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Guidelines and requirements for the management of land release and residual contamination operations

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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 requirements for the establishment of mine action programmes are covered in IMAS 02.10. This Guide focuses on the management requirements for technical operations, including the land release of Explosive Ordnance (EO), including those associated with residual risk.

Land release is the process of applying all reasonable effort to identify, define, and remove all presence and suspicion of mines/ERW through non-technical survey, technical survey and/or clearance. The criteria for “all reasonable effort” shall be defined by the national mine action authority. This is achieved by developing and applying appropriate policies and management processes, by establishing and continuously improving the skills of management and field staff, by obtaining accurate and timely information on mine and ERW hazards, by applying safe and effective operational procedures, and by using appropriate and efficient equipment.

The land release process (the requirements for which are set out in detail in IMAS 07.11, 08.10 and 08.20), as well as systems and processes developed to deal with residual contamination are essentially ones of risk management: specific risks, presented by EO of all types, are identified, assessed and treated/mitigated where it is necessary to do so. The suitability, effectiveness and efficiency of the land release process are reviewed at various stages to check that all relevant risks are being adequately managed.

All effective risk management is founded on access to appropriate information management systems to help understand the operational context and to support the assessment, mitigation and review of risks as they are managed. Risk is defined within the ISO system as ‘the effect of uncertainty’. A key part of the management of land release is to reduce uncertainty through the collection, storage, analysis and dissemination of data and information. Similarly, a key component of effectively managing residual risk is to reduce uncertainty by drawing on, analysing and utilising historical data and information in decision making.

Land release operations are carried out by many different types of organisations, such as NGOs, commercial companies, national mine action teams or military units (when carrying out humanitarian demining or ERW remediation). It may be a humanitarian emergency intervention, or it may form part of a development programme where emphasis will be given to establishing a national mine action capacity. Work may take place under a wide variety of circumstances, including ones where political, security and technical aspects are changing rapidly and often, requiring nimble, speedy and responsive decision-making and management action if operations are to remain safe, efficient and effective.

Management is not just about planning and supervising current tasks. It is about continually reviewing current practices and procedures to improve safety, effectiveness and efficiency and ensuring a constant link between land release operations and the mine affected communities.

Mine action programmes rarely have the capacity to deal with the entirety of all forms of contamination in an affected country within a short timescale. Instead authorities and managers prioritize action reflecting the scale and nature of the risks to people, assets and wider emergency, reconstruction and development programmes. Over time, most national programmes scale up as circumstances allow, and then reduce again as the range and severity of risk reduces and becomes less widespread. Managing changes in the scale, scope and nature of programmes is an important function of a mine action authority, and of the agencies and organisations working within a national programme. As time passes and once the land release process has been applied, most countries find themselves dealing with a residual contamination problem. Planning and preparing for a smooth and efficient transition to an alternative institutional architecture appropriate for the management of residual contamination, including the development of appropriate tools and systems for residual risk management, are responsibilities that need to be addressed early in the life of the mine action programme to ensure that the correct information is systematically recorded for this purpose.

Guidelines and requirements for the management of land release and residual contamination operations

1. Scope

This Guide establishes principles and provides guidance for the effective management of land release and residual contamination operations.

Although this Guide focuses on land release and residual contamination, the principles can be applied to other mine action activities including Mine Risk Education (MRE) projects and stockpile destruction.

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.

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 which 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. The demining organisation may be a prime contractor, subcontractor, consultant or agent. The term 'demining sub-unit' refers to an element of a demining organisation, however named, that is operationally accredited to conduct one or more prescribed demining activities, such as technical surveys, marking, manual clearance, Explosive Ordnance Disposal (EOD) or the use of Animal Detection System (ADS) teams.

In the context of mine action, land release 'describes the process of applying all reasonable effort¹ to identify, define, and remove all presence and suspicion of mines/ERW through non-technical survey, technical survey and/or clearance. The criteria for "all reasonable effort" shall be defined by the NMAA.' For further information refer to IMAS 07.11.

Residual risk is 'the risk remaining following the application of all reasonable effort to identify, define, and remove all presence and suspicion of mines/ERW through non-technical survey, technical survey and/or clearance.'

Residual contamination is 'that contamination that gives rise to residual risk'.

¹ See IMAS chapters 04.10, 07.11, 08.10, 08.20

The use of the term Explosive Ordnance (EO)² in the IMAS shall be interpreted as encompassing mine action's response to the following munitions:

- Mines
- Cluster Munitions
- Unexploded Ordnance
- Abandoned Ordnance
- Booby traps
- Other devices (as defined by CCW APII)
- Improvised Explosive Devices (as stipulated below)

Improvised Explosive Devices (IEDs) meeting the definition of mines, booby-traps or other devices fall under the scope of mine action, when their clearance is undertaken for humanitarian purposes and in areas where active hostilities have ceased.

