adjusted as clearance work progresses. Any amendment shall be agreed between the GoSL and the clearance organisation before the clearance depth is changed. The amendment shall formally be recorded in the tasking order or clearance contract.

2.7 Standard Operating Procedures (SOP)

All activities conducted during BAC or in support of BAC shall be conducted in accordance with SOP compiled by the clearance organisation and approved by the NMAC.

3 The Battle Area Clearance Process

BAC is normally conducted when and where ERW is expected or found after war battles or field exercises or ammunition tests. The procedures described here are in accordance with humanitarian clearance principles aimed at clearing land of ERW to a hundred percent to the depth determined and/or specified in the tasking dossier or contractual document.

BAC is normally conducted in two stages, namely a visual search as a first stage followed by a subsurface search as the second stage. Taking this into account the order of activities shall be as follows:

- a. Setting out the clearance site.
- b. Visual search of the site.
- c. Subsurface search of the site.
- d. Marking and recording of the cleared land.

3.1 Setting out of the clearance site

See Annex A for the suggested layout of a BAC site.

During the Non-Technical Survey of the area and/or during the setting out of the site the area to be cleared should be categorised as follows:

- a. High-impact areas. This shall include the killing zones of the battlefield and/or the target areas inside defined shooting ranging tables.
- b. Medium-impact areas. This shall include fading out areas of the battlefield and/or the over- and under-shoot areas inside the shooting ranging tables.
- c. Low-impact areas. This shall include launching areas, approaching areas and/or the rest of the ranging tables.

Areas may also be identified and categorised during the clearance process if it is impossible to do it before the clearance process starts.

3.2 Visual search stage

A visual search is the least effective method. It should be strictly controlled to ensure that areas are not missed and the lay of the land and density of vegetation will govern the size and spacing of the search party. Working search parties are not to search continuously for more than 60 minutes without at least a ten-minute break.

Any number of search parties may be employed on an area, providing a minimum safety distance of 150 meter is maintained between parties. Searching shall be carried out in silence, except for instructions and notification of a find.

The searchers will move in a straight line with the supervisor behind them and centrally located. He will control them to ensure that the area is thoroughly searched.

Any searcher who locates an item of ERW is to immediately alert the remainder of the party, inform the team leader of the type of munitions and mark its location with a flagged picket or similar. The team leader shall record a GPS reading of the location.

The "search line" is to progress in this manner until the full area of the box has been visually searched and all surface/visible ERW is located and marked.

Highly dense vegetation and/or dense bushes shall be searched by using a metal detector. If it is impossible to ensure that the dense vegetation and/or dense bushes are free from any ERW the vegetation shall be cut down to a height where the area can be visually searched.

All items of UXO located are to be destroyed in situ at the end of the day or, if safe to do so, removed to a central storage pit for subsequent demolition.

High-impact areas shall be divided into 50 meter x 50 meter clearance blocks that will be visually searched.

A search block shall be visually searched in a minimum of two directions at right angles to each other for high impact areas.

Medium- and low-impact areas should be visually searched by covering larger pre-determined areas and by using larger teams. Where a large concentration of ERW is found, the contaminated area shall be changed to and addressed as a high-impact area.

3.3 Manual subsurface search stage

In cases where ERW need to be detected to a depth of 500 mm or more, UXO metal detection equipment shall be used.

Subsurface searching shall be carried out following a visual search in a high- impact area where a large concentration of ERW and/or ERW debris was found in the box. Each box is to be systematically searched and all detector signals are to be investigated.

Depending on the type of detecting equipment a team of searchers shall work in a box of 25 meter x25 meter. The searchers shall use a 25 meter long rope that is strung tightly across the box starting at the box starting point. The rope shall be brightly coloured and not less than 20 mm in diameter.

The searcher(s) carrying the detector will move along the rope and search with the detector. A searcher shall remain behind at the start of the search rope on the edge of the box being searched. When the detector reaches the end of the 25 meter search rope the rope shall be moved in the direction the search is conducted. The searcher that remained behind shall move across for the next rope move and the search will continue.

When searcher(s) receives a reading/signal he/they shall mark the location and notify the searcher on the edge of the box, who will go forward and investigate the signal. The searcher(s) shall withdraw to the edge of the box while the signal is investigated. If an ERW is found the searcher will identify it by planting a red marker 30 cm in front of the ERW position.

Care shall be taken to ensure that separate search teams do not work closer than 50 meter from each other.

