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Quality Management in Mine Action

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Lebanon Mine Action Center-LMAC

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Foreword

As detailed in the National Mine Action Policy of 2007, the Lebanon Mine Action Center (LMAC) has the responsibility to execute and coordinate the Lebanon Mine Action Program (LMAP) on behalf of the Lebanon Mine Action Authority (LMAA), including the development and amendment of standards. Such standards shall be developed in a participatory approach that shall involve international, governmental, and nongovernmental organizations.

The NMAS shall be reviewed as needed to reflect amendments in the IMAS as well as incorporate changes to international obligations and local requirements. Such revisions shall be regularly made available on the LMAC's website www.lebmac.org or can be obtained through contacting the LMAC via the email info@lebmac.org.

The National Mine Action Standards (NMAS) of Lebanon were first developed in the form of Technical Standards and Guidelines (TSG). These TSG were edited into the first edition of the Lebanon NMAS in 2010 and were written to comply with the International Mine Action Standards (IMAS) at that time. The IMAS are constantly under review and subject to revision. The desire to remain compliant with the revised IMAS led to an update of the NMAS in 2020. Since then, further IMAS revisions have led to the NMAS being reviewed and revised again in 2023.

Acronyms

EDD	Explosive Detection Dog
EO	Explosive Ordnance
IA	Implementing Agency
IMAS	International Mine Action Standards
LMAA	Lebanon Mine Action Authority
LMAC	Lebanon Mine Action Center
LMAP	Lebanon Mine Action Program
LNMAS	Lebanon National Mine Action Strategy
MDD	Mine Detection Dog
NMAS	National Mine Action Standards
QA	Quality Assurance
QC	Quality Control
QM	Quality Management
SOPs	Standing Operating Procedures (Standard Operating Procedures)
RBM	Results Based Management

Introduction

The guidance provided in this standard should be applied by managers in all Mine Action agencies (Implementing Agencies) working in Lebanon.

As suggested in the International Mine Action Standards (IMAS 07.12), this standard is not intended to introduce anything new to the management of Implementing Agencies (IAs) in Lebanon. It is intended to clarify much of what already takes place and to encourage consistency with Quality Management (QM) as it is understood in the management of other activities. Adherence to this standard should increase confidence in the professional and efficient management of every aspect of mine action in Lebanon.

All QM relies upon the availability of information to inform the planning of activities, direct their implementation, check performance during the work, and to take action to improve their safety and quality. Recent changes to the NMAS reflect an increased emphasis on the use of information as evidence to support decision-making, and on improving the efficiency of interdependent mine action activities in pursuit of the goals of the Lebanon Mine Action Program (LMAP) and the Lebanon National Mine Action Strategy (LNMAS).

Quality Management includes Results Based Management (RBM), by which achievement is measured in terms of the advantages gained by the people of Lebanon. The required results are set by the LMAA and applied by the LMAC with deference to donor preferences over prioritization whenever they are compatible with the LMAP and NMAS.

Quality management in mine action

1 Scope

This NMAS provides guidelines for the implementation of Quality Management (QM) principles, practice and processes for Humanitarian Mine Action (HMA) Implementing Agencies (IAs) working in Lebanon. This standard guides the LMAC and should also guide all HMA IAs in their day-to-day operations. Each HMA IA's QM system should be consistent with the QM requirements of the LMAC as stipulated throughout the NMAS.

1.1 Scope of the required QA/QC systems

This NMAS also provides a set of standards required and recommended guidelines for internal QA/QC conducted by IAs while they are conducting demining operations in Lebanon. This NMAS also applies to the external QA/QC to be implemented by the LMAC Quality Management (QM) team. It should be applied to all NTS, TS and search and Clearance tasks.

This NMAS provides guidelines for QC sampling procedures that focus on the method of inspecting cleared land that has been adopted in Lebanon, which is random sampling (augmented by targeted sampling when appropriate).

LMAC recognizes the limitations of conducting QC by random sampling which cannot prove that the un-sampled land has been appropriately searched and cleared. However, random sampling does raise confidence in the quality of work and is all that can reasonably be done without unjustifiably using assets to re-search large areas that have already been searched and appropriately cleared.

2 References

A list of normative and informative references is provided in Annex A.

Normative references provide cross-referencing to other standards referred to in this NMAS, and which form an integral part of the provisions of this standard.

Informative references are documents that may be consulted to assist in the implementation of this NMAS.