ERW is Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO) (CCW protocol V).

Unexploded Ordnance (UXO) is 'Explosive Ordnance that has been primed, fuzed, armed or otherwise prepared for use or used. It may have been fired, dropped, launched or projected yet remains unexploded either through malfunction or design or for any other reason.'

Abandoned Explosive Ordnance (AXO) is explosive ordnance that has not been used during an armed conflict, that has been left behind or dumped by a party to an armed conflict, and which is no longer under control of the party that left it behind or dumped it. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use (CCW protocol V).

4. Land release and residual contamination management process

The overall management process is shown in outline in Annex B. In practice, the process may not always be linear and activities may not always take place in the same order. Nevertheless, the process indicates the general sequence and logical progression from defining the problem to handing over cleared land to its intended beneficiaries. The process exhibits the basic stages of the Plan, Do, Check, Act sequence described in IMAS 07.12. Within the four main steps a mix of operational, quality and risk management functions take place, all supported by the management of information.

Land release is the process of applying all reasonable effort to identify or better define Confirmed Hazardous Areas (CHA) and remove all suspicion of mines/ERW, including unexploded sub-munitions, through nontechnical survey, technical survey and clearance, using an evidence-based and documented approach. IMAS 07.11 discusses the process in detail. Any residual risk following the application of the land release process is managed using the same evidence-based principles of all reasonable effort.

Managing the risks presented by mine and ERW contamination is a cyclical process, with strategic and operational plans updated as necessary to reflect changing circumstances and conditions. Strategic, operational and technical responses change as a country or region moves from a period of active conflict to one of emergency reconstruction, through broader development phases to a longer-term future in which residual contamination presents limited occasional risks to some human activity.

The fundamental management process remains the same through every stage and phase of a national programme: the context is taken into account; risks to and impacts on, affected populations are identified, assessed and their significance determined; capacities and capabilities necessary to mitigate those risks are determined, equipment and resources are procured, people are trained, and practical work (under all five pillars of mine action) is undertaken; monitoring and evaluation takes place to establish the extent to which risks and impacts are being reduced; progress is reviewed and decisions are taken about changes to the programme to ensure that mine action activities are appropriate, justified, economic, efficient and effective.

² See IMAS 01.10 Guide for the application of International Mine Action Standards (IMAS), Amendment 9, March 2018

Not every country will enjoy a smooth linear progression from conflict through reconstruction to eventual residual management. Some may be unfortunate enough to suffer reverses and even return to conflict. The cyclical management process remains applicable, but may necessarily result in significant fluctuations in the scale and scope of mine action activity.

The five stages of the management process (planning, preparation, clearance, post-land release as well as residual management activities) are addressed below.

4.1. 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. In mine action the planning process is central to understanding the context in which mine action activities take place and to the identification, assessment and establishment of appropriate and effective mitigation measures for the risks and impacts presented to affected people by EO.

Mine action authorities and managers should identify, assess, monitor and review any risks of appearing to take sides in ongoing conflicts. Mitigation of such risks should be undertaken in close coordination with organisations' senior management, as well as relevant authorities, institutions, government departments and donors.

Planning for mine action requires accurate and timely information on the form, scale and impact of EO hazards. Such information will come from non-technical and technical surveys, local knowledge, assessment missions and from on-going local mine action (including MRE) projects and tasks.

The decision to develop a national mine action programme will normally be as a result of accurate and sufficient information gathered demonstrating such a need. The process of gathering this information is a combination of formal/deliberate and informal activities and can be referred to as a General Mine Action Assessment (GMAA) process. This process is a continuous process of information gathering, through any relevant means, relating to EO accidents, incidents and other EO related information. The process effectively starts when the first piece of information is received indicating that there is an EO problem in the country and ends effectively when all the information about the EO problem is known.

The GMAA process:

- a) collects and analyses information to assess the scale and impact of the EO problem in the affected country and individual communities;
- b) provides information on which to decide the necessity to survey reported and/or suspected locations of EO contamination, quantities and types of explosive hazards; and
- c) collects general information such as the security situation, terrain, soil characteristics, climate, routes, infrastructure and local support facilities, to assist the planning of future mine action activities and projects.

Information gathered during the GMAA process should provide an indication of the size and scope of the problem (if any), an assessment of the resources needed to meet it, the national capabilities and potential to address the problem, and an assessment of the need for external assistance including financial, human skills, material and information. The information collected will, at some stage, be sufficient to enable a national authority, with assistance as necessary, to establish priorities and to begin to develop a coherent national mine action programme and plan.

