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National planning guidelines for stockpile destruction

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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 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 general principles and guidelines for the technical aspects of the stockpile destruction of Anti-Personnel Mines (APM) are covered in IMAS 11.10, which also includes an overview of the use of industrial demilitarization technology. Technical standards and guidelines for the use of Open Burning and Open Detonation (OBOD) as a destruction technique are covered in IMAS 11.20. This standard specifically focuses on the development of national policy and the management of explosive ordnance (EO) stockpile destruction by national authorities and destruction organisations.

EO stockpile destruction can be carried out by different types of organisations, such as commercial companies, national mine action teams or military units. Despite differences in approach, common core activities exist, which carry common responsibilities and it is these that are explored in this standard.

Stockpile destruction is the process of final conversion of munitions and explosive ordnance into an inert state whereby they can no longer function as designed¹. The effective management of stockpile destruction planning and operational activities aims to physically destroy EO in a safe, cost effective and efficient manner. This is achieved by developing and applying appropriate management processes, by establishing and continuously improving the skills of managers and workers, by obtaining accurate and timely technical information on the technical specifications and physical condition of the EO, by applying safe and effective operational procedures, and by using appropriate and efficient equipment. However, management is not just about planning and supervising current tasks; it is also about reviewing current practices and procedures to improve safety, effectiveness and efficiency.

The process and procedures that aim to achieve this continuous improvement to an organisation's management system and operational practices are commonly referred to as Quality Management (QM). One method of demonstrating QM for an organisation is to become ISO 9000 compliant. There is a great deal of general information and training material available for national authorities and destruction organisations who may choose to adopt the ISO 9000 approach. This approach is covered in detail in IMAS 07.10 - Guide for the management of demining operations, but it has also been adapted for stockpile destruction and included in this IMAS.

Note: The requirements of the ISO 9000 family of standards changed on 15 December 2000. The new system replaces the ISO 9001:1994, ISO 9002:1994 and ISO 9003:1994 standards with a single quality management system (QMS), ISO 9001:2000. It is this new standard that is referred to in this IMAS.

This standard aims to explain systems and procedures that can be used at the national level to plan the destruction of EO stockpiles, including APM that need to be destroyed/demilitarised.

1. Definition: NATO Maintenance and Supply Agency (NAMSA), *P Courtney-Green*, May 2000.

National planning guidelines for stockpile destruction

1. Scope

This Guide establishes principles and provides guidance for the effective national planning and management of stockpile destruction operations of explosive ordnance (EO) including Anti-Personnel Mines (APM). It does not cover planning and management of the destruction of nuclear, biological or chemical weapons.

2. References

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

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.

The term 'national authority' 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.

Note: The planning and management of stockpile destruction will generally be undertaken by the Ministry of Defence, in liaison with the Ministry of Foreign Affairs.

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

The term 'stockpile destruction' refers to physical destructive procedure towards a continual reduction of the stockpile of explosive ordnance. This will include APM and cluster munitions as well as small arms ammunition etc.

4. Stockpile destruction process

4.1. Management process

The stockpile destruction management process is shown in outline in Annex B. In practice, the process may not be linear and the activities may not always be consecutive. Nevertheless the process indicates the general sequence and logical progression from defining the problem to the final destruction of the surplus stockpiled explosive ordnance (EO). The four stages of the management process (planning, preparation, destruction and verification activities) are addressed below.

4.2. Planning

Planning is the collection, assessment and processing of information, selection of an appropriate way to proceed, and subsequent formulation of the detailed method by which a task is to be carried out.

Planning for stockpile destruction requires accurate and timely information on the quantity, storage location, type and technical design of the EO, together with knowledge of the available destruction technology. Finance will obviously have an influence, but until the destruction of the stockpile has been planned it is difficult to calculate the real costs. Indeed, once the real costs have been identified, it may be necessary to re-plan the destruction operation in an attempt to find a more cost-effective route.

Stockpile destruction operations shall be planned in a manner that minimises the impact to the environment. If necessary, the NMAA may conduct an Environmental Impact Assessment, See IMAS 10.70 for the protection of the environment.

For new stockpile destruction programmes, the planning process should ideally start with a formal assessment of the country situation. This assessment will draw heavily on existing information provided by the military, research agencies and, if applicable, commercial companies. Technical expertise is essential during the planning process, and countries can request the support of UNMAS to assist in the planning process.

4.3. Preparation

Preparation includes all enabling activities that help clarify the destruction requirement, and develop the capacity of a national authority and destruction organisation to carry out a destruction task. All aspects of the demilitarization cycle at Annex C should be considered.

4.3.1. Ammunition account

The accuracy of the national ammunition account is very important to ensure that future monitoring and verification activities do not identify accounting errors once the stockpile destruction process has started. It is therefore highly recommended that a national authority should conduct a 100% stock check of the EO stockpile to be destroyed prior to the commencement of the destruction process and monitoring and verification activities. Any accounting errors can be rectified at this point, which further contribute to security and confidence building measures. There should be no 'surprises' once the destruction, monitoring and verification processes commence.

There are a variety of personal computer (PC) based ammunition accounting systems available. The national authority should consider loading the EO stockpile details on to such a system; this will enhance accuracy and improve operational efficiency during the demilitarization cycle.

4.3.2. Storage location

The national ammunition account will provide information on the initial storage locations of the stockpiled EO. An assessment should then be made as to the storage capacity and conditions at the final point of disposal. This assessment will then determine how much EO can be safely stored during the destruction process.