3 Key terms and definitions

The following terms and definitions are used in this standard:

- *Accreditation*: the procedure implemented by the LMAC and by which a HMA organization or a HMA team becomes formally recognized as competent and able to plan, manage, and implement HMA activities safely, effectively, and efficiently.

- *Accrediting body*: the body responsible for the management and implementation of the national accreditation system. In Lebanon, this responsibility is held by the LMAC's Quality Assurance (QA)/Quality Control (QC) section.
- *Confidence*: in this context, 'confidence' refers to the state of being sure that the required level of search and clearance has been achieved after ensuring that all reasonable effort has been exerted.
- *Critical non-conformity*: the location of an explosive hazard during a QC sampling of any area declared by the IA to be 'clear' of hazards: also, the failure of the IA to work in the accredited manner or to correct discrepancies as required by the LMAC.
- *Demining organization*: an organization, national or international, accredited by the LMAC to conduct humanitarian demining activities in Lebanon. Demining organizations may also be referred to as 'Employers' or commonly as 'Implementing Agencies' (IAs).
- *Demining Team*: a team of professionals approved and accredited to conduct one or more demining activities, such as technical survey, non-technical survey, area search and clearance operations and EOD spot tasks.
- *Fade Out*: an agreed surface area radiating from a discovered EO hazard that is searched to confirm that no further evidence of EO hazards exist.
- *Implementing Agencies (IAs)*: the term refers to commercial organizations, agencies, associations, national NGOs, international NGOs, UN bodies, and government bodies, such as the military, municipalities, and ministries that are accredited by the LMAC to conduct humanitarian demining activities in Lebanon. Those engaged in Land Release activities are often called 'Demining organizations'.
- *Inspection*: the process adopted by a demining organization or the LMAC to determine by observation, measurement, examination, testing or otherwise whether a sample of land that has been declared free from explosive hazards to the required depth is in fact free from those hazards.
- *Inspection Body*: LMAC, the IA, or another suitably accredited body authorized by LMAC which conducts post-clearance quality control by applying random sampling procedures or other appropriate methods of inspection.
- *Quality Assurance (QA)*: a part of quality management focused on providing confidence that quality requirements are being met (ISO 9000:2015). The purpose of QA in mine action is to confirm that management practices and operational procedures for demining operations are appropriate, and are achieving the stated requirement(s) in a safe, effective, and efficient manner. Internal QA is conducted

by demining IAs themselves. External QA is conducted by the LMAC or another entity authorized by the LMAC.

- *Quality Control (QC)*: a part of quality management focused on checking that quality requirements have been achieved. QC is applied to the inspection of a finished product. In the case of humanitarian demining, the 'product' is safe land that has been appropriately searched and EO hazards cleared.
- *Quality Management (QM)*: the set of coordinated activities designed to direct and control an organization in terms of how it plans, organizes, leads, and controls its operations to ensure efficiency, quality and continuous improvement. QM involves establishing quality policies and quality objectives, then designing and refining processes to achieve these quality objectives through quality planning, quality assurance, quality control and continuous improvement.
- *Reasonable effort, all reasonable effort*: describes the minimum acceptable level of effort that is necessary to identify and record hazardous areas or to search for and remove all EO (explosive hazards) from hazardous areas safely. LMAC will determine the level of effort that is reasonable at any task taking cognizance of international norms. In the event of disagreement, the final arbiters of what is 'all reasonable effort' shall be the Government and Courts of Justice in Lebanon.
- *Risk Management*: the entire process by which risks are identified, assessed and mitigated appropriately to ensure that 'all reasonable effort' has been taken to achieve a 'tolerable risk'. See NMAS 07.14 Risk management.
- *Reasonable effort, all reasonable effort*: describes the minimum acceptable level of effort that is necessary to identify and record hazardous areas or to search for and remove all EO (explosive hazards) from hazardous areas safely. LMAC will determine the level of effort that is reasonable at any task taking cognizance of international norms.

In addition to the above terms, NMAS 04.10 provides a glossary of terms and definitions used across all of the Lebanon NMAS.

As in the IMAS, the terms 'shall', 'should' and 'may' are used across all standards to indicate the required degree of compliance. For any organization working in Lebanon, the use of 'shall' indicates a compulsory requirement. The term 'should' indicates the national preference which may be varied with LMAC approval. The term 'may' indicates a suggestion that is not obligatory.

