



## LMAS 09.10-1

# MANUAL MINE CLEARANCE

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**Note:**

This document is current at the date shown on this page. The Local Mine Action Standards (LMAS) are subject to regular revision, so users should ensure that they are using the latest version of each document in the standards. The most recent versions of LMAS are available with SMACO office of Rabouni.

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## Foreword

Critical safety, control and quality elements of the International Mine Action Standards (IMAS) have been retained in the Local Mine Action Standards (LMAS), so ensuring that they maintain the principles agreed in IMAS guidelines.

The work of preparing, reviewing and revising LMAS is conducted by a technical committee with the support of international, governmental and non-governmental organisations in Western Sahara, East of Berm (EoB).

In the LMAS, the following words are used to indicate the intended degree of compliance and are to be reflected in Mine Action Organisation Standard Operating Procedures (SOPs):

'Shall', 'will' and 'must' are used to indicate requirements, methods or specifications that are to be applied in order to conform to the standard;

'Should' is used to indicate the preferred requirements, methods or specifications.

'May' is used to indicate a possible method or course of action.

In LMAS:

The term "Demining Organisation" refers to any organisation (government, NGO or commercial entity) responsible for implementing demining projects or tasks. Demining Organisations include headquarters and support elements.

The term "Mine Action Organisation" refers to any organisation (government, military, commercial or NGO/civil society) responsible for implementing mine action projects or tasks. The mine action organisation may be a prime contractor, subcontractor, consultant or agent.

For the purpose of the LMAS, the words "Demining Organisation" and "Mine Action Organisation" are interchangeable and used to describe the same body.

## 1. Introduction

1.1 IMAS does not currently include a specific section pertaining to manual mine clearance, however LMAS 09:10/1 has been written in accordance with proven manual mine clearance procedures which may be detailed in other national mine action standards.

1.2 The standard should be read in conjunction with LMAS 03.40/1 Detectors, 10.20 Demining Worksite Safety, and 10.20/1 Demining Site Marking Systems.

1.3 For the purpose of this standard, the words 'UXO' and 'ERW' are interchangeable and used to describe the same thing, ERW includes AXO. A 'mine' is not considered to be a UXO or ERW.

1.4 For the purpose of this standard, the words 'clearance lane' and 'working lane' are interchangeable and used to describe the same thing. Working Lane is described in 10.20 Demining Worksite Safety.

## 2. General Principle

2.2 Minefield clearance tasks shall involve the planning, systematic search and clearance of a given area that has either mines and/or other ERW contamination. It involves the removal and / or destruction of all mines/ERW and their component parts, in accordance with the approved Implementation Plan (IP), which would otherwise pose a significant threat to the local population.

2.3 All minefield clearance operations progress from the identification of a mine/ERW contaminated area through a detailed reconnaissance/survey to the reporting and registration of its completion following the actual clearance of the contaminated area.

2.4 The default depth for mine clearance in Western Sahara, EoB is **13 cm**, i.e. measured from the surface of the 'original' ground to the top of the mine. However, the default depth may be amended to account for site-specific requirements and agreed by the SMACO. If an amendment is made to the clearance depth then the Site Supervisor **shall** ensure that full details of this are recorded on the site Implementation Plan approved by the external monitor

## 3. Objective

This standard details acceptable standards and techniques to enable safe, efficient and effective manual mine clearance operations.

## 4. Definitions

Pertinent definitions of terminology used within this Chapter are detailed below to aid understanding however additional terminology may be found in the LMAS 04.10 Mine Action Terms, Definitions and Abbreviations, 10.20 Demining Worksite Safety, and IMAS.

### 4.1 Qualified

For the purpose of this Chapter, the term **Qualified** is used to describe a person who has received operational Accreditation from the SMACO, authorising them to perform specific mine clearance activities in accordance to their accredited position.