4.3.3. Security of storage

The physical security of the EO stockpile at the final point of destruction shall also be assessed, and the national authority shall ensure that adequate physical security standards are in place. Although the EO will be in the physical possession of the destruction organisation at this phase of the operation, the ultimate responsibility for ensuring stockpile security shall remain with the national authority.

4.3.4. Transport of EO for destruction

Once the storage capacity of the final destruction location and the production levels have been estimated, the transport element of the logistics plan can be formulated.

The physical condition of the EO will determine whether they are 'Safe to Move' or not and qualified ammunition technical personnel should make a formal 'Safe to Move' assessment as part of the transport process. Once this technical assessment has been made, the EO can then be physically moved to the destruction location.

4.3.5. Selection of destruction technology

Technical guidance for the selection of the appropriate destruction technology for APM is contained in IMAS 11.10 Guide for the destruction of stockpiled APM

The physical destruction/demilitarisation techniques available for the destruction/demilitarisation of EO range from the relatively simple OBOD techniques to highly sophisticated industrial processes. IMAS 11.10 seeks to inform national authorities only of the technical and logistic issues involved in APM stockpile destruction. However, there are so many inter-relational factors involved in APM stockpile destruction that it is not possible to provide 'template solutions'.

The selection of the most suitable technique or technology by a national authority will depend primarily on the resources available, the physical condition and quantity of the stockpile to be destroyed, the national capacity and the applicable environmental and explosives legislation. The most influential factor is likely to be economies of scale, in that the more EO that is to be destroyed, the larger the economies of scale and therefore the wider range of available technology. Consequently, national authorities may wish to consider EO destruction on a regional basis in order to achieve the large economies of scale required for an industrial process.

4.3.6. Development of destruction technology

National authorities should be aware that the development of even relatively simple destruction systems can be a time consuming process. Safety must be paramount, therefore there is little opportunity to 'fast track' many of the necessary processes.

The development of OBOD processes will take weeks to months, whilst the development of industrial demilitarization processes can take months to years. This time requirement needs to be incorporated into the planning and preparation processes to ensure that, in the case of APM, the political requirements of the Mine Ban Treaty (MBT) can be met.

4.3.7. Funding (mobilisation of resources)

Funding comes from many sources. Funding may be provided by the government of the country, from donor governments, the United Nations or other international organisations, or in some cases from benefactors and philanthropists. Funds may be held in trust funds or some other form of controlled accounts. Regardless of the source of funding it is important that the funds match the true cost of stockpile destruction and that a long term commitment is provided by the donor. This is particularly important for major projects that require the destruction organisation to make major investments in staff, infrastructure and expensive new equipment such as furnaces and pollution control systems.

An example of a possible simple financial model for the stockpile destruction process is at Annex D.

4.3.8. Contract preparation

The definition of the work to be undertaken should ideally be in the form of a contract, tasking order or other such formal agreement. The preparation of a contract or tasking order enables the national authority, together with the donor agency (if applicable), to specify the destruction requirement in detail. The contract should give details of the risk and QM processes to be adopted during the destruction work. It also should outline the reporting requirements, and the progress and financial milestones to be achieved.

Although the guidance given in IMAS 07.20 is for demining contracts, these principles and procedures are equally applicable for destruction contracts².

4.3.9. Training

Destruction programmes require well-qualified managers and well-trained workers. Although some centralised training for senior national managers and technical advisors may be appropriate, the majority of training should be conducted in country, not only for cultural and linguistic reasons, but also for access to details of the stockpile itself

Guidance on the management of training is given in the IMAS 06.10.

4.3.10. Information

The effective management of destruction programmes requires accurate, appropriate and timely information. There are many sources of information – at local, national and international level that have an application to the needs of programme planners, managers and the donor community – but access to such information is often restricted and the accuracy of critical data often cannot be confirmed.

National authorities and destruction organisations should establish and maintain effective management information systems. These are vitally important in the areas of accounting, monitoring and verification.

The UN stockpile destruction website, <http://www.stockpiles.org/>, is a source of useful information on many aspects of stockpile destruction. It includes a summary of available technology and case studies that should be consulted during the planning process.

4.3.11. Equipment and tools

Destruction programmes for small size and small scale EO have, until recently, traditionally relied on OBOD techniques using manual practices, procedures and drills. In many situations, OBOD may be the most efficient and cost effective means of destruction.

However, in some programmes economies of scale, or the technical problems posed by the destruction of certain EO types, may enable destruction to be conducted more safely, effectively and efficiently by industrial processes.

Destruction technologies can be grouped in three general categories according to their technical maturity and availability: equipment that has been fully developed, tested and evaluated (T&E), and can be introduced into destruction programmes without any major modification or changes (for example, rotary kiln furnaces); those technologies that have been proved to work but require further development and formal T&E, (for example, cryofracture); and those technologies that may have an application to destruction, but have yet to mature and have not yet been formally demonstrated, (for example, Silver II). A summary of available technologies for APM is in IMAS 11.10 - Guidelines for the destruction of stockpiled APM. Some of these may be suitable for the destruction of other EO.

Destruction organisations should focus their equipment procurement on the first category, but whenever possible should assist in the development and fielding of those technologies in the second category. Some new technologies have the potential to generate major improvements in safety and cost-effectiveness; donors should provide assistance and encouragement to those destruction organisations fielding new technologies, and their T&E.

2. Further advice on destruction contracts could be obtained from the NATO Maintenance and Supply Agency (NAMSA), who are experienced in formulating demilitarization contracts on behalf of NATO members.