For possible future mine action programmes, the planning process should start with a formal assessment³ of the country situation. This assessment will draw heavily on existing information provided by former warring factions and from agencies and organisations familiar with the mine-affected country or region including women's organizations. Where UN assistance is requested, a

³ This is not the same as the GMAA but is a part of it.

multi-disciplinary assessment team may deploy to the country to validate and update existing information, and to determine at first hand the scale and impact of the EO situation. The country assessment should determine whether a national mine action programme is required, and whether such a programme is possible. Full recognition should be given to on-going work, including informal demining projects.

Planning, including formal assessment of remaining EO contamination, is closely linked to the strategic management cycle, and is reflected in changes to the strategic plan, as well as to the scope and scale of mine action responses, reflecting changing circumstances and conditions over time. Such changes may include: the achievements of an established mine action programme; changes in the security/political environment; the effects of ageing on some types of weapon; and other aspects influencing interactions between contamination and affected populations.

4.2. Preparation

Preparation includes all enabling activities that help clarify the land release requirement, and develop the capacity of a demining organisation and its sub-units to carry out non-technical survey, technical survey and clearance tasks. This includes the selection and accreditation of demining organisations as prescribed in IMAS 07.30.

At the national level, preparation should also include:

- a) equipment preparation;
- b) establishing methods of victim reporting in a sex and age disaggregated manner;
- c) establishing a network of community volunteers both male and female, or linking with existing community volunteer networks;
- d) coordination activities;
- e) links with other sectors; and
- f) the management of information.

4.2.1. Non-technical survey

Non-technical survey refers to the collection and analysis of data, without the use of technical interventions, about the presence, type, distribution and surrounding environment of EO contamination, in order to define better where EO contamination is present, and where it is not, and to support land release prioritisation and decision-making processes through the provision of evidence. IMAS 08.10 provides guidelines on the conduct of non-technical survey.

4.2.2. Technical survey

Technical survey refers to the collection and analysis of data, using appropriate technical interventions, about the presence, type, distribution and surrounding environment of EO contamination, in order to define better where EO contamination is present, and where it is not, and to support land release prioritisation and decision making processes through the provision of evidence. IMAS 08.20 provides guidance on the conduct of technical survey in the land release process.

4.2.3. Clearance requirement

Clearance should only be carried out in Confirmed Hazardous Areas (CHA), which are normally established following a non-technical survey or technical survey. The aim of clearance is the identification and removal or destruction of EO, from a specified area to a specified depth to ensure the land is safe for land users. IMAS 09.10 provides guidance on clearance requirements.

There may be circumstances in the early stages of a new mine action programme, where a demining organisation is given the mandate to identify its own clearance tasks based on general priorities provided by the donor and/or the NMAA. In such circumstances, the demining organisation should apply guidelines provided in IMAS 07.11 on land release, in advance of clearance, formally record the area, target details and depth or other specifications of the intended

clearance for each project.

4.2.4. Funding (mobilisation of resources)

The funding for land release activities comes from many sources. Funding may be provided by the government of the mine-affected country, from donor governments, the United Nations or other international organisations, or in some cases from benefactors and philanthropists. Demining NGOs may raise funds directly from public and private sources or from public collections. 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 land release and that a long term commitment is provided by the donor. This is particularly important for major projects that require the demining organisation to make major investments in staff, expensive new equipment such as mechanical demining, and, specialist capabilities such as the training of ADS. Funding should take into consideration the requirements of both men and women in the programme as needed.

4.2.5. 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 government of the mine-affected country, together with the donor agency, to specify the clearance requirement in detail. The contract should give details of the risk and quality management processes to be adopted during the clearance work. It also should outline the reporting requirements, and the progress and financial milestones to be achieved.

Guidance on clearance contracts is given in IMAS 07.20.

4.2.6. Training

Land release activities require well-qualified managers and well-trained surveyors/deminers. Although some centralised training for senior national managers and technical advisors may be appropriate, the majority of training should be conducted in the mine-affected country, not only for cultural and linguistic reasons, but also for access to details of the EO hazards. The inclusion of both male and female managers should always be considered. IMAS 06.10 Management of training provides guidance on training requirements.

Training is an on-going process, constituting one of the primary risk mitigation measures available to mine action managers. Analysis of training needs should reflect requirements highlighted during planning processes, as part of wider analysis of the working context, and in light of the results of monitoring of mine action operations (as per IMAS 07.40).

4.2.7. Information management

The effective management of mine action 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. Often access to such information is restricted and the accuracy of critical data cannot be confirmed.

NMAA should make every effort to fully involve the mine-affected communities within the general information flow and management process. This can be done through the establishment of community based reporting mechanisms and commitment to community involvement throughout the national mine action process. Community involvement should be balanced taking into consideration factors such as sex, age and culture, among other factors, to ensure diversity.