### 4.2 Site Supervisor

- a. For the purpose of this Standard, the term **Site Supervisor** shall be used to describe the following person:
  - A suitably qualified person who is responsible for a mine clearance site(s), including managing the operations and emergencies at the site(s).
  - The Site Supervisor is responsible for up to three (3) mine clearance sites comprising a maximum of 3 mine clearance teams, providing that adequate additional supervision is in place for the sites and teams.
  - During operations, the Site Supervisor shall be located within 5 minutes travel time and have reliable communications with the site(s).
- b. Refer to 'Organisation and Responsibilities', and 'Command and Control' below

### 4.3 Deminer

- a. A man or woman qualified and employed to undertake demining activities on a demining worksite.
- b. For the purpose of this standard, the term 'Deminer' is used to describe a person responsible for conducting mine clearance operations as directed by the relevant Mine Action Organisation. The Deminer shall always be supervised when conducting mine clearance operations and his/her primary responsibilities shall involve marking,

searching, locating and reporting mines/ERW in accordance to the Mine Action Organisation SOP and LMAS.

#### 4.4 Demining Lane Clearance

a. A manual mine clearance Deminer is responsible for clearing a 1 metre wide lane primarily using one or a combination of the following recognised methods: □ Hand-held metal detector search.

- Prodding.
- Excavation.

#### 4.5 Demining Lane Marking

Refer to LMAS 10.20 Demining Worksite Safety, and 10.20/1 Demining Site Marking Systems for details pertaining to Demining Lane Marking

#### 4.6 Base Stick (B/S)

- a. The B/S shall be used during manual mine clearance operations.
- b. If there is a requirement to remove the B/S from the demining lane, prior to this, red topped wooden pickets, red rocks (or red/white rocks, depending on the SMACO shall be positioned inside the B/S at the front right and left sides.
- c. Refer to LMAS 10.20/1 Demining Site Marking Systems, for further details pertaining to the Base Stick.

### 5. Organisation and Responsibilities

- 5.1 The structure of a manual mine clearance unit and job titles may vary between Mine Action Organisations and although, the quantity of qualified personnel may differ, there shall be a sufficient amount to conduct safe, efficient and effective mine clearance operations.
- 5.2 Each person shall be qualified and accredited in manual mine clearance procedures pertaining to their position and responsibilities.
- 5.3 The structure for a manual mine clearance unit may vary between Mine Action Organisations, however for the purpose of this Standard, a manual mine clearance 'unit' refers to a 'squad', 'section' or 'team' comprising a maximum of six (6) Deminers.
- 5.4 A demining site may comprise one or more units and there shall be a minimum distance of 50 metres between each unit for command and control purposes, unless a reduction is authorised by the SMACO.
- 5.5 Each unit shall be supervised by at least one qualified person when conducting manual mine clearance.
- 5.6 During mine clearance there shall be sufficient operational personnel at site to manage, implement and support the operations, particularly in the event of an accident.
- 5.7 The minimum requirement to facilitate safe, efficient and effective manual mine clearance operations including a casualty evacuation (CASEVAC) at the site is as follows:

#### Site Supervisor (minimum 1)

- a. Site Supervisors (or person with equivalent mine clearance qualifications) shall be located within five (5) minutes travel time, have reliable communications, and shall be capable of supervising operations at the site.

- b. Each Site Supervisor shall be able to manage an emergency at the site and shall be capable of briefing visitors.
- c. One (1) Site Supervisor may manage up to three (3) mine clearance sites comprising a maximum of three (3) mine clearance teams, providing that adequate additional supervision is in place for the all sites and teams, i.e. at least one (1) Site Supervisor located at each operational site.
- d. One (1) Site Supervisor shall be located at the Working Area during operations (i.e. Deminers conducting marking and clearance). He/she shall be located at a maximum distance of 100 metres from the working Deminers, with the ability to walk to each of the working Deminers within five (5) minutes.
- e. One (1) Site Supervisor is allowed to supervise a maximum of six (6) working Deminers (equivalent to 1 unit), if safe to do so, and if located in accordance with the point d. above.  
Deminer (minimum 3)
- a. Three (3) Deminers shall be located at the operational site.
- b. Two (2) of the Deminers shall be able to walk to the working Deminers within five (5) minutes. Note, the Deminers may also be conducting mine clearance.
- c. One (1) of the Deminers shall be able to walk to the working Deminers within thirty (30) seconds. Note, the Deminer may be conducting mine clearance.
- d. Three (3) Deminers may be located at up three (3) operational sites **only** if in accordance with the above points.