4 Purpose

The purpose of QM in mine action is to provide confidence to the beneficiary, the mine action agency, the LMAC and the donor that quality requirements have been met or exceeded, and that the agency's mine action activities are 'fit for purpose'. Combined with

risk management (which is an essential part of QM) an appropriate QM system will ensure the recording of evidence to show whether tasks are conducted as safely and efficiently as possible.

5 Needs and expectations of IA QM systems

The minimum requirements of a mine action IA's QM system in Lebanon are that:

- the needs and expectations of the NMAS and the LMAC with regard to all aspects of safety, QA and QC are met;
- the needs and expectations of the donors with regard to safety, efficiency and cost-effectiveness are met;
- the laws of Lebanon are complied with; and
- the internal QM requirements of the IA are met.

The QM system should ensure that the humanitarian interests of all staff and all members of the community where the IA is working are considered and served.

5.1 Gender and diversity

The mine action agency's QM system shall take into account the different needs, expectations and requirements of gender and diversity groups without favoring any one group over another.

The QM system should be designed to collect, report and analyze data relating to gender and diversity aspects of its work. Whenever required to do so by the LMAC, disaggregated (separate) data about gender, age, and social grouping should be collected and made available.

5.2 Scope of an IA's internal QM system

The scope of each mine action agency's QM system should be appropriate for use in the IA's working context, which includes the requirements and expectations of the LMAC and other stakeholders in Lebanon. The system should encompass a well documented risk management system and make provision for self-critical review and revision in pursuit of continuous improvement.

Currently, the LMAC provides QM oversight in terms of Quality Assurance (QA) and Quality Control (QC) checks. This is designed to ensure compliance with the Implementing Agency's SOPs and the NMAS in the safe pursuit of the LMAP's goals. It is not intended to extend LMAC's monitoring capacity to include assessing the effectiveness and maintenance of each IA's internal QM systems, such as those applied to logistics and accountancy, unless a need to do so becomes apparent.

The QA and QC oversight provided by the LMAC does not replace the mine action IA's responsibility to have its own QM system that includes effective and responsive QA/QC

monitoring. LMAC's monitors should never find serious non-conformities and safety issues because these should be found and promptly resolved by the IA's internal QA and QC.

5.2.1 Mine action 'products'

Mine action IAs should identify the mine action products relevant to their activities that need to be covered by their QM system. The following mine action 'products' require QM oversight:

- land prepared and presented for release;
- any EO or part of an item of ordnance that presents a potential hazard to the users, or potential users, of land;
- explosive materials, components or ancillary items which contain some explosives, or behave in an explosive manner, such as detonators and primers;
- data, information and reports required by the LMAC and/or the donor;
- staff recruitment and training; and
- mine action equipment, including prosthetics, orthotics and mine risk education materials.

Each IA may identify any number of other internal 'products' to be covered by their own internal QM requirements.

5.2.2 Mine action 'processes'

Mine action IA's are required to identify, define and document processes relevant to their operations in the comprehensive SOPs that they submit to the LMAC. Every aspect of those SOPs related to the mine action activities that the IA will be accredited to conduct should be covered under the IA's internal QM system.

Each process within the QM system should be assigned to specified job positions (with deputies when appropriate) and documented in a way that records all decisions and requires that the process be critically reviewed to facilitate improvement.

5.2.3 Leadership and commitment

Successful implementation and continual improvement of a QM system relies on leadership and commitment from the highest levels within the IA. To demonstrate this, mine action IA managers should:

- establish, document and maintain a quality policy;
- establish, document and maintain quality objectives, consistent with the overall strategic direction and context within which the IA operates;
- monitor and review the progress and performance of the QM system and take any actions necessary to ensure that quality objectives are achieved;
- ensure that adequate resources are available to maintain the QM system; and

- ensure that staff understand the importance of conforming to the requirements of the QM system.

5.2.4 The IA's QM policy

Each mine action IA should establish a written mine action QM policy that is appropriate to the purpose, functions and strategic objectives of the IA. The policy should include a commitment to satisfying the requirements of the NMAS and include a commitment to providing documented evidence of the pursuit of continual improvement. The quality policy should be made available to the LMAC when required.

A QM policy should include an implementation plan that explains what will be done, what resources will be required, who will be responsible, when action will be completed, and how the performance of the QM system will be monitored and evaluated.

