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Explosive ordnance disposal

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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 organizations. The latest version of each standard, together with information on the work of the technical committees, can be found at 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).

While, in practice, EOD operations include disposal of all EO, including mines, the main focus is on the disposal of ERW. Both items of abandoned ordnance (AXO) and unexploded ordnance (UXO) are found and disposed of during the course of EOD operations. The wide variety of size and complexity of ERW requires special attention to be afforded 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 conduct and 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, explosive remnants of war (ERW), including unexploded sub-munitions, and chemical weapons. This standard does not cover demining worksite safety, nor quality requirements for clearance, which are addressed in other IMAS.

This standard does not apply to the disposal of nuclear or biological weapons. National mine action authorities (NMAA) need to obtain and disseminate specialist advice on such weapons and ammunition and their destruction, if required.

2 Normative 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.

For clearance requirements see IMAS 09.10, for battle area clearance (BAC) see IMAS 09.11, for clearance of ammunition storage area explosions see IMAS 09.12 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 B for related TNMA.

3 Terms and definitions

A complete glossary of all the terms, definitions and abbreviations used in the International Mine Action Standards (IMAS) series is given in IMAS 04.10.

In the IMAS series, the words “shall”, “should” and “may” are used to indicate the intended degree of compliance:

- “shall” is used to indicate requirements, methods or specifications that are to be applied in order to conform to the standard;
- “should” is used to indicate preferred requirements, methods or specifications; and
- “may” is used to indicate a possible method or course of action.

3.1

national mine action authority

NMAA

government entity, often an inter-ministerial committee, in an explosive ordnance-affected country, charged with the responsibility for broad strategic, policy and regulatory decisions related to mine action

Note 1 to entry: In the absence of an NMAA, it may be necessary and appropriate for the UN, or some other body, to assume some or all of the responsibilities of an NMAA.

3.2

demining organization

any organization (government, non-governmental organization or commercial entity) responsible for implementing demining projects or tasks

Note 1 to entry: Demining organizations include headquarters and support elements and comprise one or more sub-units.

3.3 explosive ordnance

EO

all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents

Note 1 to entry: 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. (See Allied Administrative Publication (AAP) 6, edition 2013.)

3.4 explosive remnants of war

ERW

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 clearance operations. Such operations may involve mines, a single item of ERW, or a number of items at a specified location such as a mortar or artillery position. It may also involve stockpiles of ammunition. This standard does not, however, address the destruction of stockpiles of anti-personnel landmines in accordance with the Anti-Personnel Mine Ban Convention (APMBC) (see IMAS 11.10).

The effective management of clearance 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 rendering safe explosive ordnance, the use of well trained and qualified deminers and individual EOD operators, and the use of effective and safe equipment, stores and supplies. It is recognized 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. Generally, operators should deal only with those items and situations for which they have been trained and authorized in writing. 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 rendering safe 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 individual EOD operators shall meet the requirements and regulations of the NMAA, or the authority acting on its behalf or in its place. The NMAA, or the authority acting on its behalf or in its place, may request proof of capability in addition to the qualification. Detailed competencies and operating categories are listed in T&EP 09.30/01/2014.

- 1) A Level 1 (EOD) qualification enables the trained holder of the qualification to locate, expose and destroy in situ, in a controlled environment such as a technical survey and/or clearance site, single items of mines and specific ERW on which the individual has been recorded as trained. Thus, Level 1 operators shall only be licensed to destroy only specific items of ordnance.
- 2) 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 and transport specific items of ordnance, as authorized in writing by a Level 3 (EOD) or above. It also enables the holder to conduct the simultaneous disposal of multiple items of ordnance using line mains or ring mains. This qualification extends only to those specific items of EO on

which the individual has been recorded as trained on. The holder shall only conduct tasks in all environments subject to current written authorization from a Level 3 (EOD) operator or above.

