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Marking mine and UXO hazards

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Foreword

International standards for humanitarian mine clearance programmes were first proposed by working groups at an international technical conference in Denmark, in July 1996. Criteria were prescribed for all aspects of mine clearance, standards were recommended and a new universal definition of 'clearance' was agreed. In late 1996, the principles proposed in Denmark were developed by a UN-led working group and the *International Standards for Humanitarian Mine Clearance Operations* were developed. A first edition was issued by the UN Mine Action Service (UNMAS) in March 1997.

The scope of these original standards has since been expanded to include the other components of mine action and to reflect changes to operational procedures, practices and norms. The standards were re-developed and renamed as *International Mine Action Standards* (IMAS).

The United Nations has a general responsibility for enabling and encouraging the effective management of mine action programmes, including the development and maintenance of standards. UNMAS, therefore, is the office within the United Nations responsible for the development and maintenance of IMAS. IMAS are produced with the assistance of the Geneva International Centre for Humanitarian Demining.

The work of preparing, reviewing and revising IMAS is conducted by technical committees, with the support of international, governmental and non-governmental organisations. The latest version of each standard, together with information on the work of the technical committees, can be found at <http://www.mineactionstandards.org/>. Individual IMAS are reviewed at least every three years to reflect developing mine action norms and practices and to incorporate changes to international regulations and requirements.

Introduction

The marking of mine and UXO hazards is undertaken to provide a clear and unambiguous warning of danger to the local population, and where possible to install a physical barrier to reduce the risk of unintentional entry into hazardous areas.

This standard draws on the only two treaties in international law which deal with landmines: the Mine Ban Treaty (MBT or Ottawa Convention) and Amended Protocol II to the UN Conventional Weaponry Convention on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices. Countries which are States Party to the MBT and/or Amended Protocol II have certain specific obligations regarding the marking of mine hazards.

Each State Party to the MBT 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.' The MBT requires the marking to be '... at least to the standards set out in Amended Protocol II.'

Amended Protocol II requires States Party to ensure '... the effective exclusion of civilians from the (mined) area by fencing or other means. ... Marking must be of a distinct and durable character and must at least be visible to a person who is about to enter the perimeter-marked area.' Amended Protocol II provides an example and specifications for the marking of minefields and mined areas and requires that signs similar (but not necessarily identical) to the example and the specifications are used '... to ensure their visibility and recognition by the civilian population.'

The provisions of this standard do not replace the obligations detailed in the MBT and Amended Protocol II, and States Party should be fully conversant with their legal obligations in respect to the two treaties.

Marking mine and UXO hazards

1. Scope

This standard specifies the minimum requirements for the marking of mine and UXO hazards and hazardous areas. It does not specify marking systems used by organisations during demining operations.

2. References

A list of normative references is given in Annex A. Normative references are important documents to which reference is made in this standard and which form part of the provisions of this standard.

3. Terms, definitions and abbreviations

A list of terms, definitions and abbreviations used in this standard is given in Annex B. A complete glossary of all the terms, definitions and abbreviations used in the IMAS series of standards is given in IMAS 04.10.

In the IMAS series of standards, the words 'shall', 'should' and 'may' are used to indicate the intended degree of compliance. This use is consistent with the language used in ISO standards and guidelines:

- a) 'shall' is used to indicate requirements, methods or specifications that are to be applied in order to conform to the standard.
- b) 'should' is used to indicate the preferred requirements, methods or specifications.
- c) 'may' is used to indicate a possible method or course of action.

The term 'National Mine Action Authority (NMAA)' refers to the government department(s), organisation(s) or institution(s) in each mine-affected country charged with the regulation, management and co-ordination of mine action. In most cases the national Mine Action Centre (MAC) or its equivalent will act as, or on behalf of, the 'NMAA'. In certain situations and at certain times it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all of the functions, of a NMAA.

The term 'demining organisation' refers to any organisation (government, NGO or commercial entity) responsible for implementing demining projects or tasks. The demining organisation may be a prime contractor, subcontractor, consultant or agent.

4. General characteristics of hazard marking systems

The design of mine and UXO hazard marking systems should take account of local materials freely available in the contaminated region and the period for which the marking system will be in place.

It is generally accepted that materials used in marking systems should have little, if any, value or practical use for purposes other than mine and UXO hazard area marking. If material of any value is used, then it is likely to be removed.

4.1. Signs and markers

A hazard sign is a manufactured, permanent or semi-permanent notice giving information in a written and/or symbolic form which, when placed as part of a hazard marking system, is designed to provide warning to the local population of the presence of mines and UXO. Examples of hazard signs are given in Annex C. The words should represent the predominant hazard (mines or UXO) and the symbol should indicate 'danger' in a form which will be recognised nationally and locally.