NMAA and demining organisations should establish and maintain effective information management systems. The UN's Information Management System for Mine Action (IMSMA) has been developed to provide the facility to collect, collate and distribute relevant information at field and headquarters levels in a timely manner. IMSMA is available to all mine action programmes.

The ready availability of up-to-date, accurate and complete information is essential to any safe and efficient mine action operation.

Guidance on information needs, information management and the application of information

systems to demining operations is given in IMAS 05.10.

4.2.8. Equipment and tools

It is the responsibility of the NMAA to allocate the proper tools in the most effective manner to ensure that priorities can be achieved. This can be done through maintaining a reserve capacity at the national level that can be allocated on an as required basis depending on the clearance situation.

Land release activities have traditionally relied on manual practices, procedures and drills. In many situations, manual methods (using metal detectors and hand tools) will be the most appropriate and effective means of detecting, removing or destroying EO. However, in some programmes the greater use of equipment may enable clearance (and other elements of land release) to be conducted more safely, effectively and efficiently.

Demining technologies can be grouped in three general categories according to their technical maturity and availability:

- a) equipment that has been fully developed, tested and evaluated (T&E), and can be introduced into mine action programmes without any major modification or changes;
- b) those technologies that have been proved to work but require further development and formal T&E; and
- c) those technologies that may have an application to demining, but have yet to mature and have not yet been formally demonstrated.

Demining 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 demining organisations fielding new technologies, and their T&E.

Guidance on the application of technology and the procurement of equipment for demining is given in IMAS 03.10. A number of CEN Workshop Agreements provide guidance on T&E of demining equipment such as metal detectors, machines and PPE. More details can be found on the IMAS website.

4.2.9. Accreditation

The accreditation process consists of two parts. Organisational accreditation is the procedure by which a demining organisation earns formal recognition as being competent and able to plan and manage effectively and efficiently. Operational accreditation is the procedure by which a demining organisation earns formal recognition as being competent and able to carry out demining 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 demining activity such as survey, manual clearance or the use of ADS.

Guidance for the accreditation of demining organisations is given in IMAS 07.30.

4.3. Clearance

Clearance is the location, removal or destruction of mines and ERW, and for EOD operations may also involve access, diagnosis, render safe, final disposal and (where appropriate) protective works.

Guidance on defining clearance requirements is given in IMAS 09.10. Guidelines on defining Battle Area Clearance requirements are given in IMAS 09.11.

4.3.1. Clearance procedures

The need for effective and safe operational procedures is essential. Some operational procedures are based on international norms and 'best-practice', such as the destruction of EO in-situ, safety distances and the handling of explosives. Some are based on the local EO hazards and ground conditions. Some reflect equipment characteristics and performance. And some reflect local preferences, such as the position adopted for prodding and excavation.

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 and be gender sensitive.

4.3.2. Explosive Ordnance Disposal (EOD)

EOD involves the disposal of EO (See definition in IMAS 01.10). EO may be cleared as part of a demining contract, or it may be cleared under separate arrangements by a contractor specialising in EOD, or both situations may occur in parallel. For the purposes of IMAS, both activities are defined as EOD operations.

The majority of ERW found during proactive land release efforts are small items of ordnance such as sub-munitions, grenades and mortar ammunition. But ERW also includes larger items such as artillery ammunition, guided missiles, air-dropped bombs, cluster munitions and caches of Abandoned Explosive Ordnance (AXO). The wide variety of size and complexity of ERW requires special attention to be given to the management of EOD operations.

Guidance for the management of EOD as part of demining programme is given in IMAS 09.30. It covers general principles and management responsibilities. It does not provide specific technical guidance for the disposal of particular EO. CWA 15464:2005 provides guidance on requirements of EOD competencies.

4.3.3. Specialist capabilities

4.3.3.1. Use of Animal Detection Systems (ADS)

The use of ADS to detect the vapour from buried mines and munitions has become increasingly common in recent years, and some programmes now use a large number of ADS. There have however been variations in the performance claimed for ADS. Some users have claimed increases in clearance rates by factors of five and above, while other users, even in the same area, have expressed doubts about the effectiveness and reliability of their ADS programmes. Similar variations have occurred with ADS trials.

IMAS 09.40 provides guidance to NMAA and to demining agencies using ADS.

4.3.3.2. Mechanical demining

An increasing number of mechanical devices have been produced that aim to detonate, destroy or isolate mines. In some cases mechanical devices may also be deployed against certain ERW, sub-munitions for example. Early machines were often unwieldy, unreliable and underpowered, and the clearance achieved fell below the minimum UN requirement, unless they were part of an integrated manual-mechanical procedure. At present, where such machines are used, their operation is usually confined to the reduction of risk by the removal of vegetation and trip-wire operated mines, and some mine destruction as part of area reduction. IMAS 09.50 provides guidelines for mechanical demining operations.