5.2.5 The IA's QM objectives

Each mine action IA should specify quality objectives that are:

- relevant to the scope of the IA's mine action activities;
- consistent with the IA's quality policy;
- measurable;
- monitored, reviewed and updated;
- communicated; and
- include relevant aspects of stakeholder satisfaction reflecting the different circumstances, requirements and needs of different gender and diversity groups.

Mine action IAs should specify operational objectives for their mine action activities that allow monitoring of performance against deadlines, schedules, budgets and the requirements of the LMAC.

5.2.6 The IA's QM of mine action staff

The staff available should always be adequate to perform all those functions, including QM functions, that are necessary to maintain confidence in the safety, efficiency and effectiveness of the IA's mine action activities.

Mine action IA managers should:

- determine the competence requirements of job functions affecting the performance of mine action activities;
- confirm the competence of staff on the basis of appropriate education, training and/or experience;
- where necessary, take action to ensure the competence of staff through recruitment, transfer or additional training;

- ensure equal opportunity principals are respected during recruitment and training;
- monitor the effectiveness of training; and
- retain appropriate records of training and competence.

Mine action staff should be made aware of:

- the quality policy;
- quality objectives relevant to their job functions;
- the significance of their roles and responsibilities in relation to the quality of mine action processes, services and products; and
- the quality and safety implications of not conforming with the QMS.

5.2.7 QM of the IA's mine action equipment

The equipment and resources available should always be adequate to perform all those functions, including QM functions, that are necessary to maintain confidence in the safety, efficiency and effectiveness of the IA's mine action activities.

Mine action IA managers should:

- determine equipment requirements necessary to deliver safe, efficient and effective mine action activities;
- specify requirements, communicate requirements to suppliers and implement procurement processes;
- ensure that equipment is checked on receipt to confirm that it satisfies requirements;
- establish maintenance schedules in accordance with manufacturer's recommendations and as required by prevailing circumstances and conditions;
- ensure that adequate training of equipment operators is carried out;
- ensure that equipment is tested before operational use;
- implement operational controls, checks and tests to confirm the continued suitability and functioning of equipment;
- ensure that non-conforming equipment is marked and/or segregated to avoid its inadvertent use;
- ensure that appropriate repair or disposal action is carried out on non-conforming equipment; and
- maintain and retain equipment documentation appropriate to the type, value and significance of the equipment.

5.2.8 The IA's QM documentation

Each mine action QM system should be documented in a way that ensures the safe, efficient and effective implementation of the mine action activities conducted by the IA using the system. The LMAC shall determine the minimum level of QA and QC documentation that mine action IAs must maintain in Lebanon. Each IA is expected to extend this documentation requirements as may be necessary to meet the needs of their IA's internal QM systems.

As a minimum documentation produced by mine action IA's operating in Lebanon should include:

- a QM policy, (including objectives), that requires the regular review of QM decisions and of the QM system itself;
- Standing Operating Procedures (SOPs) appropriate to the scope of the mine action IA's activities and which cover quality, safety and environmental management procedures;
- operational records as required by the LMAC;
- internal QA and QC records as defined within the agency's QM system and by the LMAC;
- risk management records (see NMAS 07.14 Risk management); and
- records of any nonconformity and any corrective actions.

5.3 Internal monitoring and evaluating of an IA's performance

Monitoring of performance is essential to add Quality to a Management system. The LMAC has determined the minimum requirements for monitoring as described in NMAS 7.40. In this, the LMAC requires the mine action IA to conduct certain QA/QC activities and record them appropriately for inclusion in the IMSMA system. LMAC's goals focus on the achievement of safety for the people of Lebanon. Each mine action IA's QM system may have additional internal monitoring requirements in pursuit of the IA's own extended goals.

NMAS 14.10 covers the evaluation of mine action interventions. The results of these evaluations should be considered during internal management reviews of the mine action IA's QM system.

The LMAC encourages all those involved in mine action to bring perceived non-conformities and opportunities for improvement to the attention of appropriate managers.

5.3.1 IA internal management review

Management reviews should be conducted by the senior management of mine action IA's at appropriate intervals to ensure the continued effectiveness of the QM system.

Management reviews should be conducted at least annually, or more frequently in light of prevailing circumstances and conditions.