4.3.12. Accreditation

Organisational accreditation is the procedure by which a destruction organisation earns formal recognition as being competent and able to plan and manage effectively and efficiently. Operational accreditation is the procedure by which a destruction organisation earns formal recognition as being competent and able to carry out destruction activities. Accreditation will be awarded to the headquarters of an organisation (the in-country office) for a finite duration, normally for a period of two to three years. Operational accreditation applies to the capabilities needed to carry out a particular destruction activity such as OBOD operations or use of rotary kiln furnaces.

Guidance for the accreditation of demining organisations is given in IMAS 07.30, but this applies equally to the accreditation of destruction organisations.

4.4. Destruction

Destruction is the process of final conversion of munitions and explosives into an inert state whereby they can no longer function as designed.

4.4.1. Safety and Occupational Health (S&OH)

Managers of destruction programmes are required to achieve a safe working environment by providing effective management and supervision, by developing work practices that contribute to risk reduction, by selecting equipment with inherently safe design, by providing appropriate training, and by making available effective Personal Protective Equipment (PPE). Given the wide range of possible technical solutions, it is not possible to provide a precise and complete set of specifications that apply to all situations. Thus destruction organisations should develop and maintain management procedures and processes that will enable S&OH risks to be identified, evaluated and reduced in a systematic and timely manner for each destruction task and for each destruction worksite.

Stockpile destruction operations shall be planned, conducted and monitored to ensure minimum impact to the environment. If necessary, the NMAA may conduct an Environmental Impact Assessment, See IMAS 10.70 for the protection of the environment.

Guidance for the development and implementation of S&OH management systems is given in IMAS 10.10. Guidance on the storage, transportation and handling of explosives is given in IMAS 10.50, and guidance on the reporting and investigation of incidents is given in IMAS 10.60.

4.4.2. Explosive safety procedures

The need for effective and safe operational procedures is essential. Standard Operating Procedures (SOPs) should be prepared for all operational procedures, practices and drills. SOPs are instructions that define the preferred method of conducting an operational task or activity. Their purpose is to establish recognisable and measurable degrees of uniformity, consistency and commonality within an organisation, with the aim of improving operational effectiveness and safety. SOPs should reflect local requirements and circumstances.

4.4.3. Quality Assurance (QA)

Destruction involves the establishment and monitoring of management processes and operational procedures before and during the destruction process. Internal QA will be conducted by destruction organisations themselves, but external inspections by an external monitoring body should also be conducted.

The purpose of QA is to confirm that management practices and operational procedures for destruction are appropriate, and will achieve the stated requirement in a safe, effective and efficient manner. Monitoring should involve structured discussions with management and employees, and formal inspections of SOPs, reports and records.

The national authority may appoint an agent to carry out the monitoring and inspections of the destruction organisation and its sub-units under its authority and responsibility, exercised under conditions agreed in the contract or formal agreement. Any agent so appointed by the national authority will be required to have all the facilities, qualified staff, management systems and SOPs necessary for adequate monitoring.

More detailed guidance on QM is included in clause 5 of this IMAS, whilst IMAS 07.42 establishes principles and guidelines for the monitoring of stockpile destruction programmes.

4.5. Verification

4.5.1. Verification systems

The national authority and destruction organisation shall design and implement a verification system as a security and confidence building measure. One possible procedure follows:

- a) an interested international organisation, the national authority or donor should supply numbered, tamperproof seals;
- b) an independent 100% stock check should be conducted on the EO once they have been moved to the destruction facility. This should be monitored by independent observers;
- c) a computer based ammunition accounting system should be supplied to the destruction facility as part of the contract. The software should be tamperproof and record every transaction and amendment. (The software should contain all of the security features of the UK ACAS 2 system, which could be easily amended for this task);
- d) on completion of the initial stock check the building should be sealed by the independent observer team; and
- e) there should then be a controlled release of stocks to the destruction organisation for destruction. The destruction organisation will 'bid' to the international monitoring team for the release of operating stocks for destruction. An accredited member of the independent monitoring team, or their representative, will then travel to the destruction facility to break the seals and release the agreed stocks of EO. The building will then be resealed. At this point the destruction organisation will also be allowed to conduct a safety inspection of the building and the remaining stocks. Rules should be agreed for the breaking of seals by the destruction organisation in exceptional circumstances, (for example a fire in the storage building).

4.5.2. Media operations

Transparency of the destruction process is frequently an important pre-requisite as a security and confidence building measure. The role of the media in obtaining national and international visibility of the destruction of EO and especially a national stockpile of APM should not be underestimated. The national authority, in conjunction with the destruction organisation, should develop a media plan during the planning phase of the operation. This plan should include, as applicable:

- a) press releases;
- b) access to the destruction site by journalists and film crews at short notice;
- c) video and photographic record of destruction; and
- d) access to the ammunition accounting system.

4.5.3. Post Project Review (PPR)

Wherever possible, destruction organisations should conduct a formal PPR to identify lessons-learned during the planning, preparation and destruction phases of the operation. The PPR should include a report on the suitability of the equipment, procedures, training and support. Issues of concern should be identified and prioritised, and solutions proposed. The requirement for PPRs should be included in destruction contracts by donors and national authorities. PPRs should be distributed to the United Nations (UNMAS, UNDP and UNOPS), to donors or sponsors and a copy should be placed on the UN stockpile destruction website. Where PPRs highlight shortcomings in established equipment or procedures, particularly issues involving safety, they should be more widely distributed.