The type of detector/locator used will determine the method of instrument technique, but it is important to keep the search ropes straight and correctly positioned on the ground so as not to miss any areas.

See Appendix B for a sketch describing the subsurface search process using metal detectors.

All items of ERW located are to be destroyed in situ at the end of the day or, if safe to do so, removed to a central storage pit for subsequent demolition.

Subsurface search activities may also be conducted using detection dogs or mechanised systems. Clearance organisations utilising dogs and/or mechanised systems shall conduct the search activities in accordance with their approved SOP. The marking, recording and destruction of found UXO shall still remain as described in this Standard.

3.4 Marking and recording

All ERW found shall be marked and recorded. The locations where the ERW were found shall be recorded as accurate as possible. The locations can be recorded by either using a GPS or intersection on a sketch that is to scale. The type of ERW found shall also be recorded.

The completion survey and the post-clearance documentation shall be completed in accordance with SLNMAS 04.70.

3.5 Areas unable to clear

Areas that the clearance organisation is unable to clear shall be marked, fenced and recorded by GPS. The reason for non-clearance shall be motivated and proposals for future clearance suggested. The uncleared areas shall be fully described in the post-clearance documentation.

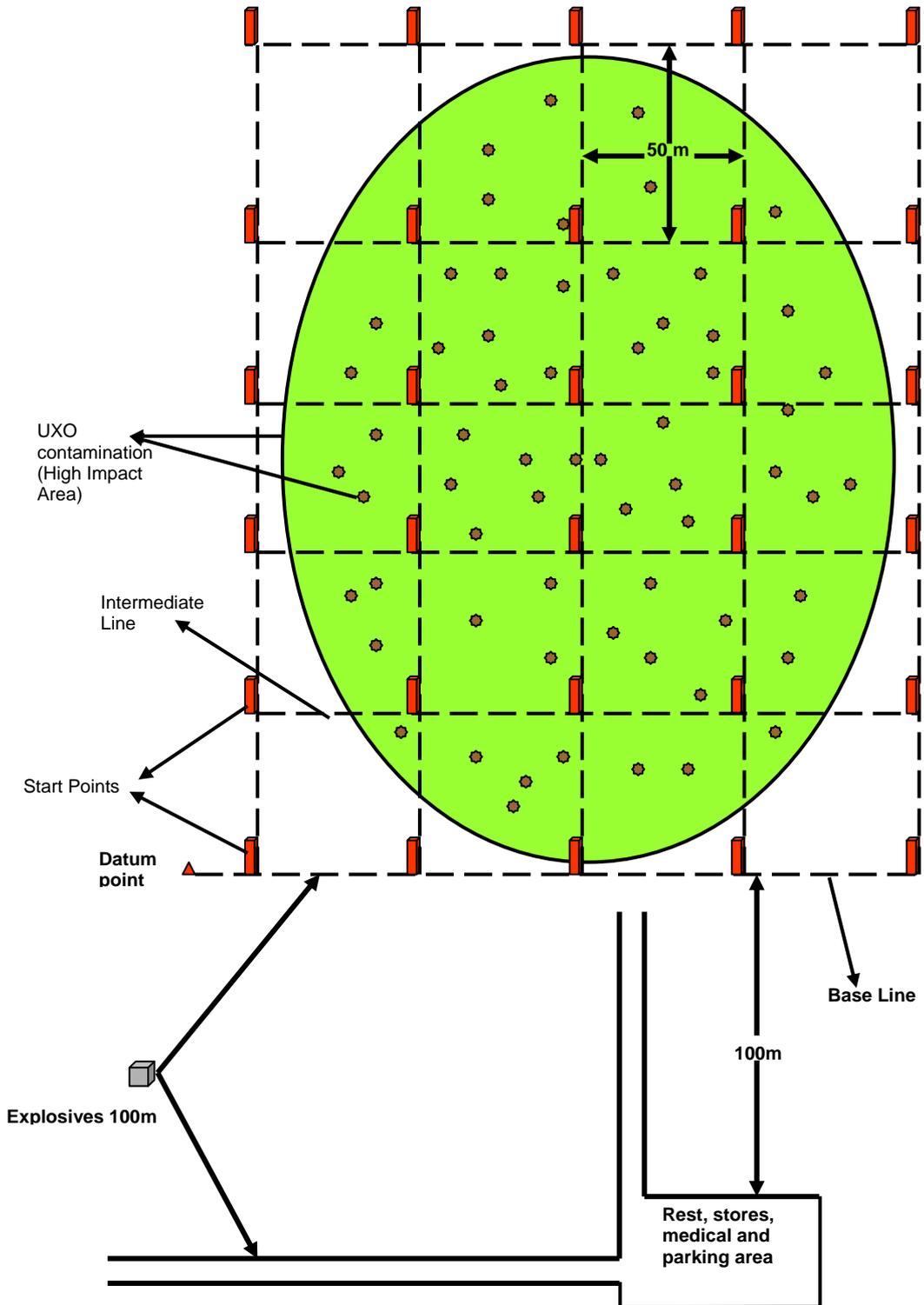
4 ERW Debris

ERW debris collected during the clearance process shall be declared free of explosives and shall be buried in a deep pit with the top of the debris not shallower than 400mm. The EOD Supervisor of the clearance organisation shall be responsible for the FFE written certification. The position of the ERW debris pits shall be properly recorded and marked.

During the destruction of ERW the use of sandbags should be considered for tamping to prevent any damage to the environment (trees, game, etc).

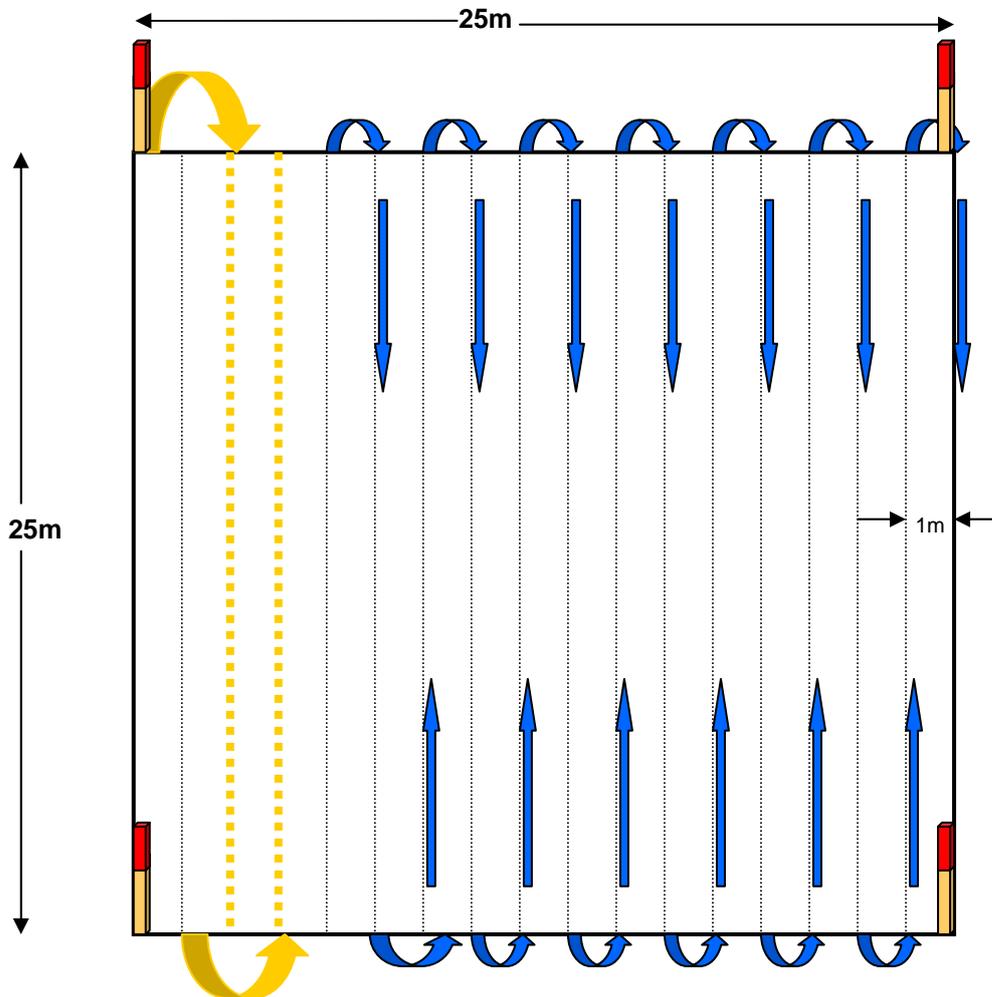
Annex A

BAC Site Layout



Annex B

Sub-surface search process (using handheld metal detectors)



Yellow: arrows rope moving pattern
Blue: arrows search moving pattern

The distance that the rope is moved depends on the type of equipment that is used.