A hazard marker may be used to indicate a mine or UXO hazard when signs are not available, or when local conditions prevent their effective use – for example when signs are repeatedly removed by the local population. An example of the use of hazard markers is given in Annex D.

Hazard signs and markers should be clearly visible in daylight at a distance of 30m, and from adjacent signs and markers. If markers are masked by vegetation or terrain, the use of a physical barrier should be considered.

Hazard signs and markers should not be constructed of munition casings, materials that may have contained explosives, or discarded weapon systems.

4.2. Marking systems

There are three general categories of marking systems:

- a) Permanent marking systems should be used to mark the perimeter of mine and UXO hazard areas which are not scheduled for clearance in the near future. They should employ a combination of markers, signs and physical barriers.
- b) Temporary marking systems may be used to mark the perimeter of a mine and UXO hazard area in preparation for clearance operations. They should include the use of physical barriers.
- c) Improvised marking systems are generally placed or erected by the local population. They may also be used by demining organisations when materials are not available to construct temporary or permanent marking systems.

4.2.1. Permanent marking system specifications

The design of permanent mine and UXO hazard marking systems shall include a combination of markers, signs and physical barriers that clearly identify the boundary of the mine and UXO hazard area.

Hazard marking symbols shall be clearly visible; see clause 4.1 above. Markers and signs shall clearly identify which side of the marked boundary is considered to be within the mine and UXO hazard area and which side is considered to be safe. The warning sign should be clearly displayed facing outwards from the mined area or suspected hazardous area.

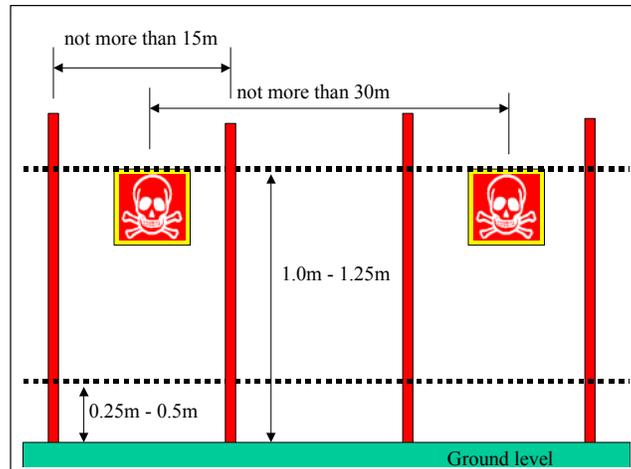


Figure 1: Physical barrier fence

Physical barriers may include walls, fences or other obstructions that prevent the unintentional entry into a mine or UXO hazard area. Fences should be erected with two strands attached to uprights at 0.25m to 0.5m and 1.0m to 1.25m above the ground. (See Figure 1) Fencing strands may be of any suitable durable material including wire, string, synthetic cord or tape. Uprights may include trees, buildings or existing structures and posts erected as part of the warning system, and should be positioned not more than 15m apart.

Hazard signs shall be attached to the top strand of the fence not more than 30m apart and within 5m of each turning point. If necessary, they may also be attached to uprights.

4.2.2. Temporary marking systems

Temporary marking systems may be used to mark the perimeter of a mine and UXO hazard area in preparation for clearance operations. They may include the use of physical barriers.

Temporary marking systems shall conform to the standards determined by the NMAA.

4.2.3. Improvised marking systems

Improvised marking systems should use locally available material. They should be constructed in accordance with the standards determined by the NMAA.

Demining organisations should avoid using improvised marking systems. Improvised systems should be replaced with temporary permanent marking systems as soon as possible.

5. Marking system maintenance

The NMAA shall be responsible for the maintenance of permanent and temporary marking systems. This should be integrated with national and local Mine Risk Education (MRE) programmes, and should actively involve the communities at risk.

The demining organisation that constructs or replaces the marking system shall:

- a) Mark the hazardous area(s) in a manner consistent with this IMAS, and as directed by the NMAA; and

- b) Brief the affected communities and local authorities on the marking system. It is necessary to transfer 'ownership' of the marking systems to the communities at risk and to explain the need for its maintenance. This handover should be formally documented.

In the absence of any local authority or stable resident community, the demining organisation which constructed or emplaced the marking system should make arrangements to maintain it until such time as the area is cleared of mines, UXO or other devices. It should then seek to transfer the responsibility for its maintenance to the local authorities, another demining organisation or any other competent authority.

6. Responsibilities

6.1. National Mine Action Authority (NMAA)

The NMAA shall prepare and publish standards for the design and construction of appropriate and achievable hazard marking systems to be used in national mine action programme and demining projects. It shall also give guidance to regional and local authorities on the retention and maintenance of minefield marking systems.