Management reviews should take into account:

- the status of actions arising from previous reviews;
- changes in the mine action context relevant to the QM and RM systems;
- LMAC and donor satisfaction with the QM system;
- the extent to which quality objectives have been met; and
- the nonconformities that have been identified and the corrective actions that have been taken.

Management reviews should lead to decisions and actions related to taking action over opportunities for improvement, making changes to the QM system, and meeting newly identified resource and competency needs.

The results of QM reviews should be communicated to all of the mine action IA's staff, the LMAC and any other relevant stakeholders.

6 The LMAC's QM inspection of cleared land

To ensure quality-demining operations and have confidence that the land released to owner(s) is safe, the Lebanon Mine Action Center (LMAC) uses a two-stage Quality Management (QM) approach that is compliant with the International Mine Action Standards (IMAS) and the International Organization for Standardization (ISO)'s QM standards.

The first stage is Quality Assurance (QA) and focuses on all of the processes used during Land Release. It starts with the accreditation of IAs that submit appropriate and professional SOPs for LMAC appraisal which must be accepted before the IA is authorized to work in Lebanon. Quality Assurance checks may be made at every stage of operations, including planning and training, and are designed to ensure that the accredited IA works to their own SOPs and conducts the work in compliance with the NMAS and the LMAC's directions. Further details of QA monitoring are given in NMAS 07.40 Monitoring Mine Action Organizations and Operations.

The second stage of QM is Quality Control (QC) which focuses on the inspection of the final product, the land that is presented by the IA as being safe for release. QC should be conducted before land is formally handed over to its end-users/owner(s).

This NMAS provides principles and guidelines for the QC of land that has been prepared for release by one or more IA.

QC provides confidence that the procedures applied have achieved a maximum confidence of safety and that the land is indeed free of EO hazards to the agreed minimum depth in the ground. The default search and clearance depth in areas where the presence of anti-

personnel mines is anticipated is 15 cm unless another depth is specified in the tasking order. When the EO hazards anticipated are not anti-personnel mines, varied minimum depths of search may be appropriate and the requirement may vary for different parts of the same task at the LMAC's discretion. The intended end-use of the land may influence the depth of search required in any sub-surface search.

QC provides LMAC and the donors with a measure of proof that the work has been conducted as required. It can also give confidence to the end-users of the land. Additionally, professionally conducted independent QC can help IAs to achieve safe, effective, and efficient demining operations. Quality Control, both internal and external, should be designed to help all those involved identify and resolve any problems that arise in the achievement of the desired goal. To this end, QC should be conducted without conflict as part of a team.

In Lebanon, QC complies with the principles and procedures for inspection and sampling published under ISO 2859. Noting that the results of sampling are influenced by the way in which a sample is selected, flexible procedures for sample selection are applied. Adequate procedures are in place to ensure that the inspection is both unbiased and can be flexible enough to give confidence that the sample area is representative.

6.1 General QC requirements

Quality Control (QC) post-clearance inspection is part of the demining Quality Management (QM) function designed to provide confidence that clearance requirements have been met. It supplements accreditation and Quality Assurance (QA) by inspecting the final product, the cleared land, before it is formally declared 'cleared' and handed over to the end-user(s).

In Lebanon, there are two categories of QC. These are internal QC conducted by a demining IA during its search and clearance operations and external QC that is conducted by the LMAC QA/QC Team as part of a post-clearance inspection or by another duly accredited entity authorized by LMAC to conduct the QC on its behalf.

Post-clearance QC is not limited to searching samples of the land declared 'clear'. It includes inspecting the accuracy of post clearance marking and survey, ensuring compliance with all task requirements and checking the IA's completion report. The LMAC may add QC requirements as required, depending on the task.

Determining the extent of QC sampling to be conducted requires the pragmatic application of available resources. The goal is to determine whether the land is safe and can be released, not to criticize the IA. The QC process must be completed in a timely manner while avoiding incurring extreme costs. To achieve this in Lebanon, the QC requirement is varied depending on the search and clearance assets and procedures that have been used. The QC requirement may also vary in response to conditions at the task, such as the anticipated EO hazards, the security situation and the ground conditions.

For efficiency, and at the discretion of the LMAC, post-clearance QC may not need to be conducted on the work of specific IA with a good QA record of working thoroughly during the task and an established track record of faultless QC after other tasks.

