

Sudan National Mine Action Standards – SNMAS 05.04

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Marking of Mine and ERW Hazards

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1. Introduction

The marking of mine and Explosive Remnants of War (ERW) hazards and contaminated areas is one of the essential aspects in prevention of accidents to the people, especially those living in vicinity of contaminated areas. Marking is undertaken to provide a clear, visible and unambiguous warning of danger to the people and contribute in reducing the risk of mine and ERW hazards to the men, women and children in the affected communities. This can also be carried out, if possible and appropriate, through installing physical barriers to reduce the risk of unintentional entry of people and their animals into hazardous areas.

This National Mine Action Standard (SNMAS) draws up the requirement of Anti-personnel Mine Ban Convention (APMBC or Ottawa Convention) that Sudan is committed to it, regarding the identification and marking of explosive hazards. Sudan as state party to APMBC has specific obligations regarding the marking of explosive hazards.

Each State Party to the APMBC is obliged “to ensure as soon as possible that all Anti-Personnel Mines (APM) 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 APM contained therein have been destroyed”.

In addition to considering the provision of APMBC of identification and marking of hazardous areas in Sudan territory, this SNMAS also covers the requirements of marking that are necessary to be undertaken during the land release process of non-technical and technical survey and clearance operations and activities.

2. Scope

This SNMAS covers the requirements for marking mine and ERW hazards and marking system that is applied during the land release demining operations and the marking that needs to be emplaced after the land has been released from hazards and handed over the beneficiaries and communities.

3. References

IMAS 08.40, SNMAS 05.01, SNMAS 05.02 and SNMAS 05.03 and SNMAS 06 series.

4. Terms and Definition

A complete glossary of all mine action terms and definitions are given in IMAS 04.10, which should be referred to, IMAS 04.10 is quite inclusive and broad in principle, covering all mine action terms and definition that are used globally including Sudan. However for the terms related to Land Release used in this SNMAS is given in SNMAS 05.01.

5. General Characteristics of Hazard Marking Systems

The marking system shall be providing a clear and visible warning signs to the people, to avoid approaching the mine and or ERW hazardous areas. It will be useful to utilize locally available materials which are durable for the expected duration of the marking signs to be in place.

According to the local context and circumstances, the materials used in marking systems should have little or no value or practical use for purposes other than mine and ERW hazardous area marking, this will help the mine action programme to ensure that the mine and or ERW hazardous area marks are not removed and nor used for other purposes.

6. Mine and ERW Warning Signs and Markers

The warning signs and markers are used to indicate mine and ERW hazards, and can be permanent or semi-permanent according to the purpose and intended duration of their use.

6.1. Mine and ERW Hazards Warning Signs

The warning signs shall provide visible and clear notice in a written and symbolic form to the local population and general public about the presence of mines and ERW, when used as part of marking system. See Annex A for mine and ERW hazards' warning signs and markers.

The words shall represent the hazards in local language and English, and the symbol shall indicate 'danger' in a form that should be easily understood and recognized nationally and locally by men, women and children.

The mine and ERW hazards markers can be used for the same purpose especially when the signs are not available, or when local conditions prevent their effective use.

Warning signs shall at minimum be visible and recognizable in daylight at a distance of 30 meters and from adjacent signs. If covered and masked by vegetation or terrain, the distance between signs should be reduced and required height should be considered to ensure their visibility, otherwise the use of a physical barrier should be considered.

Mines and ERW warning signs shall not be constructed from munitions casings and materials.

6.2. Mine and ERW Hazards Markers

The mine and ERW hazards markers shall be used for the same purpose as warning signs to provide visible and clear notice and warning to the local population and general public about the presence of mines and ERW to avoid approaching hazardous areas. Instead of written warning and symbols, markers are red painted pickets and stones and or other features that can be used for the same purpose and painted with red color.

The hazards markers shall at minimum be visible and recognizable in daylight at a distance of 30 meters and from adjacent markers. If covered and masked by vegetation or terrain, the distance between markers should be reduced and required height should be considered to ensure their visibility, otherwise the use of a physical barrier should be considered. Mines and ERW markers shall not be constructed from munitions casings and materials.

7. Marking System in Land Release Operations

7.1. General

The following three categories of marking system should be considered as part of land release operations including Non-Technical Survey, Technical Survey and Clearance:

- a) The perimeters of all mine and ERW hazardous areas which are not planned to be released in near future, should be marked with permanent marking system. A combination of markers, signs and physical barriers should be considered.
- b) The perimeters of all mine and ERW hazardous area which are under land release operations shall be marked with temporary marking system. Such marking system may include physical barriers. Such marking system shall be undertaken by TS and Clearance teams.

