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Mine/ERW Clearance Marking System

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Mine/ERW Clearance Marking Systems

1. Introduction

Standard marking systems are essential to safe, efficient and effective demining operations. They provide clear, unambiguous warning of hazardous areas and assist in the control of demining operations. MACCA on behalf of the Afghanistan Government is responsible for developing marking systems for use in demining in Afghanistan and ensuring that mine action organisations comply with these systems.

2. Scope

This chapter of the AMAS describes the minimum requirement for mine and ERW clearance marking systems in Afghanistan

3. Control Markers

Control markers are used for indicating the key points of reference outside the hazardous area and also for indicating the perimeter of a cleared area. All the control markings shall be placed in safe areas. They shall be clearly visible in daylight from a minimum distance of 30m and be durable. They may be identified by painted signs on existing structures or on large rocks, if permanent in nature.

Control markers shall be marked in Red paint if the hazard is mine, cluster munitions and A-IED tasks or Blue if the hazard is a battle area clearance (BAC) task. The control markers to be used for key points of reference are:

- a) Reference Point (RP).
- b) Benchmark (BM).
- c) Start Point (SP).
- d) Turning Point (TP).
- e) Intermediate Point (IP).

4. Reference Point

A RP is a fixed point of reference and is located to a suitable distance outside the hazardous area. It should be a permanent and easily recognizable landmark or feature in the general area. The position of the RP shall be such that other control markers are able to be located from it. The location of a RP shall be surveyed and Global Positioning System (GPS) should be used for obtaining its positions (Lat & Long). RP shall be marked with a sign to be clearly distinguishable from other RPs and control markings 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 "BAC" for battle area clearance.

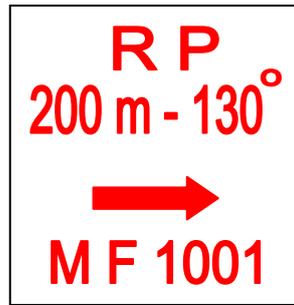


Fig 1 An example of a RP sign

This sign shows the RP for Minefield Number 1001. This indicates that the BM for minefield 1001 is located 200 meters from this point on a magnetic bearing of 130 degree.

5. Benchmark

BMs are fixed points of reference used to locate a hazard or hazardous area. On large clearance sites more than one BM may be established covering different areas on a site.

The BM shall consist of three metal rods of approximately 30cm in length driven flush into the ground with the rods forming a triangle with sides of approximately 30cm. The exact position of the BM is the centre of the three rods. The location of the BM should be determined by GPS. BM shall be located a short distance outside the hazardous area and shall be clearly marked with a signs distinguishing it from other BMs and control markings in the area. Where possible, the BM sign should be positioned approximately 125 cm above the ground. The signs should include:

- a) The letters 'BM'.
- b) A unique task number prefixed by the letters 'MF' or 'BF'
- c) An appropriately colored triangle with sides at least 15cm in length.
- d) An arrow indicating the direction of the hazardous area.
- e) A distance and bearing to the SP for the hazardous area.
- f) The identification of the survey team, which positioned the BM.
- g) The date the BM was positioned.

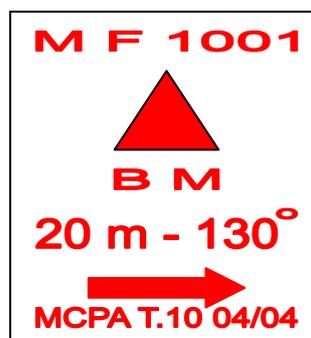


Fig 2 An example of a BM sign

This illustrates the BM sign for Minefield # 1001 positioned by MCPA Team No-10 in April 2004. It indicates that the SP for the minefield No-1001 is located 20 meters from this point toward on a magnetic bearing of 130 degrees.

6. Start Point

A SP is the point at which the surveyed hazardous area boundary lane 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 the centre of the three rods. The SP should be located by bearing and distance from a BM.

SP shall be clearly marked with an appropriate painted sign or rocks positioned above the rods. The sign or rocks shall be marked with the letters 'SP' in white. 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.

7. Turning Point

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 with the ground. The position of each TP should be located using a bearing and distance from the previous TP or the SP and shall be recorded with an accuracy of not less than +/- 30cm and +/- 2 degrees. Positions of TPs shall not record using 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 letters '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 change 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.

8. Intermediate Point

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. As for TP, 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 colored 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 1.25m above the ground.

IPs shall be positioned at intervals appropriate to the site conditions and shall be located using bearings and distances from a previous TP or SP. Positions of IPs may not be recorded using GPS. The bearing and distance from the previous TP/SP or the previous IP may be recorded on the hazardous area map included with the 'MACCA IMSMA Minefield Report'.