- 3) 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 demolitions up to 50 kg net explosive quantity (NEQ) on a wide range of specific types of explosive ordnance on which the individual has been trained. A Level 3 (EOD) operator may authorize in writing a Level 2 (EOD) operator to conduct tasks in a range of environments and to make decisions on safe movement of EO.
- 4) In addition to the skills of a Level 1, 2 and 3 (EOD) qualification, which cover the skills that are routinely required in mine action, there may be a requirement for additional specialist skills. The Level 3+ (EOD) qualification is for specialist individual EOD operators who have been trained in areas that are needed to address specific hazards. Level 3+ competency modules are included in T&EP 09.30/01/2014 and comprise of the following:
 - a) advanced explosive theory;
 - b) aerial bombs EOD;
 - c) armoured fighting vehicle (AFV) clearance;
 - d) basic chemical EOD;
 - e) bulk demolitions;
 - f) guided weapons.

The Level 3+ (EOD) qualification shall clearly indicate the specialist training received by each individual, whether within core or specialist competencies.

Whenever there is a requirement for specialist skills not covered in the Level 3 qualification, it is the duty of the contracting authorities to specify the additional skills required for a particular task. It is then also the responsibility of the mine action organizations concerned to demonstrate that their Level 3+ operators have the higher-level training and experience appropriate for the task.

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.

Demining organizations who wish to authorize Level 3 EOD staff to conduct demolitions greater than 50 kg NEQ shall certify in writing that the individuals selected to undertake the task have demonstrated the necessary competence to do so. This includes single-item, multi-item and bulk demolitions. The authorization shall include the categories and sub-categories of EO to be destroyed, and the permitted environments (controlled/not controlled) where EO can be destroyed. It shall also be limited to a clear time frame. The authorization shall be signed and dated by a named individual with a higher EOD qualification than the individual subject to the authorization.

4.3 Certification

At every level of EOD competency, the training organization or authority that certifies an individual should, within the certification, explicitly list the disciplines on which the individual has been trained. At the most basic level, this may include the specific munitions on which the individual has been trained to destroy or neutralize. For more advanced levels, it should cover the generic competency subjects covered by the training.

To complement the certification, individual EOD operators shall maintain logs of their EOD tasks. A suggested EOD log format can be found at Annex C.

4.4 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 individual EOD operators. This could include written tests, practical exercises, demonstrating a task, or procedures for assessment of performance during EOD operations.

EOD competencies standard T&EP 09.30/01/2014 provides guidance on the competencies needed for EOD levels 1, 2, 3 and 3+ and is designed to enhance the process of planning and evaluating an individual EOD operators development and capacity building. Its use can also help improve the assessment of training and competency of operators involved in EOD work.

4.5 Render-safe procedures

Individual mines and ERW should be destroyed or rendered safe in situ whenever it is not safe to move them and whenever practical. However, prior to the destruction of ERW in situ, the effects of subsequent contamination and damage should be assessed in order to determine the most effective method of render-safe/destruction. The decision to move a particular type of mine or ERW should be based on an assessment by a qualified EOD operator. EO should be rendered safe as required, prior to moving to a suitable location for disposal. Any EOD activity should be closely coordinated with relevant authorities to ensure organizational and community awareness.

Demining organizations, with an integral EOD capability, shall prepare standard operating procedures (SOPs) for render-safe procedures, appropriate for the mine and ERW hazards likely to be encountered and consistent with accepted international EOD practice.

If a demining organization does not have a suitable integral EOD capability or is not able to sub-contract that capability to an accredited individual or organization, it 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.

Render-safe procedures should not usually be necessary for bulk or individual items of AXO as, by definition, they have not been primed or have failed to explode. It should be noted, however, that AXO could have been exposed to extreme temperature and climate changes for a prolonged period of time, resulting in degraded stability of the ordnance.