5. Quality Management (QM)

The effective management of destruction operations aims to destroy EO stockpiles in a safe and efficient manner. This is achieved by developing and applying appropriate management processes, by establishing and continuously improving the skills of managers and workers, by obtaining accurate and timely information on the stockpile, by applying safe and effective operational procedures, and by using appropriate and efficient equipment. But management is not just about planning and supervising current tasks. It is about reviewing current practices and procedures to improve safety, effectiveness and efficiency.

The process and procedures that aim to achieve this continuous improvement to an organisation's management system and operational practices is commonly referred to as QM. One method of demonstrating QM for an organisation is to become ISO 9001:2000 compliant. There is much general information and training materials available for destruction organisations who choose to adopt the ISO 9001:2008 approach.

A summary of the ISO 9001:2008 approach is given in Annex E. In essence, ISO 9001:2008 is a series of international standards for quality systems. They specify requirements and recommendations for the development of a management system, the purpose of which is to ensure that the 'products' or 'services' delivered meet the agreed needs. In the case of destruction, the product is the safe and efficient destruction of the EO stockpiles.

Managers of destruction organisations are encouraged to examine how to apply the principles of QM to stockpile destruction. In doing so they should take particular note of two issues. First, how a special processes should be planned, implemented, monitored and reviewed. Second, they should note the responsibilities of all managers and workers to identify and take advantage of opportunities for improvement to the process.

6. Responsibilities

6.1. United Nations

The United Nations has a general responsibility for ensuring the establishment of a regime conducive to the effective management of all aspects of mine action programmes, including the stockpile destruction of EO.. To achieve this, the United Nations will continuously refine IMAS to reflect developing mine action norms and practices, and will incorporate changes to international regulations and requirements such as those produced by the International Organisation for Standardisation (ISO) and the International Labour Organisation (ILO). UNMAS is the office within the United Nations Secretariat responsible to the international community for the development and maintenance of IMAS, including this Guide.

The United Nations applies IMAS to its humanitarian demining contracts unless the local situation precludes their effective use. In such circumstances, when one or more IMAS is not appropriate, the UN provides alternative, specifications, requirements and guidance. In the event that the UN is directly involved in stockpile destruction, guidance will be provided after discussion with the national authority and the destruction organisation.

6.2. National authority

The national authority, or the organisation acting on its behalf, is responsible for ensuring the national and local conditions that enable the effective management of destruction projects. The national authority is ultimately responsible for all phases of a destruction project within its national boundaries, including defining the explosive safety requirements, the accreditation of destruction organisations, the monitoring of destruction organisations during destruction operations, and final verification that the EO stockpile has been safely destroyed. In the case of APM and Cluster Munitions, States Parties to both conventions are also responsible for reporting progress to the UN in their Article 7 reports respectively.

The national authority is responsible for establishing and maintaining national regulations and procedures for the management of destruction operations. These procedures should be consistent with IMAS, other relevant national and international standards, regulations and requirements.

6.3. Donors

Donor agencies are part of the management process, and as such are responsible for ensuring that the projects they are funding are managed effectively, and in accordance with international standards. This involves strict attention to the writing of contract documents, and ensuring that destruction organisations chosen to carry out such contracts meet the accreditation criteria. Donors, or their agents, are also partly responsible for ensuring that the standards and guidelines for quality management are applied, including monitoring and verification of the stockpile destruction process. This responsibility and accountability is even greater when the national authority is in the process of formation, and has not had the opportunity to gain experience.

6.4. Destruction organisation

Ultimately, it is the destruction organisation, of whatever type, which is required to establish an appropriate and effective management system, demonstrate it to the national authority, and apply it throughout the destruction project.

Where the national authority is in the process of formation, the destruction organisation is also responsible for assisting the formation process, by giving advice and assistance including the framing of national standards. However, it would be unusual for stockpile destruction operations to commence prior to the formation of a national authority.