9. Operational Marking with Rocks

Boundaries between all designated areas, lanes, and points in mine/ERW clearance operations shall be clearly marked. In Afghanistan the marking system that is most commonly used are painted rocks. The rocks should be at least 15 cm in diameter so that they are easily seen.

Piles of painted soil or alternatively wooden pickets may be used, so long as the marking system remains clear and is easily identified by everyone involved in the operation. Wooden pickets shall be a minimum length of 0.5 metres above the ground.

The following colour system shall be used for rocks:

- a) Red Painted Rocks: Indicate the boundary of an unsafe area and the rocks shall be spaced every two meters at a maximum.

- b) White Painted Rocks: Indicate the boundary of a safe area and the rocks shall be spaced every two meters at a maximum.
- c) Red and White Painted Rocks: Indicate the boundary between the safe (White) and unsafe (Red) areas in a mine clearance operation.
- d) Yellow Painted Rocks: Indicate the location of an anti-personnel mine that has been destroyed during clearance.
- e) Yellow & White Painted Rocks: Indicate the position of a missing mine from a patterned mine row.
- f) Yellow & Red Painted Rocks: Indicate the location of ERW destroyed during clearance.
- g) Black Painted Rocks: Indicate the location of an anti-tank mine destroyed during clearance.
- h) Blue Painted Rocks: Indicate the start and end of daily clearance during mine clearance operations and for marking the boundary in BAC sites.
- i) Blue and White Rocks: Indicate the boundary between the safe (White) and unsafe (Blue) areas in a BAC operation.
- j) Green Painted Rocks: Indicate the boundaries of sample boxes during the sampling process of quality management.

10. Marking in the Clearance Lane

Marking in the clearance lane shall be in a way that the deminer can clearly identify where it is safe to work and where it is dangerous. Mine clearance organisations may have different methods for achieving this; however those methods shall be clearly stated in the organisations SOPs that have been approved by MACCA.

There are two common methods of marking a clearance lane in Afghanistan;

- a) Two Rows of red and white painted rocks may be used to indicate the lane in which the deminer is currently working.
- b) Two 25-metre lengths of mine marking tape or rope with eyelet pickets may be used to indicate the lane in which the deminer is currently working.

A wooden Base Sticks shall be used by deminers to mark the boundary between the cleared and unclear areas where the deminer is working in the clearance lane. The base stick shall be 1.2 meters long and painted Red over the middle for 1.0m and painted white for 10cm on each end as shown below.

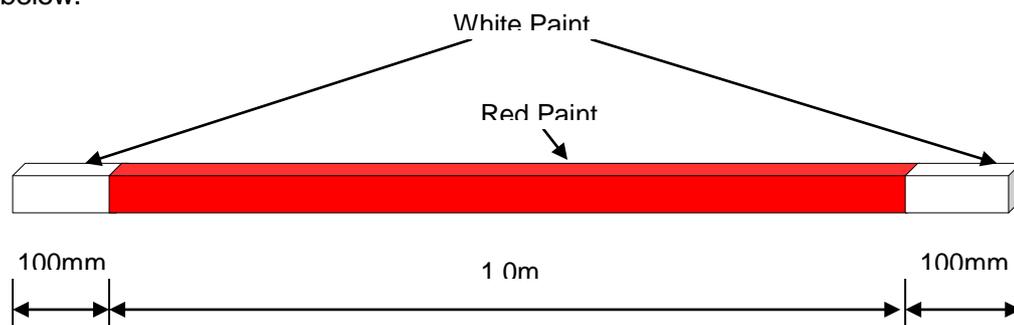


Fig 3 Dimensions and colour of a Base Stick

11. Permanent Fencing and Hazard Sign Marking Systems

Permanent marking of hazardous areas may be required if clearance of a mine and ERW area is not going to occur in the near future. This may be as a result of the land being of low priority or simply because the area is not located within close proximity of the impacted community or is geographically challenging for clearance teams to undertake. In such cases a durable permanent fencing and hazard sign marking system should be placed to identify the hazardous area and stop anyone inadvertently entering it.

The details for permanent fencing and hazard sign marking systems are detailed in IMAS Chapter 8.4 Marking of Hazards.

12. Marking of a Released Area

The marking of any area that has been released following clearance and or land release processes shall be unambiguous and provide a clear picture to the landowner and beneficiaries of where the land has been cleared. The marking shall include the permanent marking of control markers so that an area can be easily located and approached safely if follow up work is required.

If only a portion of a minefield is cleared, and suspected areas remain, then the unclear areas shall be fenced where possible. Unclear areas that are assessed as not posing a hazard need not be fenced but should be recorded as not being cleared.

All perimeter and control points shall be indicated on both the IMSMA Completion Report and associated schematic diagrams or maps submitted, along with all perimeters measurements (distances and bearings).

The IMSMA Completion Reports and sketch map shall also define the parameters of **all** different clearance assets employed on the site and also to identify those areas that have received confirmation clearance.