4.6 Destruction procedures

Demining organizations shall prepare SOPs for the effective and safe destruction of EO relevant to the operating environment. These should include single- and multi-item demolitions of mines and ERW in situ, and bulk demolitions of AXO. EOD operations should be carried out in a manner that minimizes any impact on the environment. Planning for and destruction of bulk AXO should be conducted by suitably trained individual EOD operators. Special attention shall be given to ensuring the containment of blast, ground shock 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. IMAS 09.12 provides guidance on EOD clearance of ammunition storage explosions. IMAS 10.70 provides guidelines as to the minimum environmental protection measures in demining operations.

4.7 Disposal site

A disposal site is an area authorized for the destruction of mines and ERW found during demining operations. Where both demolition grounds and burning grounds are required, they may be co-located on a disposal site. Disposal sites shall be chosen to ensure that hazards associated with destruction operations are reduced to an acceptable level, in line with the requirement to protect the environment wherever possible. NMAAs should allocate appropriate disposal sites for demining organizations, as required. They should also approve guidelines and procedures for their safe and efficient use (see IMAS 11.20).

4.8 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 organizations 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 organizations shall apply the general principles given in IMAS 10.50. Consideration should be given to providing suitable hazard classification to recovered home-made explosives (HME) in order to comply with the principles of safe movement, handling and storage.

5 Responsibilities

5.1 National mine action authority (NMAA)

The NMAA should:

- establish and maintain national standards for EOD;
- establish and maintain performance criteria and tools for the quality and audit of the demining organizations conducting EOD operations;
- establish and maintain the capability to accredit EOD training organizations and monitor the training and certification process;
- establish and maintain the capability to accredit demining organizations involved in EOD operations;
- where possible, allocate appropriate disposal sites for demining organizations, as required, and approve guidelines and procedures for their safe and efficient use;
- establish and maintain the capability to monitor the effectiveness, safety and measures to protect the environment of demining organizations involved in EOD operations;
- establish national systems for EOD incident reporting; and
- 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 operations.

5.2 Demining organizations

Demining organizations shall:

- gain from the NMAA, or organization acting in its place or on its behalf, accreditation for EOD operations;
- establish and maintain SOPs for EOD operations which comply with national or IMAS standards, and other relevant standards and regulations, that reflect local conditions and circumstances;
- ensure that their individual EOD operators are competent, suitably trained and qualified by certifying in writing the IMAS EOD level of all their operators;
- instruct individual EOD operators to maintain logs of their operational experience and shall verify such logs in writing;
- apply SOPs for EOD operations in a consistent, effective and safe manner which include procedures to protect the environment; and
- ensure that the affected community is fully aware of all EOD activities (including training) and clearance regulations and implications, particularly related to the depth of clearance.

5.3 EOD training organizations

EOD training organizations shall:

- gain from the NMAA, or organization acting in its place or on its behalf, accreditation for EOD training;
- establish and maintain SOPs for EOD training which comply with national or IMAS standards, and other relevant standards and regulations, that reflect local conditions and circumstances; and
- establish and maintain certification procedures so that training completion certificates explicitly list the disciplines on which the individual has been trained and has qualified as competent.

Annex A (normative) Normative references

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this 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.

- IMAS 04.10, *Glossary of mine action terms, definitions and abbreviations*
- IMAS 07.13, *Environmental management in mine action*
- IMAS 09.10, *Clearance requirements*
- IMAS 09.11, *Battle area clearance (BAC)*
- IMAS 09.12, *EOD clearance of ammunition storage area explosions*
- IMAS 10.20, *Demining worksite safety*
- IMAS 10.50, *Storage, transportation and handling of explosives*
- IMAS 11.20, *Principles and procedures for open burning and open detonation operations*
- T&EP 09.30/01/2014, *EOD competency standards*

Annex B

(informative)

Informative references

The latest version/edition of these references should be used. GICHD holds 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 accessed on the IMAS website (<http://www.mineactionstandards.org/>). NMAA, employers and other interested bodies and organizations should obtain copies before commencing mine action programmes.