6.2. Demining organisations

Demining organisations shall apply the NMAA standards for hazard marking systems.

In the absence of national standards and specifications on hazard marking, demining organisations shall apply the specifications of this standard, and should coordinate their marking systems with other demining organisations operating locally, until a NMAA is established.

Annex A (Normative) References

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of the standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of the standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid ISO or EN:

- a) IMAS 08.20 Technical survey;
- b) IMAS 09.40 Guide for the use of mine detection dogs;
- c) IMAS 09.50 Mechanical application;
- d) IMAS 10.20 S&OH - Demining worksite safety;
- e) The Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices as amended on 3 May 1996 (Protocol II to the 1980 Convention as amended on 3 May 1996); and
- f) Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction.

The latest version/edition of these references should be used. GICHD hold copies of all references used in this standard. A register of the latest version/edition of the IMAS standards, guides and references is maintained by GICHD, and can be read on the IMAS website (<http://www.mineactionstandards.org/>). NMAA, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.

Annex B (Informative) **Terms, definitions and abbreviations**

B.1.

demining organisation

refers to any organisation (government, NGO or commercial entity) responsible for implementing demining projects or tasks. The demining organisation may be a prime contractor, subcontractor, consultant or agent.

B.2.

hazard (ous) area

contaminated area

a generic term for an area not in productive use due to the perceived or actual presence of mines UXO or other explosive devices.

B.3.

hazard marker

object(s), other than hazard signs, used to identify the limits of a mine and UXO hazard area. Hazard markers shall conform to the specification established by the NMAA.

B.4.

hazard marking system

a combination of measures (signs and barriers) designed to provide the public with warning and protection from mine and UXO hazards. The system may include the use of signs or markers, or the erection of physical barriers.

B.5.

hazard sign

a permanent, manufactured sign which, when placed as part of a marking system, is designed to provide warning to the public of the presence of mines.

B.6.

National Mine Action Authority (NMAA)

the government department(s), organisation(s) or institution(s) in each mine-affected country charged with the regulation, management and coordination of mine action.

Note: In most cases the national MAC or its equivalent will act as, or on behalf of, the 'NMAA'.

Note: In certain situations and at certain times it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all of the functions, of a NMAA.

Annex C (Normative) Hazard signs - minefield and mined areas

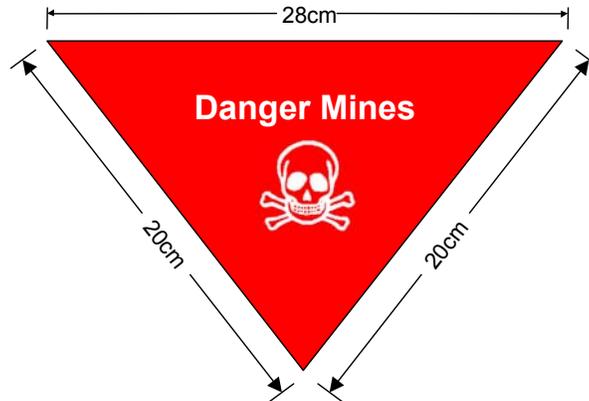


Figure C1: Hazard sign - triangle

Notes:

1. This is a normative Annex because of the obligations under international law of States Parties to mark and fenced mined areas. Notwithstanding the normative nature of this Annex, flexibility in the design and layout of hazard signs is permissible in accordance with the direction given in the remainder of these notes.
2. The sign should have a red or orange background with a white symbol for danger. The universal symbol for danger is the skull and crossbones, however the NMAA may specify another symbol if the skull and crossbones is not appropriate.
3. The words 'Danger Mines' (or 'Danger UXO' depending on the predominant hazard) should appear on the sign in the local language(s). Amended Protocol II recommends that the warning should also appear in one of the six recognised UN languages (English, French, Russian, Chinese, Arabic and Spanish), but this recommendation is not a requirement for the purposes of this standard.
4. Amended Protocol II recommends that the sign should include a yellow border of reflective material, but this recommendation is not a requirement for the purposes of this standard.
5. The rear surface of the sign should be white.
6. Dimensions should not be less than indicated on the diagram.

