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Explosive ordnance disposal

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Contents

Contents	iii
Foreword	iv
Introduction	v
Explosive ordnance disposal	1
1. Scope	1
2. References	1
3. Terms, definitions and abbreviations	1
4. Explosive Ordnance Disposal (EOD) procedures and operations.....	2
4.1. General principles.....	2
4.2. Qualifications	2
4.3. Quality and audit of the qualifications	3
4.4. Neutralisation and disarming procedures.....	3
4.5. Destruction procedures.....	4
4.6. Transportation, handling and storage of mines and ERW.....	4
5. Responsibilities.....	4
5.1. National Mine Action Authority (NMAA)	4
5.2. Demining organisations	4
Annex A (Normative) References	6
Amendment record	7

Foreword

International standards for humanitarian demining programmes were first proposed by working groups at an international technical conference in Denmark, in July 1996. Criteria were prescribed for all aspects of demining, 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) with the first edition produced in October 2001.

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

Explosive Ordnance Disposal (EOD) involves the disposal of Explosive Ordnance (EO), including mines, and Explosive Remnants of War (ERW). However, in accordance with Protocol V of the Convention on Certain Conventional Weapons (CCW), ERW includes Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.

While, in practice, EOD operations include disposal of all EO, including mines, the main focus is on the disposal of ERW and the majority of ERW found during demining operations are small items of UXO and EO such as sub-munitions, grenades and mortar ammunition. However, ERW can also include larger items such as artillery ammunition, guided missiles, air-dropped bombs and caches of AXO. The wide variety of size and complexity of ERW requires special attention to be given to the management of EOD and the qualifications required to deal with the varying devices.

The aim of this standard is to provide specifications and guidance for the management of EOD as part of mine action. It covers general principles and management responsibilities for EOD. It does not provide specific technical guidance for the disposal of particular EO.

Explosive ordnance disposal

1. Scope

This standard provides specifications and guidelines for the safe conduct of Explosive Ordnance Disposal (EOD) operations as part of a mine action programme. It applies to the disposal of mines and ERW including unexploded sub-munitions. Demining worksite safety and quality requirements for clearance are addressed in other IMAS.

This standard does not apply to the disposal of nuclear, biological or chemical weapons. National Mine Action Authorities (NMAA) will need to obtain, and to disseminate, specialist advice on such weapons and ammunition and their destruction, if required. This standard also does not specifically cover munitions with highly toxic or carcinogenic components, although some mines (such as PFM1) fall into this category.

2. References

A list of normative and informative 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.

CWA 15464:2005 - Humanitarian Mine Action - EOD Competency Standards (5 parts), provides guidance on the competencies needed for EOD levels 1, 2 and 3 when dealing with conventional munitions disposal as part of EOD in mine action operations.

For clearance requirements see IMAS 09.10, for battle area clearance (BAC) see IMAS 09.11 and for demining worksite safety see IMAS 10.20.

A number of Technical Notes for Mine Action (TNMA) provide specific guidelines about specific EO hazards. See informative references in Annex A for related TNMA.

3. Terms, definitions and abbreviations

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; and
- c) 'may' is used to indicate a possible method or course of action.

The term 'National Mine Action Authority (NMAA)' refers to the government entity, often an inter-ministerial committee, in a mine-affected country charged with the responsibility for the regulation, management and coordination of mine action.

Note: In the absence of a **NMAA**, 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 the functions, of a MAC or, less frequently, an NMAA.

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, and comprise one or more sub-units.

The term 'Explosive Ordnance (EO)' refers to all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket and small arms ammunition; all mines, torpedoes and depth charges; pyrotechnics; cluster bombs and dispensers; cartridge and propellant actuated devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature.

The term 'Explosive Remnants of War (ERW)' refers to Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.

4. Explosive Ordnance Disposal (EOD) procedures and operations

4.1. General principles

EOD operations involve the detection, identification, field evaluation, render safe, recovery and disposal of EO. EOD may be undertaken as a routine part of mine clearance operations following the discovery of ERW in or near hazardous areas. EOD operations may also be undertaken to dispose of ERW discovered outside hazardous areas. Such operations may involve a single item of ERW, or a number of items at a specified location such as a mortar or artillery gun position. It may also involve stockpiles of ammunition, AXO left in bunkers or ammunition points. The standard does not however address the destruction of stockpiles of anti-personnel landmines in accordance with the Anti Personnel Mine Ban Convention (APMBC)¹. See IMAS 11.10 guide for destruction of stockpiles of anti-personnel landmines.