- TNMA 09.30/01, *EOD clearance of armoured fighting vehicles*
- TNMA 09.30/02, *Clearance of depleted uranium hazards*
- TNMA 09.30/03, *Guidance on liquid propellant fuelled systems*
- TNMA 09.30/04, *Fuel air explosive (FAE) systems*
- TNMA 09.30/05, *YM-1(B) anti-personnel mine – Technical description*
- TNMA 09.30/06, *Clearance of cluster munitions based on experience in Lebanon*
- TNMA 10.20/01, *Estimation of explosion danger areas*
- TNMA 10.20-02/09, *Field risk assessment (FRA)*

Annex C (informative)

EOD task log format

Table B.1 gives an indicative format for an individual EOD operator log. The format is not exhaustive. Individuals may record extra information as they wish or as required by their organizations.

Serial	Date and time of group task start	Date and time of group task finish	Task leader (name)	Task ID code (if applicable)	Demining organization	Location (grid reference)	Task description	Explosive ordnance destroyed/subject to an RSP	Remarks	Name of EOD operator verifying task	Signature of EOD operator verifying task
1											
2											
3											
4											
5											

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 are given a number. The date and general details of the amendment shown in the table below. The amendment is also shown on the cover page of the IMAS by the inclusion under the edition date of the phrase “*incorporating amendment #.*”

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

The most recently amended IMAS are posted on the IMAS website at www.mineactionstandards.org.

Number	Date	Amendment details
1	01 Mar 2010	<ul style="list-style-type: none"> – UNMAS address updated. – NMAA definition updated. – Inclusion of normative reference UNDP/SEESAC RMDS/G 05.55 – Removal of Annex B and its reference in Clause 3.
2	12 Oct 2010	<ul style="list-style-type: none"> – Inclusion of subclause 4.6 Disposal site. – Inclusion of a list item d) in 5.1. – Inclusion of normative reference IMAS 11.20.
3	01 Aug 2012	<ul style="list-style-type: none"> – Replacement of UNDP/SEESAC RMDS.G 05.55 with IATG 11.30 ASA Explosions – EOD Clearance in 4.5. – Replacement of UNDP/SEESAC RMDS.G 05.55 with IATG 11.30 ASA Explosions – EOD Clearance in Annex A. – Reviewed for impact of IATG development. – Minor typographical amendments.
4	01 Jun 2013	<ul style="list-style-type: none"> – Reviewed for impact of amended land release IMAS 2013. – Amendment number included in the title and header.
5	30 October 2014	<ul style="list-style-type: none"> – Minor amendment to the Introduction”. – Amendments to the Scope. – Amendment to Clause 2: replacing CWA with T&EP. – Amendments to 4.2 d) to reflect EOD qualification level 3+. – Inclusion of new subclause 4.3 Certification. – Inclusion of a new subclause 5.3 Responsibility of EOD training organizations. – Inclusion of requirement for protection of environment in 4.6, 5.1 and 5.2. – Update of Annex A: CWA replaced by T&EP and IATG 11.30 replaced by IMAS 09.12.
6	23 September 2022	<ul style="list-style-type: none"> – Amendment to the Introduction. – Amendment to the Scope. – Amendments to 4.2 d) to reflect re-defined EOD levels, and revised EOD qualification level 3+ modules.

		<ul style="list-style-type: none">- Amendment to 4.2 d) to reflect flexibility for individual demining organizations to authorize in writing Level 3 EOD staff to conduct demolitions above 50 kg at their discretion.- Amendment to 4.5 to reflect February 2019 changes to IMAS 04.10 concerning use of “render safe” rather than “neutralize”.- Minor amendment to subclause 5.3 to reflect the requirement for demining organizations to certify EOD levels in writing of operational staff.- Addition of the words “and chemical weapons” to the Scope.- Addition of the word “shall” to level 1 and 2 definitions in 4.2.- Amendments to subclause 4.2: individuals shall maintain EOD log.- Addition of new Annex B suggested EOD log format.
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