Procedures for introducing new and untried mechanical systems were developed in 1998 at the Karlsruhe International Conference on Mine Action Technology. The Conference recommended that all mechanical systems should be formally evaluated to confirm that they are safe, effective and reliable. This recommendation was subsequently accepted by the United Nations for all UN-supported mine action programmes.

Ideally, trials (and the subsequent evaluation of trials data) should be carried out before mechanical systems are introduced into mine action programmes. However, sometimes it may be necessary for the evaluation to be carried out after a programme has commenced. CWA 15044:2004 provides guidelines for the testing of demining machines.

4.3.4. Community Liaison

Community Liaison is an integral part of a mine action programme as a whole and the land release process in particular. Special efforts should be made to ensure gender balance and diversity of background for the Community Liaison Officers. Community Liaison plays a major part in:

- a) confirming the land release requirements; and
- b) ensuring a high level of confidence from the community in the quality of the finished product (i.e., cleared land).

The general requirements of the community liaison function may be filled by specialist members of the mine action team, or the capacity may be subcontracted to a specialist MRE agency.

The NMAA should include the community liaison capacity of an agency in its overall monitoring plan. It may be necessary in some instances to undertake a linking role in order to establish links between demining organisations and MRE programmes to ensure an adequate community liaison function is established and maintained.

4.3.5. Safety and Occupational Health (S&OH)

Managers of demining 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 and suitable personal protective equipment (PPE) for both men and women. Given the wide range of operational settings and demining activities, it is not possible to provide a precise and complete set of specifications that apply to all situations. Demining 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 demining task and for each demining worksite.

Guidance for the development and implementation of S&OH management systems for use in demining operations is given in IMAS 10.10. Guidance on demining worksite safety is given in IMAS 10.20. Guidance on PPE is given in IMAS 10.30. Guidance on medical support to demining operations is given in IMAS 10.40. Guidance on the storage, transportation and handling of explosives is given in IMAS 10.50. Guidance on the reporting and investigation of demining incidents is given in IMAS 10.60. Guidance on protection of the environment is given in IMAS 10.70

4.4. Post-land release

The inspection of cleared land aims to provide confidence that clearance requirements have been met, and as such forms an essential part of the overall clearance process. An important aspect of the handover procedure is to highlight the systems and procedures in place for managing any residual risk, clarify ownership of said risk and to ensure that the local community has been fully briefed (see also TNMA on residual contamination).

Prior to the handover of a task, the area should be surveyed and marked, and all necessary documentation, including detail on cancelled, reduced and cleared areas, should be prepared, and associated with a formal handover certificate. IMAS 08.30 provides guidance on post-clearance handover requirements and management responsibilities. This process should include an analysis of the access to, the use of, and the ownership rules of, the cleared land to ensure that neither men nor women are discriminated against during the hand-over process.

Wherever possible, demining organisations should conduct a formal post project review (PPR) to identify lessons-learned which are relevant to the planning, preparation and clearance phases of the operation. The PPR should include a report on the suitability of the equipment, procedures, training and support and should have all accident/incident reports appended. Issues of concern should be identified and prioritised, and solutions proposed. The requirement for PPRs should be

included in clearance contracts by donors and national authorities. PPRs should be distributed to national mine action authorities, to the United Nations (UNMAS, UNDP and UNOPS), and to donors or sponsors. Where PPRs highlight shortcomings in established equipment or procedures, particularly issues involving safety, they should be more widely distributed.

Long-term monitoring of the performance of surveyed and cleared land should be carried out in accordance with the requirements of IMAS 07.40.

4.5. Management of residual contamination

Residual contamination is associated with the risk that remains following the application of the land release process and is managed using the same evidence-based principles of all reasonable effort. Managing residual contamination relies on the application of the same principles of risk management associated with any other type of contamination, and any other phase in the life of a mine action programme. The general expectation is that the management of residual contamination is likely to require fewer resources and may include the transfer of responsibilities to different actors sustainable in a national system, compared with earlier phases of operations, such as police and military units.

Planning for management of residual contamination, including the development of appropriate institutional architectures, datasets, tools and systems should start when a mine action programme matures and assets are available to plan for the future residual management needs. This will allow changes in the scale and scope of operations, transition to different sources of funding, and the development of appropriate competence within different actors to be managed in a controlled way. Strategic, operational and technical information, gathered from monitoring processes, operational reporting and, where necessary, dedicated studies, should be used to provide early indications of likely future needs. National strategic plans should make adequate provision for forward-looking analysis and planning for the management of residual contamination.

Delays in investigating future needs, planning for them and implementing appropriate preparations can lead to challenges in managing residual contamination. Authorities and managers, supported by international institutions and donors, should encourage the collection of relevant data, and effective planning, as part of the strategic management cycle.