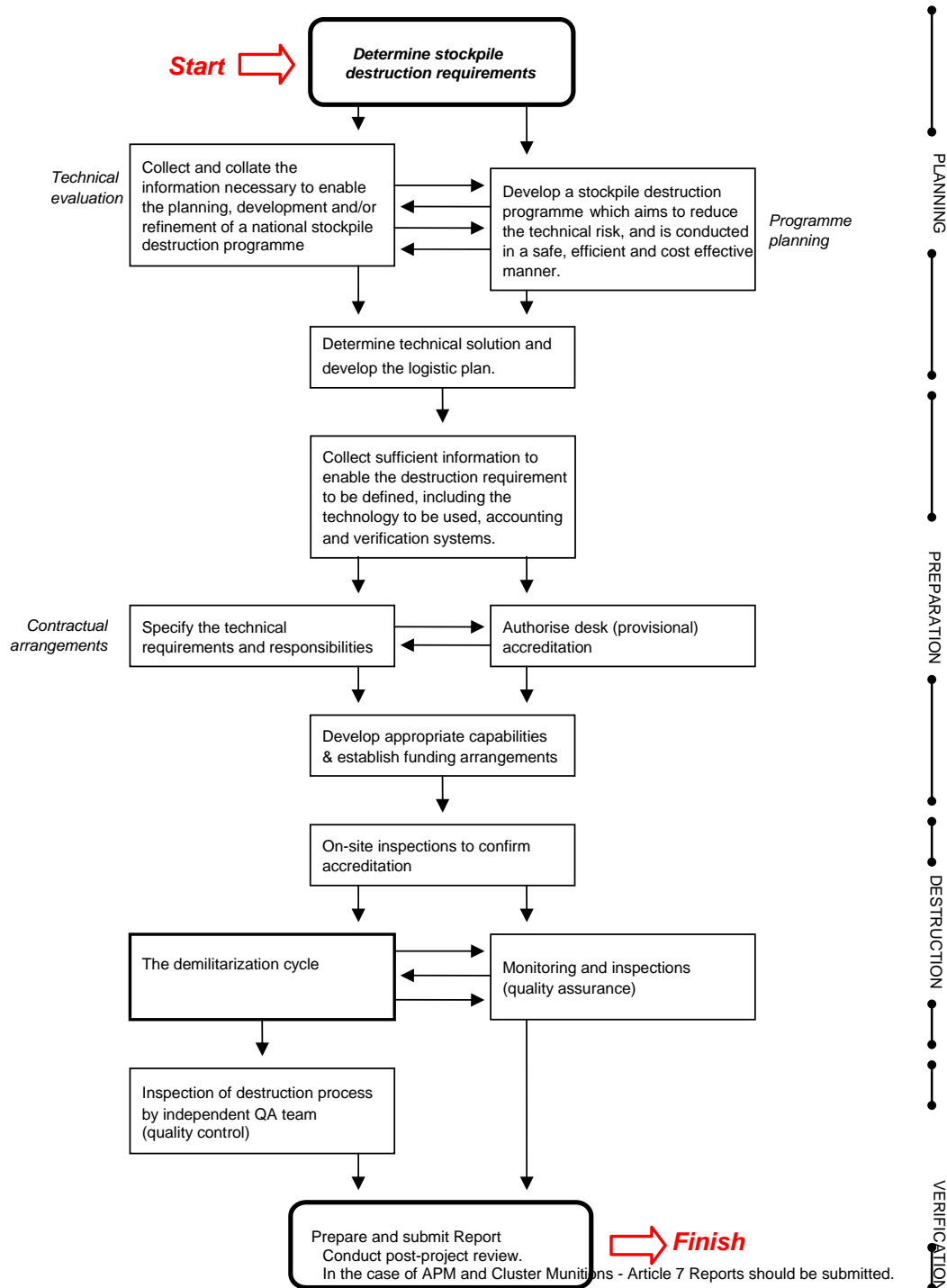
Annex A (Normative) References

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:

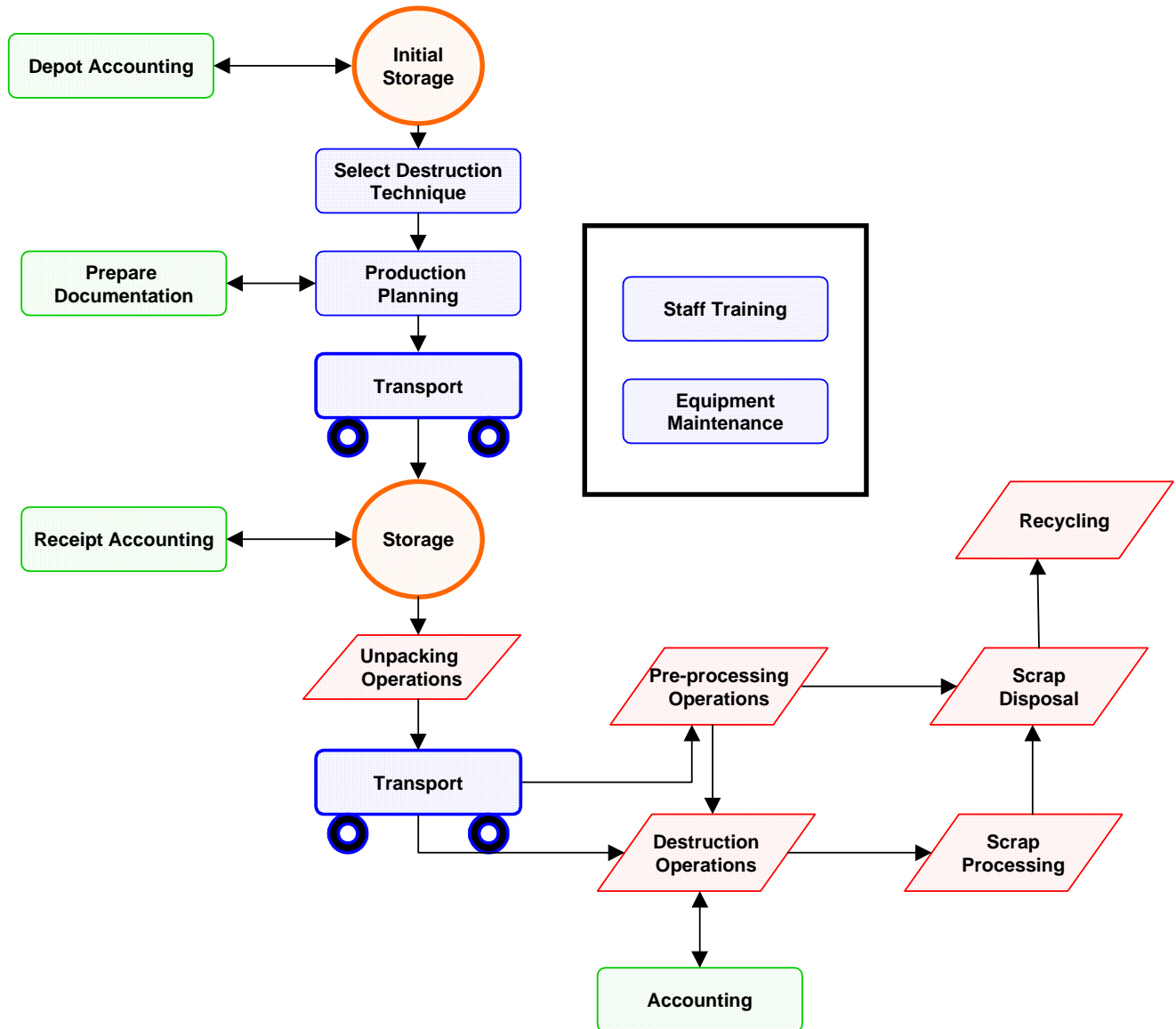
- a) IMAS 04.10 Glossary of mine action terms, definitions and abbreviations;
- b) IMAS 06.10 Management of training;
- c) IMAS 07.10 Guide to the management of demining operations;
- d) IMAS 07.20 Guide for the drafting of mine action contracts;
- e) IMAS 07.30 Accreditation of demining organisations and operations;
- f) IMAS 07.42 Monitoring of stockpile destruction programmes;
- g) IMAS 10.10 S&OH - General requirements;
- h) IMAS 10.50 S&OH - Storage, transportation and handling of explosives;
- i) IMAS 10.60 S&OH - Reporting and investigation of demining incidents;
- j) IMAS 10.70 S&OH Protection of the environment;
- k) IMAS 11.10 Guide for the destruction of stockpiled APM; and
- l) IMAS 11.20 Principles and procedures for OBOD operations.