#### Medic (minimum 1)

- a. One (1) Medic may support up to two (2) operational sites.
- b. One (1) Medic able to travel to the medical treatment point within (five) 5 minutes for each operational site he/she is supporting.
- c. For additional details see LMAS 09.10 Medical Support to Demining.

## **6. Command and Control**

- 6.1 It is the responsibility of the Site Supervisor to ensure that there is sufficient command and control during demining operations.
- 6.2 Command and control may become more problematic particularly in urban areas, populated, adjacent to roads, and depending on the terrain. Consideration should therefore be given to the overall task and threat posed, with an appropriate response thought-out. The optimum search techniques should be employed to ensure all pertinent mines/ERW are reliably located.
- 6.3 The number of personnel conducting clearance operations at the Site simultaneously and the distance between personnel and teams shall be dictated by certain factors including the clearance methodology, threat, nature of the ground, climatic conditions and the ability of supervisory personnel, however shall be in accordance with 4. Organisation and Responsibilities, above.
- 6.4 Where possible, the person supervising should ensure that he/she is in a position to watch all people under his/her responsibility simultaneously however, as a minimum requirement he/she shall diligently observe each Deminer under his/her responsibility at least once during each working shift.

- 6.5 The person supervising shall ensure that they are aware of the activities of all personnel under his/her responsibility and that they are working safely, efficiently and effectively.
- 6.6 The working shift when conducting manual mine clearance shall be a maximum of 50 minutes duration followed by a minimum of 10 minutes rest. Consideration shall at all times be given to the safety and therefore the Mine Action Organisation shall reduce the working shift duration and/or increase the rest period, in circumstances where it is considered unsafe, i.e. arduous conditions or extreme temperatures.
- 6.7 The rest period may be reduced from 10 minutes to a minimum of 5 minutes however **only** if the working shift duration is 30 minutes or less.
- 6.8 For additional safety requirements during manual mine clearance operations refer to LMAS 10.20 Demining Worksite Safety, Table 1.