6.2 QC requirements for manual search and clearance

As part of internal QC of areas demined using metal detectors, the IA should QC at least 10% of all searched areas on a daily basis. The second search should be conducted by a suitably experienced and qualified person other than the original deminer/searcher. All QC checks shall be made using detectors that have been proven to be able to detect the anticipated EO hazards at the required clearance depth(s).

Manual clearance that is conducted without metal detectors using area excavation techniques shall require enhanced internal QA supervision to ensure that the search is conducted thoroughly and in accordance with the accredited SOPs. When appropriate, internal QC checks of area excavation procedures may be made using explosive detection dogs (EDD) or detector assisted BAC. When these options are not suitable or not available, additional supervision should be mandatory and treated as internal QC.

6.3 QC requirement for EDD search

The LMAC cannot conduct external QC of areas searched only by EDD. As a consequence, the onus falls on the IA that is using EDD to conduct thorough internal QA/QC by first using a second EDD to re-search the entire area searched by the first EDD (so providing full internal QA of the first EDD's search) and by conducting internal QC on a percentage of the land searched by EDD using another approved demining search and clearance procedure.

The claim that a single EDD can be used to search an area reliably is controversial because this method of deployment has led to EO hazards being missed in Lebanon (and elsewhere around the world). In consequence, the LMAC can only accept an area as having been appropriately searched by EDD when it has been searched by two well trained and proven EDD using approved search patterns that prevent the second EDD from following the scent of the first EDD. The search patterns should also require the second EDD handler to walk over the entire ground area after the second EDD has searched.

At tasks where a detector supported visual search is approved, the LMAC may permit the use of a single EDD that is followed by a full visual search over the entire area using metal detectors where visibility is constrained. When this is done, the LMAC may conduct QC in the area using the approved detector assisted visual search method.

6.4 LMAC QC sampling

External LMAC QC is used to establish sufficient confidence that all EO hazards have been removed from the specified area. It is checking that all aspects of the land release process, NTS, TS and search and Clearance, have combined to result in land that can be confidently released as being free from anticipated EO hazards. As part of this, it is also checking that

the IA has searched and cleared the ground to the specified depth(s) in accordance with the agreed tasking order and Clearance plan. External QC is conducted by the LMAC's QA/QC Section or by another duly accredited entity authorized by LMAC to conduct the QC on its behalf. During inspection, the inspection body shall generally select random areas for QC but may also select some targeted samples of land to search for non-compliance when an entirely random selection does not result in perceived high risk areas being QC checked.

The procedures and equipment used to inspect the samples of land during external QC shall be pre-approved by the LMAC, and the IA being monitored should be informed. Any major changes to sampling or inspection procedures (such as the introduction of EDD assisted sampling) should be agreed between the LMAC and IA before starting the inspection. When there is any concern that the tools or procedures used to search and clear the land may have been ineffective, alternative tools and procedures may be used during the external QC at LMAC's discretion.

Generally, the LMAC and the IA should agree a mutually acceptable time limit after the demining task has been completed within which the external QC sampling inspection should take place.

6.5 LMAC QC acceptance criteria

The LMAC shall consider land that has been declared cleared by an IA as 'clear' only if all the samples of land subject to external QC are found to be free of EO down to the depth(s) specified in the Clearance plan for the task (or part of the task). When searching for anti-personnel mines the default depth of clearance is 15 cm from the natural ground surface unless another depth has been agreed by the LMAC in the clearance plan for the task. When searching for other EO hazards, such as sub-munitions, the required depth of search and clearance should be stated in the Clearance plan and may vary in different parts of a task when ground conditions at a task site are varied. The IA shall accurately record the ground areas searched with all variations in search depth that are agreed with the LMAC and applied at the task.

The areas searched during QC are called 'sample boxes'. The LMAC Operations Section shall determine the number and size of the sample boxes that will be searched during QC of areas presented by the IA as 'cleared'. This decision may be influenced by the resources available to LMAC and by the IA's previous performance in Lebanon, but shall not be subject to direct influence by the IA.

6.5.1 Non-conformities in QC

Failure of the IA to achieve the required end-state in the manner directed is a non-conformity. Some non-conformities are 'critical' and usually mean that some or all the work will need to be repeated. Other non-conformities may be classed as 'simple' and usually do not require significant corrective measures to be undertaken.

6.5.2 Simple non-conformities during QC

A simple non-conformity is a failure of the IA to comply with the task requirements that has no obvious safety implications. This may be a breach of the requirements in the Tasking order, a breach of the NMAS or a breach of the IA's own accredited SOPs. Generally, a simple non-conformity is one that can be immediately corrected by the IA without the need to repeat any work.