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: (See www.mineactionstandards.org). NMAA, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.

Annex B (Informative) Destruction process



Annex C (Informative) The demilitarization cycle



Annex D (Informative) Example financial model

E.1. Introduction

This Annex shows a simple example financial model³ that can be used for planning and bid submission purposes. Obviously, for complex destruction operations, qualified accountancy advice should be sought.

It is emphasised that the below figures are only used to illustrate the design of the model; they do NOT reflect the costs of destruction for any known explosive ordnance destruction programme in any particular country.

SER	ITEM	NUMBER OF PERSONNEL	HOURS	COST PER HOUR (US \$)	QUANTITY	COST PER ITEM (US \$)	TOTAL COST (US \$)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
PLANNING PHASE							
1	Personnel						
1a	Director	1	20	\$10.00			\$200.00
1b	Manager	2	40	\$8.00			\$640.00
1c	Supervisor	4	80	\$6.00			\$1,920.00
1d	Foreman/ Forewoman	6	80	\$5.00			\$2,400.00
1e	Labourer / Driver	40	80	\$4.00			\$12,800.00
2	Communications						
2a	Telephone				1	\$100.00	\$100.00
2b	Fax				1	\$200.00	\$200.00
2c	Internet				1	\$200.00	\$200.00
3	Equipment						
3a	Computer				1	\$1,000.00	\$1,000.00
3b	Photocopier				1	\$4,000.00	\$4,000.00
4	Consumables						
4a	Stationary				1	\$200.00	\$200.00
4b	Postage				1	\$50.00	\$50.00
4c	Printing				1	\$1,000.00	\$1,000.00
4d	Statutory Publications				1	\$20.00	\$20.00
5	Professional Fees						
5a	Legal				1	\$5,000.00	\$5,000.00
5b	Accountancy				1	\$5,000.00	\$5,000.00
5c	Consultancy (HASW)	2	50	\$40.00			\$4,000.00
6	SUB TOTAL						\$38,930.00
PREPARATION PHASE							
7	Personnel						
7a	Director	1	20	\$10.00			\$200.00
7b	Manager	2	40	\$8.00			\$640.00
7c	Supervisor	4	80	\$6.00			\$1,920.00
7d	Foreman/Forewoman	1	80	\$5.00			\$400.00
7e	Labourer / Driver	1	80	\$4.00			\$320.00
8	Equipment (EXAMPLE ONLY)						
8a	Design and Procurement				1	\$200.00	\$200.00
8b	Installation Costs				1	\$10,000.00	\$10,000.00
8c	Disassembly Equipment				1	\$5,000.00	\$5,000.00
8d	Band Saw				1	\$30,000.00	\$30,000.00
8e	Fork Lift Truck				1	\$5,000.00	\$5,000.00
8f	Hand Pallet Transporters				4	\$500.00	\$2,000.00
8g	Hand Tools				10	\$25.00	\$250.00
8h	Vehicles				2	\$15,000.00	\$30,000.00
8i	Rotary Kiln Furnace				1	\$200,000.00	\$200,000.00