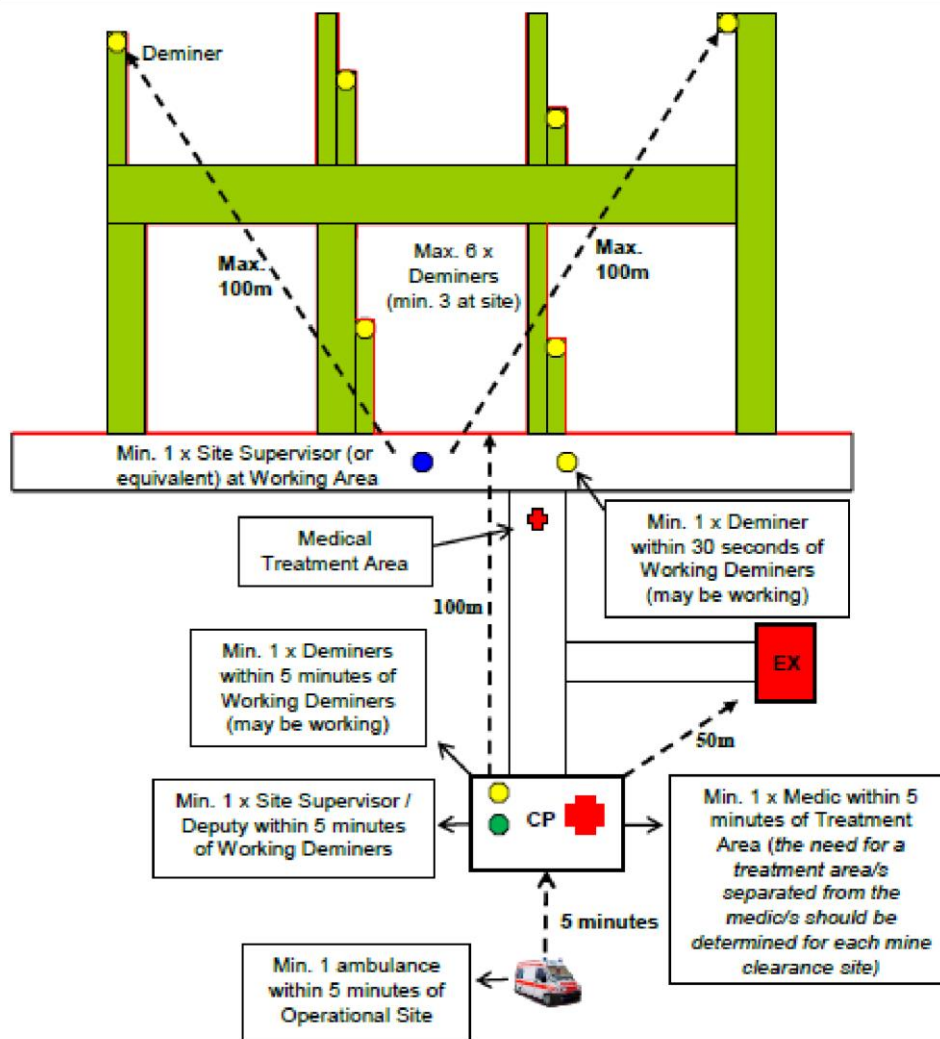


Figure 1: Example of Command and Control (minimum requirements)

## 7. Site Set-up

Prior to the commencement of clearance operations the site is to be prepared in accordance with LMAS 10.20 Demining Worksite Safety.

## 8. Recording and Reporting

- 8.1 The location of all discovered mines/ERW are to be recorded on the operational site Daily Work Sheet (or similar) for future reference, which shall ensure a more accurate and defined representation of the hazardous area.
- 8.2 During demining operations all located mines/ERW and clearance conducted is to be accurately recorded on the operational site Daily Work Sheet (or similar) and map to scale. A distinction should be made between metres cleared using the detector and full excavation procedures.

## 9. Quality Assurance (QA) and Quality Control (QC)

- 9.1 The level of Internal and External QA monitoring shall be dependent of the requirements of the SMACO, and as detailed in the Mine Action Organisations SOP.
- 9.2 The following are the minimum QC requirements for manual mine clearance operations, and reference shall be made to LMAS 07.40 Quality Management:
- A minimum of 10% “internal” QC of the cleared ground shall be conducted during all manual mine clearance operations to confirm the standard of clearance.
  - When conducting QC of areas searched using a detector, it should be conducted using the same detector as used during clearance or at least the same type/category. If however a different type/category of detector is used then it shall be confirmed beforehand through a pertinent performance test that it is capable of performing to the same standard as that used for initial clearance.
  - When conducting QC of prodded and/or excavated areas only, QC shall at least involve a visual inspection, and confirmation of the dimensions of the area (i.e. trench) to ensure that it is in accordance with clearance requirements.
  - Metal located in a cleared area during QC may not constitute non-conformity if it is confirmed that there was no requirement to clear the metal, in accordance with clearance requirements (i.e. clearance depth and “target”). However an item located during QC within the clearance depth, of a similar or greater metal content as the “target”, should constitute a non-conformity.
  - Detectors may vary i.e. the ability for ground compensation (balance) and the sensitivity level therefore it should be realized that the QC results may vary between detectors.

## 9. General References

- a. International Mine Action Standards (IMAS), in particular, 10.20 Safety and Occupational Health – Demining Worksite Safety.
- b. LMAS 03.40/1 Detectors, 10.20 Demining Worksite Safety, and 10.20/1 Demining Site Marking Systems.