- c) Improvised marking system is generally placed or erected by the local population. They may also be used by demining teams and organizations when materials are not available to construct temporary or permanent marking system.

7.2. Marking System as part of Land Release Operations

7.2.1 Control Markers

Control markers are used to indicate the key reference points to the hazardous areas. The control markings shall be placed in safe and cleared areas. They shall be clearly visible in daylight from a minimum distance of 30m.

Control markers shall be marked and written in Red for minefields and cluster munitions and Blue battle area clearance (BAC) tasks. The control markers to be as key references are:

- 1) Reference Point (RP): A RP is a fixed point of reference and should be located in a suitable distance outside the hazardous area. It should be a permanent and easily recognizable landmark. The RP shall be established in such a location that all other control markers are easily referred to. The location of a RP shall be recorded through Global Positioning System (GPS). It shall be marked with a sign to be clearly distinguishable from other RPs and control markers in the area. Where possible, the sign should be positioned approximately 125 cm above the ground level. The sign shall include:
 - a) The letters "RP".
 - b) An arrow indicating the direction of the hazardous area or BM.
 - c) A distance and bearing to the hazardous area; and
 - d) A unique task number prefixed by either "MF" for a minefield or "BF" for battle area clearance.
- 2) Benchmark: A BM is a fixed point of reference used to locate a hazardous area and its Starting Point. One BM may be used for more than one hazardous area, if needed. The BM shall consist of three metal rods each approximately 30cm long driven flush into the ground forming a triangle with sides of approximately 30cm. The location of BM shall be recorded with GPS and located in a suitable distance from the Starting Point, in a safe ground outside the hazardous area and clearly marked with specific signs distinguishing it from other BMs and control markers. Where possible, it should be positioned approximately 125 cm above the ground. A BM shall at minimum consist of the below signs and words:
 - a) The letters 'BM'.
 - b) A unique task number, and hazard ID prefixed by the letters 'MF' or 'BF'.
 - c) An appropriately painted triangle with sides around 15cm in length.
 - d) An arrow directing the location of Starting Point of the hazardous area.
 - e) A distance and bearing to the Starting Point.
 - f) The identification of the team, which positioned the BM.
 - g) The date BM is established.
- 3) Start Point (SP): A SP is the point at which the hazardous area baseline begins. SP shall consist of three metal rods of approximately 30 cm in length driven flush into the ground with the rods forming a line approximately 30 cm apart. The exact position of the SP is on the central rod. SP shall be clearly marked with an appropriate painted sign or rock with the

letter 'SP'. If a sign is used, it should be square in shape with sides at least 50 cm in length and, where possible, be positioned approximately 125 cm above the ground surface.

- 4) Turning Point (TP): A TP should be positioned at each point at which the boundary of the hazardous area changes direction. A TP should consist of a single metal rod driven flush in the ground. The position of each TP should be located using a bearing and distance from the previous TP or the SP. Positions of TPs may not be recorded with GPS.

All TPs shall be clearly marked with an appropriate painted sign or rock placed above the metal rod. The sign or rock shall be marked with the letter 'TP' and the TP number, determined sequentially from the SP, in white. If a sign is used, it should have a diameter of not less than 30cm and, where possible, it should be positioned approximately 125 cm above the ground. The bearing of each direction changes and the distance between the SP and TP1 and between individual TPs should be recorded on the hazardous area map included with the IMSMA Minefield report.

If the distance between two TPs is more than 50m, then IPs shall be used to ensure that the direction between TPs can be easily and accurately followed. The IP shall consist of a single metal rod driven flush into the ground and should be marked with a sign or rock above the rod. They shall be painted the same as TPs but shall not be numbered. If a sign is used, it should have a diameter of not less than 30cm and, where possible, be positioned approximately 100 cm above the ground. IPs shall be positioned at intervals appropriate to the site conditions.

7.2.2 Perimeter and Clearance Lane Marking

The perimeters of all hazardous area, the clearance lanes and other necessary aspects as detailed below shall be clearly marked with appropriate markers as part of the land release operations. The wooden pickets, posts and or painted stones shall be used as appropriate to the prevailing local and ground conditions and availability of the material.

The following color code and identification system shall be adopted and used in the context of Sudan, by all mine action organizations conduct land release operations.