3. The model is available from the GICHD in Microsoft EXCEL format.

SER	ITEM	NUMBER OF PERSONNEL	HOURS	COST PER HOUR (US \$)	QUANTITY	COST PER ITEM (US \$)	TOTAL COST (US \$)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
9j	Pollution Control Systems				1	\$200,000.00	\$200,000.00
8k	First Aid Equipment				10	\$50.00	\$500.00
8l	Fire Fighting Equipment				20	\$40.00	\$800.00
9	Infrastructure Refurbishment (EXAMPLE ONLY)						
9a	Painting				1	\$5,000.00	\$5,000.00
9b	Windows, Doors and Locks				1	\$10,000.00	\$10,000.00
9c	Fencing				1	\$5,000.00	\$5,000.00
9d	Lightening Protection				2	\$1,000.00	\$2,000.00
9e	Floor				1	\$4,000.00	\$4,000.00
9f	Walls				1	\$2,000.00	\$2,000.00
9g	Plumbing and Sanitation				1	\$2,000.00	\$2,000.00
9h	Signs					\$25.00	\$50.00
10	SUB TOTAL						\$517,280.00
DESTRUCTION PHASE							
11	Personnel						
11a	Director	1	100	\$10.00			\$1,000.00
11b	Manager	2	500	\$8.00			\$8,000.00
11c	Supervisor	4	500	\$6.00			\$12,000.00
11d	Foreman/Forewoman	6	500	\$5.00			\$15,000.00
11e	Labourer / Driver	20	500	\$4.00			\$40,000.00
12	Transport						
12a	Fuel (per 100 km)				10	\$3.00	\$30.00
12b	Maintenance				1	\$20,000.00	\$20,000.00
12c	Capital depreciation				1	\$60,000.00	\$60,000.00
13	Equipment						
13a	Repair and maintenance				1	\$20,000.00	\$20,000.00
14	Operating Costs						
14a	Electricity				1400	\$1.00	\$1,400.00
14b	Oil				1600	\$2.00	\$3,200.00
14c	Water				1200	\$0.50	\$600.00
14d	Gas				500	\$1.00	\$500.00
15	Consumables (OBOD)						
15a	Donor Explosive						\$0.00
15b	Electric Detonators						\$0.00
15c	Detonating Cord						\$0.00
15d	Firing Cables						\$0.00
16	SUB TOTAL						\$181,730.00
MONITORING AND VERIFICATION							
17	Personnel						
17a	Director	1	20	\$10.00			\$200.00
17b	Manager	1	20	\$8.00			\$160.00
17c	Supervisor	1	20	\$6.00			\$120.00
17d	Foreman/Forewoman	1	20	\$5.00			\$100.00
17e	Labourer / Driver	2	20	\$4.00			\$160.00
18	Consumables						
18a	Tamperproof Seals				200	\$1.00	\$200.00
19	Equipment						
19a	Computer and Software				1	\$5,000.00	\$5,000.00
20	SUB TOTAL						\$5,940.00
COST RECOVERY							
21	Ferrous Scrap (per tonne)				1	\$35.00	(\$35.00)
22	Non Ferrous Scrap (per tonne)				0.2	\$400.00	(\$80.00)
23	Plastic				1	\$5.00	(\$5.00)
24	SUB TOTAL						(\$120.00)
TOTALS							
25	TOTAL						\$743,760.00
26	Administration @	2.0	%				\$14,875.20

SER	ITEM	NUMBER OF PERSONNEL	HOURS	COST PER HOUR (US \$)	QUANTITY	COST PER ITEM (US \$)	TOTAL COST (US \$)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
27	Fee @	10.0	%				\$74,376.00
28	Contingency @	2.0	%				\$14,875.20
29	Tax ⁴ @	17.5	%				\$130,158.00
30	GRAND TOTAL						\$978,044.40

4. Should the costs of an explosive ordnance destruction programme be funded by international donors then it is usually a condition of such funding that the programme is exempt from tax. Tax has only been included in this model for illustrative purposes; for many APM destruction programmes it will not be applicable.

Annex E (Informative) ISO 9000⁵

E.1. Introduction

A framework of international standards for humanitarian mine clearance and demining was developed and agreed at the International Conference on Mine Clearance Technology, Denmark in July 1996. Criteria were prescribed for many aspects of mine action and standards were recommended.

The conference also recommended that a coordinated approach to quality assurance and quality control be adopted; in particular, the relevance of quality management systems (including the application of ISO 9000) to mine action was to be examined. In his 1996 report to the General Assembly, the Secretary-General acknowledged the UN's responsibilities in taking this work forward. [A/51/540 dated 23 October 1996.] In the Fifty First session, the General Assembly encouraged Member States, intergovernmental organisations, NGOs and foundations to support this developing work on mine action standards and quality management. [A/RES/51/149 dated 4 February 1997.]

E.2. Aim and scope of paper

This paper examines the relevance of quality management systems (QMS) and the application of ISO 9000 to stockpile destruction, and makes recommendations.

This paper focuses on the application of QMS to stockpile destruction tasks and processes, although the recommendations are applicable to other facets of mine action.

E.3. Quality - definitions

The word *quality* has many meanings: a degree of excellence, consistency, conformance with requirement and freedom from defects, imperfections or contamination. The official ISO definition is IMAS 04.10.

The concept of *total quality management* (TQM) and the development of *quality management systems* (QMS) evolved in the 1980s, and was used by management to achieve levels of excellence in manufacturing. Those companies which embraced the philosophy to change their organisations and empower their staff achieved remarkable levels of performance and a clear competitive edge. During the 1990s this approach has been applied to the public sector and 'non-profit' organisations with similar improvements in performance.

E.4. Quality management

E.4.1. The elements of QMS

QMS comprises three components: (1) standards and common procedures that define the rules, norms and required performance of an organisation; (2) an internal management system (such as ISO 9001:2008) that encourages an organisation to achieve these standards; and (3) institutional arrangements, such as national and international professional bodies, that establish the rules, norms and required performance, and monitor the performance of its member organisations. This section of the paper will address these three components and will discuss their relevance to stockpile destruction.

5. This Annex is directly derived from a UN paper on the application of quality management systems which was prepared by UNMAS and delivered to the International Workshop on the Management of Mine Action, Ottawa, March 1998. It is also included in its original form in IMAS 07.10 - Guide to the management of demining operations.

