

Section Four: Minefield Marking

INTRODUCTION

4.1 Mine marking, a major function of Mine Survey teams, provides an immediate warning for people moving in or near hazardous areas. The mine marking methods, including those of local design and manufacture, must be flexible and adaptable for implementation in the affected country and be part of a national marking system. The selected methods must be stated in the SOPs of all participating demining organisations and will vary from country to country due to language, environmental, political and cultural variances.

4.2 Mine marking must visibly delineate between known danger areas and those areas that are clear. The local population may have to be educated on the purpose of the signs and mine markings so that they will not remove the marking material.

SCOPE

4.3 This document addresses the standards for the signs and marking of hazardous areas during survey, mine and EOD clearance operations and should be read in conjunction with the standards for mine and EOD clearance and other relevant documents.

PURPOSE

4.4 The purpose of this document is to establish standards for minefield marking in order to clearly identify the hazardous areas by use of highly visible and, where possible, physical barriers.

MINE CLEARANCE MARKING

4.5 As a minimum, all safe lanes, safe routes and control areas must be marked by sticks or pickets, mine tape, rope or stones in order to define and differentiate between cleared and uncleared areas.

4.6 Safe lanes are to be a minimum of 1 metre wide.

4.7 Marking of areas within the hazardous area are to be of the same standard as safe lanes and control areas. Working lanes are to be clearly marked by sticks, tape, rope or stones to define the safe and unsafe areas. This marking should be maintained for the duration of the task.

MINEFIELD/UXO MARKETING LEVELS

4.8 There are three levels of marking :

a) Emergency Marking. Emergency marking of suspected mined areas is an immediate visual warning of the possible presence of mines and UXOs. The type of marking should consist of a clearly recognised mine symbol that indicates danger, such as the skull and crossbones. The marking should be clearly recognised from a distance of at least 50 metres and capable of enduring local weather conditions for at least six months. Local innovations may be used when conveyed to and understood by the local population.

b) Temporary Marking. Temporary marking is used to indicate a mined area boundary. Marking should use recognised mine signs, be clearly visible and placed approximately 1 metre to 1.25 metres above the ground. Signs should be spaced 50 metres apart and be securely fixed to a picket or improvised material. All marking must be monitored and maintained.

c) Long-Term Marking. Long-term marking is required for areas that are not scheduled for clearance work for an extended period of time. Regular maintenance is to be undertaken. The SOPs should stipulate the long-term marking methods to be employed.

MARKING SPECIFICATIONS

IMPROVISED MARKING

4.9 Improvised marking methods should become a part of the national and local mine awareness programmes in order to inform and educate the local population about their meaning and function. This education has a secondary function, which is to stop the removal of minefield marking and warning signs.

MINEFIELD SIGNS - STANDARDS

4.10 The following standards are detailed for the manufacture and construction of minefield marking signs and fences:

a) **Mine Signs, Size and Shape.** There are two basic designs for the shape of this sign; square and triangular. The square sign should be at least 25 centimetres by 25 centimetres. The triangular type should be at least 28 centimetres wide along the top edge and 20 centimetres on two sides.

b) **Mine Danger Symbol.** The recognised symbol for danger is the skull and crossbones and this must be illustrated on all mine danger signs. These standards take note of the Amended Protocol on Prohibitions or Restrictions on the use of Mines, Booby-Traps and other Devices (Amended Protocol II) of the United Nations Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects Technical Annex (para. 4) which offers its variant on international signs for minefields and mined areas as depicted in the example below.

c) **Colour.** The background colour of the front of the sign must be red with the skull and crossbones symbol and any words in white. The reverse side of the sign is to be white. This clearly demonstrates on which side of the sign the danger lies.

d) **Language.** 'Danger Mines' are the only words that should be used on a mine sign and should be printed in one of the six major recognised UN languages (English, French, Russian, Chinese, Arabic and Spanish) and the local language.

e) **Material.** As a minimum requirement all signs should be able to withstand the local environment and weather conditions without deterioration for a period of at least six months and, where possible, the material should be of little local value.

f) **Perimeter marking.**

(i) Piled stones, sticks or pickets may be used to effectively mark mined areas. Stones should be painted at the apex and, where possible, the mine warning sign should be positioned into the cairn or fixed to a stick or metal pole from above the stone apex.

(ii) Fencing. Fencing is a barrier to restrict humans and livestock from entering hazardous areas. Strands of fencing should be placed at 0.5 metres and at 1 metre to 1.25 metres from ground level. Mine warning signs are to

be affixed along the top strand between the pickets every 50 metres to act as a visual warning.

g) **Measurement Standards.** All countries should use a uniform method (metric is preferred) with bearings in either mills or degrees and, where possible, using magnetic bearings. The primary GPS coordinate system will be in longitude and latitude and the Grid Reference system. The secondary coordinate systems can be the local reference system. The following are technical parameters for identifying and measuring key survey points:

h) **Prominent Landmarks.** They must be an easily recognised and of a permanent nature. The exact position must be identified by GPS longitude/latitude and, where possible, an eight figure grid reference.

i) **Benchmarks.** Benchmarks are a permanent point of reference used as a navigational point to serve as a marker to the perimeter of the minefield. These benchmarks are to be numbered. Benchmarks can be made from metal, wood or stone material. If metal or wood, they will be a configuration of three pickets driven flush into the ground in a triangular pattern. The pickets should be spaced at 1.5 metres at the base. A picket is to be placed upright in the centre of the triangle and is to be 1.5 metres in height. The apex of the benchmark should be aligned to any intermediate markers or to the minefield start point. Benchmarks should be painted a prominent colour.

j) **Turning Points.** Turning points are to consist of steel, wood or stone markers. They should be distinctively marked and be located using bearings and distances from a previous turning point or benchmark. They are also to be given coordinates. GPS is not to be used for fixing coordinates of turning or intermediate points unless it has a maximum error of ± 5 cms.

k) **Intermediate Points.** Intermediate points are to be used between turning points to ensure that the direction between points is on a known fixed line that can be easily and accurately followed.

MINEFIELD MARKING MAINTENANCE

4.11 The local population must be encouraged to be responsible for the maintenance of the minefield marking systems in their immediate areas. Material, such as mine signs and fencing, should be held in a central location in order that resources can be allocated to minefield tasks. Regular inspections should be carried out by the mine clearance organisation. A handover certificate is recommended to allocate the responsibility for the maintenance to the local community.

MINEFIELD RECORDS

4.12 Emergency, temporary and long-term mine marking records and records completed during clearance operations must be linked into the minefield survey records and Minefield Information Database.