- 1) Red and white rocks: The rocks used for marking purpose shall not be less than 10 cm in diameter. The red and white are the preferred method of delineating between hazardous and safe areas and should be used whenever practical and available for the following reasons:
 - a) Rocks are generally of no use to the local population and therefore less likely to be removed.
 - b) Use of painted rocks clearly defines safe and hazardous areas, as the red side shall be positioned towards the hazardous area and the white side to the safe area.
 - c) Painted rocks are unambiguous in certain circumstances including clearance lanes, cleared lane and intermediate lanes. When used, rocks shall be spaced at a maximum of 1-meter intervals.
- 2) Short, red-topped picket: Indicate the boundary between clear and hazardous areas. They shall be spaced at a maximum of 1 meter and minimum of 30 cm above the ground.

- 3) White-topped picket or white painted rock: Indicate the boundary of designated safe areas. Pickets shall be a minimum of 30 cm above the ground.
- 4) Yellow-topped picket or yellow painted rock: Indicate the location of destroyed anti-personnel mines, anti-tank mines or ERW.
- 5) Blue-topped picket or blue painted rock: Indicate the start of a deminer's daily clearance and the location of metal collection pits.
- 6) Green-topped picket or green painted rock: Indicate the area sample checked as part of the Quality Control activity.
- 7) Long-red topped post: Indicate the boundary between clear and hazardous areas. They shall be spaced a maximum of 15 m apart and posts shall be a minimum of 1 m above the ground. A mine warning sign is normally positioned on these posts. When used during clearance operations, small red topped pickets or red rocks shall be positioned between the long red topped post at a maximum of 1 m intervals, especially when visibility between long pickets or large stones is restricted due to terrain and or vegetation.
- 8) Crossed Red Pickets: Used to indicate the extent of clearance when work ends in a clearance lane for whatever reason and for whatever length of time.

The aim of marking is to have one continuous perimeter that at all times clearly defines the hazardous and safe areas throughout the life of a demining worksite. Refer to Annex A of this SNMAS for pictorial representation of the marking which shall be used as part of land release operations in Sudan.

7.2.3 Base Sticks

The Base Sticks shall be used by deminers to maintain clearance lane width during the clearance. The area behind the base stick indicates cleared area while the area in front of base stick is un-clear area and shall not be crossed be crossed at any time.

The red painted portion of the base stick (100 cm) marks the correct lane width whilst the white ends (10 cm each side) serve as a reminder to the deminers to overlap the clearance area into the adjoining lanes and as safety margins.

The two lengths of mine marking tape or cord shall be attached to the base stick in an appropriate fashion that enables it to be unreel as the deminer progresses so as to indicate progress in the current clearance lane and to assist in the maintenance of the required direction of clearance. Appropriate stone or stick marking shall be placed as forward progress is made, at 1 m intervals.

7.3. Marking System of a Released Area

The marking of areas that have been released following land release process shall:

- 1) Provide a clear and unambiguous picture to the landowner and beneficiaries about the released area, with white marking and white cross marker on all hazard markers including hazards signs.
- 2) Include control markers with indication of area released from hazards. Presence of control markers after the area is released from hazards will help the programme to easily locate and approach safely, if follow up work is required.

- 3) If only a portion of a hazardous area is cleared, and suspected areas remain, then the unclear areas shall be fenced where possible or marked properly. The areas that are assessed as having “no evidence of” hazards; do not need to be fenced but should be recorded as not being cleared; either cancelled or reduced.

All perimeter and control points shall be indicated on both the IMSMA Completion Report and associated map.

8. Responsibilities

8.1. National Mine Action Centre (NMAC)

As the coordination and regulating body for mine action in Sudan, NMAC is responsible to:

- 1) Develop, update and publish standards for the design and construction of appropriate and achievable hazard marking systems to be used in Sudan.
- 2) Maintain hazardous areas marking system proper communication with local government authority and local people.
- 3) Monitor establishing marking system by demining and survey teams, based on the requirements of this SNMAS.
- 4) Review and accredit mine action organizations marking SOPs, and
- 5) Ensure that mine action teams have properly briefed local people and communities about the marking system and their importance and maintenance.

8.2. Mine Action Organizations

All mine action organizations accredited and conducting survey and land release operations in Sudan, shall:

- 1) Develop SOPs for marking system, either separate or part of survey and clearance procedures.
- 2) Include hazardous area marking system in their Survey and Clearance training management packages and provide the training to their survey and demining teams.
- 3) Consider the requirements of this SNMAS when establishing markers as part of survey and land release operations.
- 4) Ensure quality of markers and marking materials to be durable and stay clear throughout the intended timespan.
- 5) Ensure that their teams have properly briefed local people and communities about the marking system and its importance.
- 6) Coordinate their marking systems with other demining organizations operating in the area.
- 7) Include marking system features in their RE messages or provide inputs to RE organizations to include marking system features in RE messages.