The effective management of mine action programmes includes, where necessary, the establishment and maintenance of a capability to conduct EOD in a safe and effective manner. This involves a formal risk assessment of the ERW hazards and the development of a safe and effective EOD capability. Such a capability shall include the preparation of appropriate procedures for neutralisation and disarming, the use of well trained and qualified deminers and EOD operators, and the use of effective and safe equipment, stores and supplies. It is recognised that some programmes have a limited need for an integral EOD capability; in such cases the NMAA shall establish and provide an appropriate EOD response.

The development of a safe and effective EOD capability may require the establishment of levels of expertise to cope with a range of operational requirements. As a general principle, operators should deal only with those items and situations for which they have been trained and authorised. All other cases should be referred to the next higher level of expertise.

4.2. Qualifications

EOD can be carried out at many levels - from the neutralisation of large bombs and missiles to the destruction of grenades and sub-munitions. EOD qualifications should be appropriate to the hazard, and the munitions most likely to be found. The qualifications of all EOD operators shall satisfy the requirements and regulations of the NMAA, or the authority acting on their behalf or in place of, who may request proof of capability in addition to the qualification. As a guide:

- a) a Level 1 (EOD) qualification enables the trained holder of the qualification to locate and expose and to destroy in situ, when possible, single items of mines and ERW on which the individual has been trained;
- b) in addition to the skills of a Level 1 (EOD) qualification, a Level 2 (EOD) qualification enables the holder to determine when it is safe to move, transport and dispose of single or multiple items of mines and ERW on which the individual has been trained.
- c) in addition to the skills of a Level 1 and 2 (EOD) qualification a Level 3 (EOD) qualification enables the holder to conduct render-safe procedures and final disposal of any type of explosive ordnance on which the individual has been trained; and

¹ Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction

- d) in addition to the skills of a Level 1, 2 and 3 (EOD) qualification, a Level 4 (EOD) qualification is for specialist EOD operators who have been trained and are qualified to destroy the remaining EOD hazards with specialised EOD techniques. Such specialist skills may include the render safe of liquid propellant systems, disposal of Depleted Uranium and the clearance of conventional munitions with improvised firing systems. The Level 4 (EOD) qualification shall clearly indicate the specialist training received by each individual.

Some ERW fall within the guidelines for the above qualification levels but present a specific or additional hazard. Examples are items containing White Phosphorous (WP), missiles, or the requirement for bulk demolitions. Special consideration should be given to the need for additional training, or for specific exclusion from the category of competence.

Where particular items are frequently encountered, specific training in the disposal of these items may be given to enable the operator to deal with them rather than continually refer the problem to the next higher level of expertise.

It should be noted that sub-munitions may be particularly hazardous to deal with and should only be dealt with by level 2 or above qualified personnel.

4.3. Quality and audit of the qualifications

NMAA and mine action organizations should develop performance criteria, appropriate assessment tools and procedures in order to assess the level and quality of competence of EOD operators. This could include written tests, practical exercises, demonstrating a task, or procedures for assessment of performance during EOD operations.

CWA 15464:2005 - Humanitarian Mine Action - EOD Competency Standards (5 parts) provides guidance on the competencies needed for EOD levels 1, 2 and 3 and is designed to enhance the process of planning and evaluating EOD operators development and capacity building. Its use can also help improve the assessment of training and competency of operators involved in EOD work.

4.4. Neutralisation and disarming procedures

Individual mines and ERW should be destroyed or neutralised in situ when it is not safe to move them to a nearby disposal site. This will, among other things, help to reduce the contamination of the area with metal fragments from an in-situ detonation. The decision, whether to move a mine or ERW, or a particular type, or not, should be based on an assessment by an appropriately trained EOD operator. If the fuze system is such that it is safe to move for nearby disposal, it may be moved. If the fuze system makes it simple to render the munition safe by neutralisation and/or disarming, it should be rendered safe prior to moving it to a suitable location for disposal. A community liaison function that ensures local people know what is occurring should be a routine activity incorporated with EOD operations.

Demining organisations, with an integral EOD capability, shall prepare Standard Operating Procedures (SOPs) for neutralisation and disarming procedures which are appropriate for the mine and ERW hazards likely to be encountered and which are consistent with accepted international EOD practice.

Should a demining organization not have a suitable integral EOD capability, or be able to sub-contract that capability with an accredited individual or organisation, then they shall mark, identify and report any mine and ERW located to the NMAA. It shall then be the responsibility of the NMAA to provide an appropriate EOD response.