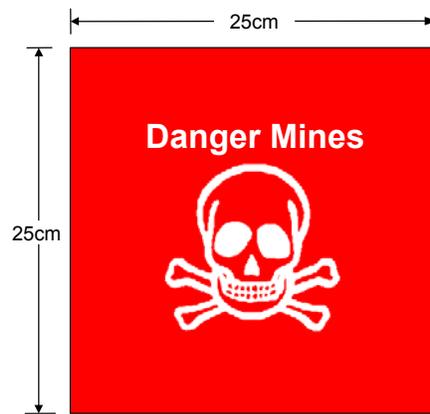


Figure C2: Hazard sign - square

Notes:

1. The sign should have a red or orange background with a white symbol for danger. The universal symbol for danger is the skull and crossbones, however the NMAA may specify another symbol if the skull and crossbones is not appropriate.
2. The words 'Danger Mines' (or 'Danger UXO' depending on the predominant hazard) should appear on the sign in the local language(s). Amended Protocol II recommends that the warning should also appear in one of the six recognised UN languages (English, French, Russian, Chinese, Arabic and Spanish), but this recommendation is not a requirement for the purposes of this standard
3. Amended Protocol II recommends that the sign should include a yellow border of reflective material, but this recommendation is not a requirement for the purposes of this standard.
4. The rear surface of the sign should be white.
5. Dimensions should not be less than indicated on the diagram.

Annex D (Informative) **Examples of marking systems**

Boundary lane using painted rocks

D.1. General Guidelines

Painted rocks shall be used to signal a mine and UXO hazard and shall be placed along the edge closest to the mine or UXO hazard. These should normally be coloured red, but if that colour has cultural sensitivities, any other 'strong' colour shall be used.

The basic rule is that no-one should cross the line indicated by coloured rocks.

White rocks shall be used to signal 'safety' and shall be placed:

- a) along the edges of useable areas;
- b) before the line of coloured rocks used to mark the edges of danger areas (i.e. on the 'useable' side of the mine and UXO hazard area); and
- c) between two rows of coloured rocks (e.g. a safety lane between two mine and UXO hazard areas so that the safety lane is obvious).

The spacing between rocks shall be no more than 5m except at turning points, where the spacing should be reduced to approximately 2m.

D.2. Boundary lane and safety lane marking

Boundary lanes and safety lanes shall be cleared and marked as follows (see Figure D1):

- a) when a lane has a useable area on one side and a hazard area on the other side, the lane shall be marked as shown in Example A in Figure D1; and
- b) when a lane has hazard areas on both sides, the lane shall be marked as shown in Example B in the Figure D1.

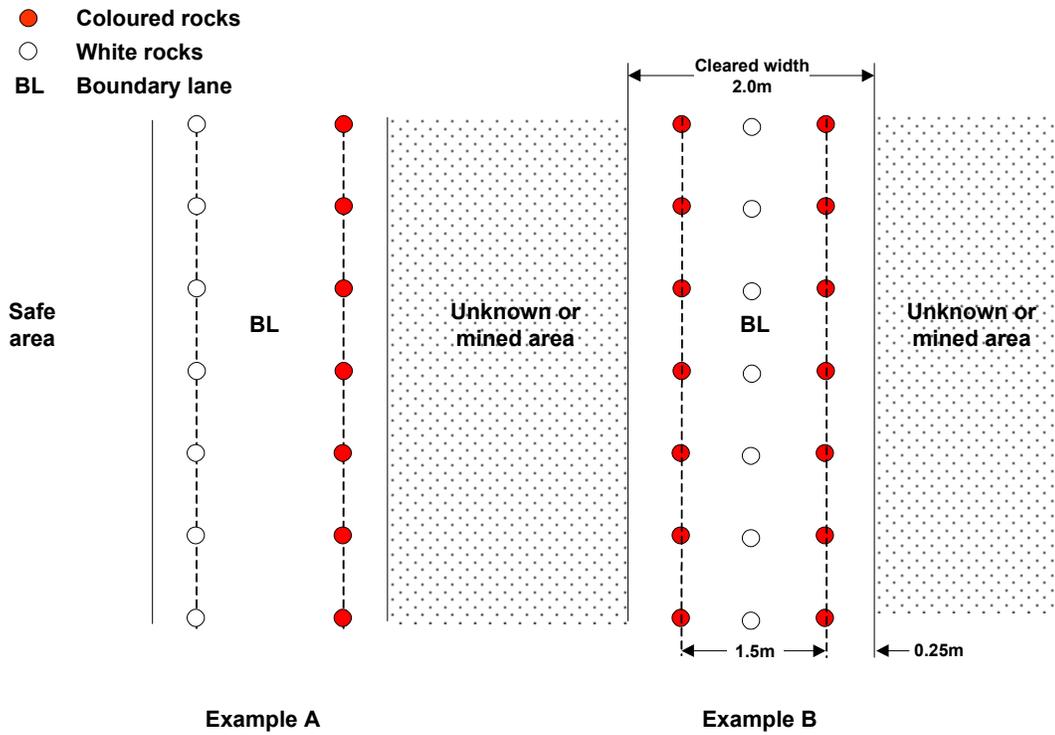


Figure D1: Example of marking using rocks