5. Quality Management (QM)

Principles of QM, as detailed in IMAS 07.12, 07.30 and 07.40, are applicable at every stage of technical operations' planning, implementation, monitoring, review and updating.

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 mine action programmes by continuously refining IMAS to reflect developing mine action norms and practices, and incorporating 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.

6.2. National Mine Action Authority (NMAA)

The NMAA is responsible for ensuring the national and local conditions that enable the effective management of survey and demining projects. The NMAA is ultimately responsible for all phases of the process within its national boundaries, including defining the land release requirements, the accreditation of demining organisations, the monitoring of demining organisations, and post-clearance inspections prior to accepting full responsibility for the cleared land.

The NMAA is responsible for developing, maintaining, reviewing and updating the National Mine Action Strategic Plan (NMASP), and for ensuring that the scale and scope of mine action activities are appropriate, feasible and acceptable in light of prevailing and expected circumstances and conditions.

The NMAA is responsible for establishing and maintaining national policy and standards for the management of land release process. These procedures should be consistent with IMAS and other relevant national and international standards, regulations and requirements.

6.3. Donors

Donor agencies are part of the management process, and as such have a responsibility to ensure that the projects they are funding are managed effectively, and in accordance with international standards including those on gender mainstreaming. This involves strict attention to the writing of contract documents, and ensuring that demining organisations chosen to carry out such contracts meet the accreditation criteria. Donors are also partly responsible for ensuring that the standards and guidelines for quality management are applied. This responsibility and accountability is even greater when the NMAA is in the process of formation, and has not had the opportunity to gain experience.

6.4. Demining organisation

Ultimately, it is the demining organisation, of whatever type, which is required to establish an appropriate and effective management system, demonstrate it to the NMAA, and apply it throughout the land release project.

Where the NMAA is in the process of formation, the demining organisation is also responsible for assisting the formation process, by giving advice and assistance including the framing of national standards.