Neutralisation and disarming procedures should not be necessary for bulk or individual items of AXO as they will not, by definition, have been primed or have failed to explode.

4.5. Destruction procedures

Demining organisations shall prepare SOPs for the effective and safe destruction of relevant mines and ERW. These should include the destruction of mines and ERW in-situ, or mines and ERW, including AXO, recovered and destroyed individually. Destruction of bulk AXO should be advised and conducted by suitably trained EOD operators. Special attention shall be given to ensuring the containment of blast and fragmentation effects resulting from the destruction of mines and ERW. Sites chosen for bulk destruction shall be located sufficiently far away from populated areas so as to represent no risk. IMAS 10.20 provides guidelines on demining worksite safety distances. UNDP/SEESAC' RMDS/G 05.55 provides guidance on EOD clearance of ammunition storage explosion. IMAS 10.70 provides guidelines as to the minimum environmental protection measures in demining operations.

4.6. Transportation, handling and storage of mines and ERW

When mines or ERW are moved, either for storage or to a site for bulk destruction, demining organisations shall apply national standards which should include reference to relevant national laws and by-laws for the transportation, handling and storage of explosives. If national standards do not exist or are inappropriate, demining organisations shall apply the general principles given in IMAS 10.50.

5. Responsibilities

5.1. National Mine Action Authority (NMAA)

The NMAA shall:

- a) establish and maintain national standards for EOD procedures;
- b) establish and maintain national standards for the qualification of EOD operators;
- c) establish and maintain the capability to accredit demining organisations involved in EOD operations;
- d) establish and maintain the capability to monitor the effectiveness and safety of demining organisations involved in EOD operations;
- e) establish national systems for EOD incident reporting; and,
- f) where necessary, seek assistance from other national governments in accordance with bilateral and international arrangements to obtain the specialist expertise and information necessary to establish safe and effective national standards for EOD procedures and EOD operations.

5.2. Demining organisations

Demining organisations shall:

- a) gain from the NMAA or organisation acting on its behalf, accreditation for EOD operations;
- b) establish and maintain SOPs for EOD operations which comply with national standards or IMAS, and other relevant standards and regulations, and which reflect local conditions and circumstances;
- c) ensure that the EOD operators are competent and suitably trained;
- d) apply SOPs for EOD operations in a consistent, effective and safe manner; and

- e) ensure that the affected community is fully cognisant of all EOD activities in the area and the implications for the community, (particularly related to the depth of clearance).

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 04.10 Glossary of mine action terms, definitions and abbreviations;
- b) IMAS 09.10 Clearance requirements
- c) IMAS 09.11 BAC;
- d) IMAS 10.70 S&OH protection of the environment;
- e) IMAS 10.20 S&OH demining worksite safety;
- f) IMAS 10.50 S&OH storage, transportation and handling of explosives; and.
- g) CWA 15464:2005 - Humanitarian Mine Action - EOD Competency Standards.
- h) UNDP/SEESAC' RMDS/G 05.55 on EOD clearance of ammunition storage explosion.

Informative references:

- i) TNMA on clearance of cluster munitions;
- j) TNMA on clearance of depleted Uranium;
- k) TNMA on clearance of liquid propellant fuelled systems;
- l) TNMA on fuel air explosive systems;
- m) TNMA on estimation of explosion danger area; and.
- n) Ammunition and explosives regulations – For use by the United Nations field missions

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.

Amendment record

Management of IMAS amendments

The IMAS series of standards are subject to formal review on a three-yearly basis, however this does not preclude amendments being made within these three-year periods for reasons of operational safety and efficiency or for editorial purposes.

As amendments are made to this IMAS they will be given a number, and the date and general details of the amendment shown in the table below. The amendment will also be shown on the cover page of the IMAS by the inclusion under the edition date of the phrase *'incorporating amendment number(s) 1 etc.'*

As the formal reviews of each IMAS are completed new editions may be issued. Amendments up to the date of the new edition will be incorporated into the new edition and the amendment record table cleared. Recording of amendments will then start again until a further review is carried out.

The most recently amended IMAS will be the versions that are posted on the IMAS website at www.mineactionstandards.org.

Number	Date	Amendment Details
1	1 Mar 2010	UNMAS address updated. Update NMAA definition Inclusion of a normative reference to the UNDP/SEESAC RMDS/G 05.55 Removal of Annex B and its reference in Clause 3.