Examples are:

- failure to comply with any LMAC documentation and QM requirements (with no direct safety impact);
- failure to conduct the task according to the approved Clearance plan (with no direct safety impact);
- failure to inform the LMAC of newly discovered information that affects the task (with no adverse safety implications); and
- any other breach of the IA's MoU with LMAC or the requirements of the NMAS that have no immediate safety implications.

All simple QC non-conformities shall be corrected immediately by the IA and, when there is a delay in their correction, the LMAC should suspend the IA's accreditation pending correction. Failure to correct a simple QC non-conformity in the manner required by LMAC shall be treated as a critical non-conformity and may lead to the suspension of the IA's accreditation to conduct demining activities in Lebanon.

Repetition of simple QC non-conformities by an IA should generally lead to a suspension of the IA's accreditation until it can show that appropriate corrective measures have been taken.

6.5.3 Critical non-conformities during QC

During external QC, a critical non-conformity is one that could lead to the end-users of the land being placed at unnecessary, so intolerable risk. This generally involves the discovery of one or more EO hazard on land that has been declared cleared. The failing may not be the responsibility of the IA, but must still be corrected.

The critical non-conformity criteria described below apply whatever assets and procedures the IA has used to search and clear an area, including MDD, mechanical assets, BAC and surface/subsurface visual or metal-detector search and area excavation.

- Any EO hazard located within the required search depth in the area presented by the IA as clear shall be regarded as a critical non-conformity.
- In areas where metal-detector search has been used, any piece of metal of a size equal or greater than the metal content of the smallest anticipated hazard at the task that is located within the required clearance depth shall be regarded as a

critical non-conformity. When search with ferrous locators has been authorized at a task, the metal located must be ferrous (when plastic cased mines are anticipated, ferrous locators shall never be used to search for them). If a non-ferrous EO hazard is located during QC of an area searched with ferrous locators, that shall be recorded as a critical non-conformity that is not the IA's responsibility.

- In areas where 'instrument assisted BAC' has been conducted, all metal detector indications using the designated 'instrument' should have been investigated to the search depth required at the task, or required in that part of the task. If the metal is beneath that depth, it can be left because there is confidence that it will not be an EO hazard. There should be evidence of excavation to the clearance depth for every metal-detector indication that is found during QC sampling. When there is a metal detector indication and the depth of excavation is checked by removing loosened ground and is found to have definitely not reached the required clearance depth, that shall be recorded as a critical non-conformity.
- In areas where area excavation has been conducted, the approved method should involve advancing by placing the excavated material behind the baseline. This means that the entire area searched is eventually covered with loosened ground. Whenever possible, QC inspection shall use similar tools and procedures to check that the required depth has been maintained (allowing for ground bounce). Except where shallow or surface rock prevents any hazards being present, evidence that the required minimum search depth has not been achieved shall be a critical non-conformity.

As soon as one critical non-conformity is located in any sample box during QC, that sample box should be rejected and required to be searched again.

If a critical non-conformity is found in two separate sample boxes during QC at a task, this will constitute a lack of confidence in the search and clearance conducted by the IA. The QC should withdraw and declare the QC inspection completed and the area rejected. The IA may then be permitted to conduct corrective work at the task and ask for re-inspection.

Note: Any EO hazard, whatever its metal content that is located during QC represents a critical non-conformity. If the kind of hazard was not anticipated at the task, responsibility for the non-conformity may not rest with the IA, but it will still be necessary to search the area again in order to be sure that the land is safe to release.

6.5.4 Corrective actions required by the LMAC

In all cases of critical non-conformities being found during IMAC QC, the following procedures shall be carried out:

- An on-site meeting shall be held between the LMAC and a representative of the IA in which the representative shall be informed about the nature of the non-conformity(ies);

- When EO hazards are found in the area declared clear, LMAC investigators shall determine whether a) it is possible/credible that the EO hazard was moved onto the site after the task was completed or (b) the located EO hazard was below the required search depth at the task at the time the search was conducted.
- The IA shall be invited to conduct its own investigation into each critical non-conformity and provide LMAC with reasons for them. The IA should also propose corrective actions that they can take.