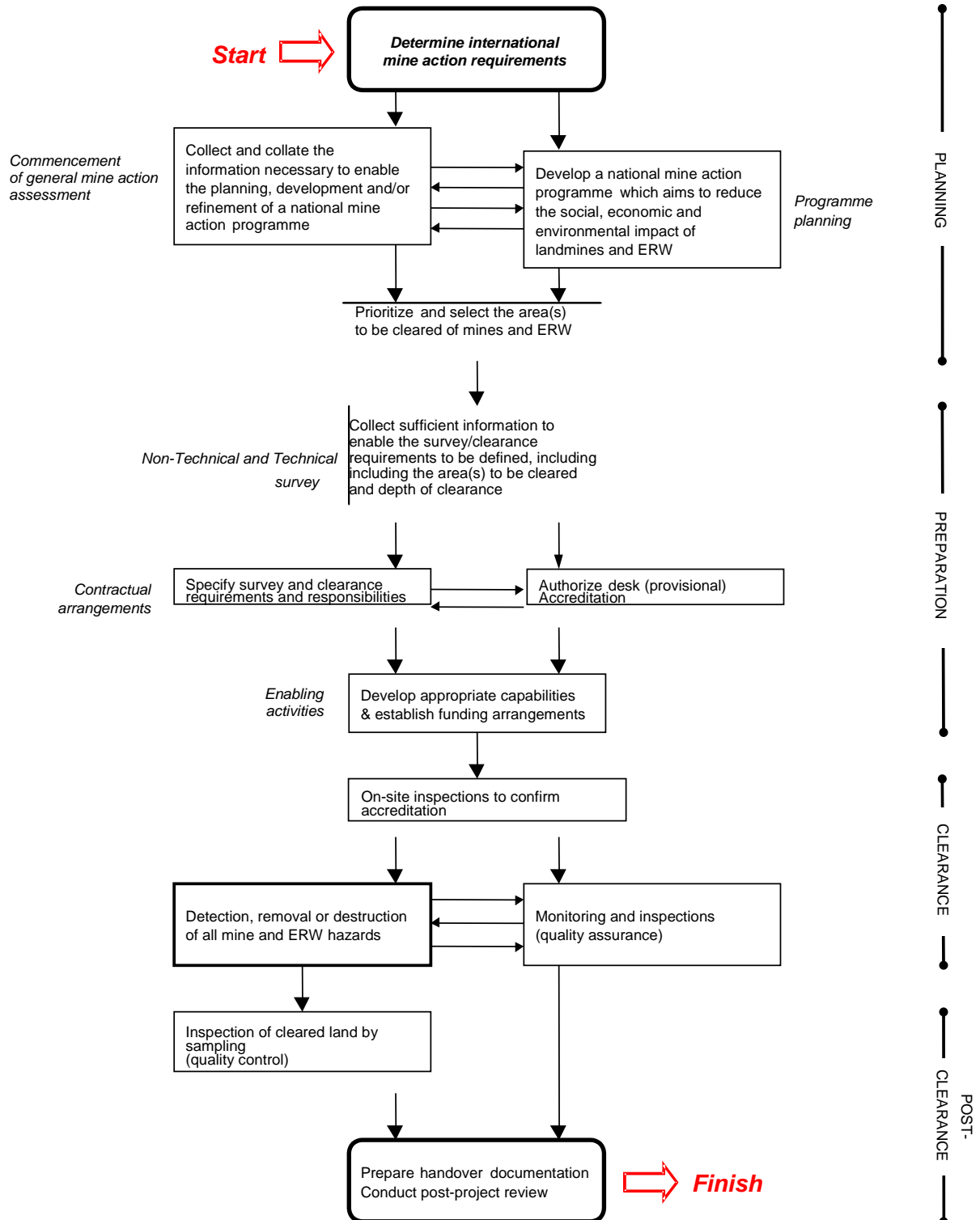
Annex A (Normative) References

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 02.10 Guide for the establishment of a mine action programme;
- b) IMAS 03.10 Guide to the procurement of mine action equipment;
- c) IMAS 04.10 Glossary of mine action terms, definitions and abbreviations;
- d) IMAS 05.10 Information management;
- e) IMAS 06.10 Management of training;
- f) IMAS 07.11 land release
- g) IMAS 07.12 Quality management in mine action
- h) IMAS 07.20 Guide for the drafting of mine action contracts;
- i) IMAS 07.30 Accreditation of demining organisations and operations;
- j) IMAS 07.40 Monitoring of mine action organisations;
- k) IMAS 08.10 non-technical survey;
- l) IMAS 08.20 Technical survey;
- m) IMAS 08.30 Post-clearance documentation;
- n) IMAS 09.10 Clearance requirements;
- o) IMAS 09.11 BAC;
- p) IMAS 09.30 Explosive Ordnance Disposal;
- q) IMAS 09.40 Guide for the use of mine detection dogs;
- r) IMAS 09.50 Mechanical demining;
- s) IMAS 10.10 S&OH - General requirements;
- t) IMAS 10.20 S&OH - Demining worksite safety;
- u) IMAS 10.30 S&OH - PPE;
- v) IMAS 10.40 S&OH - Medical support to demining operations;
- w) IMAS 10.50 S&OH - Storage, transportation and handling of explosives;
- x) IMAS 10.60 S&OH - Reporting and investigation of demining incidents;
- y) IMAS 10.70 S&OH – Protection of the environment;
- z) CWA 15044:2004 Testing Demining Machines;
- aa) CWA 15464:2005 EOD Competency standards; and
- bb) ISO 9001:2008 (E);

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

Annex B (Informative) Demining process



Annex C **(Informative)** **ISO 9000**

This Annex is an extract 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 has been updated to reflect the changes as a result of the revision of ISO 9000, and the subsequent issue of the ISO 9000:2008 series.

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 all aspects of mine clearance, standards were recommended, and a new universal definition of clearance levels was proposed. These standards are now called the International Mine Action Standards.

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 systems) 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.]

AIM AND SCOPE OF PAPER

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

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

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 " degree to which a set of inherent characteristics fulfils requirements."

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 that 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.

QUALITY MANAGEMENT

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 mine action.

ISO 9000 system

The ISO 9000 system 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 9001:2000 has since been updated and replaced with ISO 9001:2008 although, the requirements for quality management remain unchanged.

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 mine action.

Application of ISO 9001:2008 to mine action

The 5 major standard clause “areas” of ISO 9001:2008 need to be modified to reflect the role of organisations engaged in mine action.

The relevance of these clauses to demining 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 mine and ERW clearance. For example, a demining organisation seeking ISO 9001:2008 accreditation would be expected to demonstrate 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. In the case of IMAS standards, a critical non-conformity is defined as a unit of land (usually 1 square meter) containing one or more mine or ERW hazards. The demining organisation’s SOPs would be expected to be consistent with the monitoring and post-clearance inspection requirements cited in IMAS 07.40 and 09.20.

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.

Professional bodies and institutes

Organisations and individuals who aspire to meet agreed professional standards usually share common values and beliefs. Professional bodies and institutes represent the interests and articulate the views of their members. They ensure conformance to the agreed standards, and encourage commitment to the shared values and beliefs. Many institutes issue detailed professional guidelines for ISO 9001:2000 (ISO 9001:2008) accreditation, as well as general advice on routine QMS matters.

The formation of such bodies and institutes within the mine action community would be advantageous, and should be encouraged. They would provide a particularly useful mechanism for generating a professional ethos, and for developing common mine action policy and practices. They would complement the role of UNHQ.