E.4.2. ISO 9000

ISO 9000 provides a management discipline that encourages an organisation to deliver products or services to agreed requirements. These requirements may represent the specific needs and expectations of customers for a particular product, or they may be the standards of service deemed appropriate by a professional body (such as solicitors or physicians). ISO 9000 is not a product or service standard *per se*. There are no product acceptance criteria. ISO 9000 does, however, require organisations to have the management procedures, processes and practices in place that will consistently deliver products and services to the standards required.

Three levels of ISO 9000 accreditation were available in the original 1994 system: ISO 9001 was seen as the most comprehensive quality system, ISO 9002 was more appropriate for organisations delivering a product or service where no conceptual design work is required, whilst ISO 9003 provided a model quality system for use when conformance to special requirements could be assured only by final inspection and test. On 15 December 2000 these three standards were replaced by a single standard, ISO 9001:2000. ISO 9001:2008 is a revised version of ISO 9001:2000.

Organisations which seek ISO 9001:2008 accreditation are required to comply with an agreed set of criteria: the 5 major standard clause 'areas' that define the agreed criteria are listed at Appendix 1 of this paper. The interpretation of the criteria depends on the role of the organisation and whether it delivers a product or service. Many professional bodies have produced guidelines that relate to their own business sectors and professions. Currently no agreed international criteria or guidelines exist for stockpile destruction.

E.4.3. Application of ISO 9001:2008 to stockpile destruction

The 5 major standard clause 'areas' of ISO 9001:2008 need to be modified to reflect the role of organisations engaged in stockpile destruction.

The relevance of these clauses to stockpile destruction can be established by mapping them onto the IMAS standards and guides, as shown in Appendix 2 of this paper. The resulting matrix provides a deeper and more comprehensive understanding of the total quality requirements of stockpile destruction. For example, a destruction organisation seeking ISO 9001:2000 accreditation would be expected to demonstrate (as clause 8.3 in the ISO) how its internal quality assurance and quality control procedures would be used to identify critical non-conformities, an action that is currently required in many contracts.

Such an approach would provide a common framework to assess and evaluate the suitability and preparedness of contractors and sub-contractors as part of accreditation procedures. It would generate transparency and this, in turn, would improve confidence in the product.

Various international affiliations and partnerships exist; examples include the Institute of Explosives Engineers (IExpE), which has a world-wide membership, the International Federation of Explosive Engineers (IFEE) and the Institute of Munition Clearance Engineers (IMCE).

E.5. Recommendations

GA Resolution 51/540 of 23 October 1996 provided the UN with an obligation and the mandate to develop effective international mine action standards and to provide guidance on the application of quality management. In order to affect this mandate the following recommendations are proposed:

- a) organisations involved in stockpile destruction should be encouraged to develop strategies, establish management systems, and demonstrate procedures and practices that are consistent with the principles of total quality management; and

- b) there is a need to establish a set of international guidelines on the application of ISO 9000 to stockpile destruction.

Appendix 1 to Annex E (Informative) Procedures required by ISO 9001:2008

The following 5 subject areas represent the major standard 'clauses' of ISO 9001:2008. These clauses contain numerous sub-clauses, which must be satisfied in order to achieve ISO 9001:2008 accreditation. Each sub-clause has more specific requirements; in total there are 184 subjects that require evidence of some form of documentation or process - either policy or practice or both. Guidance on the relevance of each subject is provided by professional bodies and institutions. Guidance for stockpile destruction is given in Appendix 2.

4. Quality Management System

- 4.1 General requirements
- 4.2 Documentation requirements

5. Management Responsibility

- 5.1 Management commitment
- 5.2 Customer focus
- 5.3 Quality policy
- 5.4 Planning
- 5.5 Responsibility, authority and communication
- 5.6 Management review

6. Resource Output

- 6.1 Provision of resources
- 6.2 Human resources
- 6.3 Infrastructure
- 6.4 Work environment

7. Product Realization

- 7.1 Planning of product realization
- 7.2 Customer-related processes
- 7.3 Design and development
- 7.4 Purchasing
- 7.5 Production and service provision
- 7.6 Control of monitoring and measuring devices

8. Measurement, analysis and improvement

- 8.1 General
- 8.2 Monitoring and measurement
- 8.3 Control of non-conforming product
- 8.4 Analysis of data
- 8.5 Improvement

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 Dec 2004	1. Formatting changes. 2. Minor text editing changes. 3. Changes to terms, definitions and abbreviations where necessary to ensure that this IMAS is consistent with IMAS 04.10.
2	23 Jul 2005	1. Annex B, changes to the definitions of 'Explosive Ordnance Disposal (EOD)' and 'Quality Assurance (QA)' to be consistent with IMAS 04.10.
3	1 Aug 2006	1. Minor changes/additions to the first and second paragraph of the foreword. 2. Minor changes to the first paragraph of the introduction. 3. Clause 4.2.9, change to second paragraph concerning training.
4	3 Dec 2009	UNMAS address updated. Definition of NMAA updated. Minor changes throughout to ensure gender issues. Removal of the specificity towards APM and ensure more generic terms – changes to this end throughout the IMAS. Inclusion of reference to convention on cluster munitions. ISO 9001/2000 changed to ISO 9001/2008. Removal of Annex B terms and definitions and its references, Changing Annex C to B, D to C, E to D and F to E. References to Annexes updated.