Initially it will be easier to create such bodies and institutes nationally and regionally, although international affiliations and partnerships should be encouraged. Currently, only one such body is known to exist: the Institute of Munition Clearance Engineers (IMCE) which formed in 1998.

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 effect this mandate the following recommendations are proposed:

- Organisations involved in mine action should be encouraged to develop strategies, establish management systems, and demonstrate procedures and practices that are consistent with the principles of total quality management.
- There is a need to establish a set of international guidelines on the application of ISO 9000 to mine action.
- The formation of professional bodies within the mine action community is to be encouraged, although their legal status, constitution and composition will need to be closely monitored.

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

The following 5 subject areas represent the major standard 'clauses' of ISO 9001:2000. 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 demining 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

Appendix 2 to Annex C (Informative) ISO 9001:2008 - Guidelines for demining operations

**ISO 9001:2008 and
 IMAS standards**
 (Informative)

IMAS standards →

ISO 9001:2008's clauses ↓

	01.10	02.10	03.10	03.20	03.30	03.40	04.10	05.10	06.10	07.10	07.20	07.30	07.40	08.10	08.20	08.21	08.22	08.30	08.40	09.10	09.20	09.30	09.40	09.50	10.10	10.20	10.30	10.40	10.50	10.60
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 Management	✓																													
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	✓						✓			✓	✓											✓								

ISO 9001:2008 and
 IMAS standards
 (Informative)

IMAS standards →

ISO 9001:2008's clauses ↓

ISO 9001:2008's clauses	01.10	02.10	03.10	03.20	03.30	03.40	04.10	05.10	06.10	07.10	07.20	07.30	07.40	08.10	08.20	08.21	08.22	08.30	08.40	09.10	09.20	09.30	09.40	09.50	10.10	10.20	10.30	10.40	10.50	10.60
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	01 Dec 2004	<ol style="list-style-type: none"> 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. 4. Substantive changes: <ol style="list-style-type: none"> a) Clause 4.1, complete revision.
2	23 Jul 2005	<ol style="list-style-type: none"> 1. Clause 4.4, third paragraph, second sentence, the inclusion of a clause concerning accident/incident reports being appended to Post Project Reviews. 2. Annex B, change to the definition of 'Quality Assurance (QA)' to be consistent with IMAS 04.10.
3	1 Aug 2006	<ol style="list-style-type: none"> 1. Minor changes/additions to the first and second paragraph of the foreword. 2. Clause 4.1, paragraph 4, removal of the opening sentence. 3. Inclusion of the term 'mines and ERW'. 4. Removal of the term 'threat' from throughout the IMAS. 5. Clause 4.2.6, new sentence added to second paragraph. 6. Clause 4.3.2, minor text changes to first paragraph. 7. Clause 4.3.3.2 change to heading, text changes to first paragraph and removal of last paragraph (note). 8. Annex B, new definition for 'gender mainstreaming'.
4	11 Nov 2009	<ol style="list-style-type: none"> 1. Minor changes throughout. 2. Updating definition of NMAA. 3. Updating UNMAS address 4. Integration of the land release concept and inclusion of references to land release IMAS 08.20, 08.21 and 08.22. 5. ISO 9001:2000 is changed to ISO 9001:2008 6. Ensuring inclusion of gender and diversity issues -minor additions to that effect. 7. Updating normative references throughout including references to CWA. 8. Removal of Annex B and its references in the IMAS.
5	01 Aug 2012	<ol style="list-style-type: none"> 1. Reviewed for impact of IATG development. 2. Minor typographical amendments.
6	1 June 2013	<ol style="list-style-type: none"> 1. Reviewed for the impact of new land release IMAS. 2. Land release Para in introduction, non-technical survey, technical survey and clearance requirement Clauses updated. 3. Reference to GMAA IMAS removed 4. References to LR, NTS, and TS IMAS updated throughout and in Annex A. 5. List of IMAS updated in Annex C 6. Amendment No and date included in the tile and header.

7	11 June 2018	<ol style="list-style-type: none">1. Title updated2. Terminology updated in line with new title – ‘demining’ updated to ‘land release ’3. ‘mines and ERW’ replaced with ‘Explosive Ordnance’ or ‘EO’ throughout4. Additional land release para in introduction5. Reference to ‘Mine Detection Dogs’ or ‘MDD’ updated to ‘Animal Detection Systems’ or ‘ADS’ throughout.6. Section 4 intro updated to include five stages of planning7. Section 4.1 additional para on conflict risk, additional para on strategic management cycle8. Section 4.4 renamed ‘Post-land release ’, reference to TNMA on residual contamination added (TNMA currently under development).9. Section 4.5 ‘Management of residual contamination’ added
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