If it is found that the EO hazard(s) located during sampling were missed because the approved search and clearance methods could not have located them, then the LMAC shall assume responsibility for the remaining EO hazard. Following QM principles, the Clearance plan shall be reviewed with a view to determining how an error was made during task planning and correcting any failings to avoid repetition. The task area shall be reassessed and a new clearance plan using procedures able to reliably locate the EO hazards issued.

If it is found that the EO hazard was placed in the area after clearance had been completed and the IA had left the site, LMAC investigators should try to determine why this has occurred with a view to preventing repetition. In this instance, LMAC should reassess the area and determine what, if any, further work is required before the task can be released.

If it is deemed that any EO hazard located during QC sampling could have been located but was missed by the IA, the IA should take urgent and effective corrective measures that are agreed with the LMAC QA/QC Section. If this does not occur, the IA's accreditation should be suspended. When necessary, an LMAC authorized sampling team may return and initiate an up to 10,000m² box search to the depth(s) required in the Clearance plan. If any additional EO hazards are discovered within the searched box, LMAC's Head of Operations shall decide whether the entire task site needs to be searched again. In such instances, the IA responsible for the critical non-conformity(ies) shall bear all reasonable costs associated with searching and clearing the land again.

Whenever land presented as 'cleared' is found not to be free from EO hazards, the landowner and potential land users shall be informed that the land may still contain EO hazards and appropriate warning signs placed (or left in place). Unless it is likely that re-mining may recur, the land should be scheduled for appropriate clearance as soon as possible.

6.5.5 LMAC QC re-inspection

A QC re-inspection may be conducted after an IA reports completion of agreed work intended to correct critical non-conformities. In some cases LMAC authorized external QA conducted during the corrective work may be considered sufficient to give confidence of the quality of the work. During a re-inspection, the area that has been re-cleared is subjected to QC by an LMAC assigned inspection body and selected areas are re-searched. Selected areas may or may not include areas previously QC searched.

If a task declared 'cleared' fails re-inspection, the LMAC shall require the entire area to be searched and cleared again. When it is found that the assets approved for use at the task could have reliably located the EO hazards present, this task should be given to a different IA. When the assets and procedures approved for use at the task were not able to reliably locate the hazards, the same IA may be tasked to repeat the work using more appropriate means.

When an IA presents a task for QC re-inspection and critical non-conformities are found during that inspection, LMAC may suspend or withdraw the accreditation from the IA concerned. Further details can be found in NMAS 07.30 Guide for the Accreditation of Mine Action Organizations and Operations.

6.5.6 LMAC QC documentation requirements

QC should be conducted on randomly selected parts of an area that has been presented as 'clear'. Targeted selection of some QC areas is permitted when random selection does not result in high risk areas being fully represented in the samples selected for QC. The sample plan, the methods used during QC inspection, the results, and any re-inspection record shall be recorded by the QC inspectors. Details of simple and critical non-conformities shall be recorded, including the location, depth, types of any EO hazards located and any other failures to comply with the requirements of the tasking order and Clearance plan. Details of all corrective action shall also be recorded. All records shall be submitted to the LMAC for inclusion in the completion report for the task before it can be released as 'cleared'.

7 Roles and responsibilities

7.1 The LMAC

The LMAC shall:

- provide guidance on QM in mine action within Lebanon and update it as appropriate;
- require mine action IA's operating in Lebanon to have a documented QM policy;
- monitor mine action IAs in accordance with NMAS 07.40 and this NMAS;
- monitor and review the quality performance of all IAs engaged in mine action activities in Lebanon at regular intervals;
- provide any IA that is allocated a clearance task with clearly stated details of the anticipated EO hazards, the area to be searched and cleared, and the depth(s) of search required;
- arrange for the inspection, and re-inspection when applicable, of land presented as 'clear' by the IA in a timely manner whenever possible;

- investigate simple and critical non-conformities to determine the reasons behind such failures and take what measures are appropriate to ensure they are not repeated;
- provide direction on any specific corrective action to be taken by the IA following an inspection of a critical non-conformity; and
- maintain documentation of all QC inspected land.

7.2 The Implementing Agencies (IAs)

All mine action IAs shall:

- establish and maintain an effective and documented QM policy and related QM system;
- establish quality objectives that meet its internal quality policy and the goals of the LMAP;
- apply quality management practices and procedures that lead to demining activities that meet or exceed the minimum requirements of the NMAS;
- maintain accurate and honest documentation that records QM activities and make that documentation available to the LMAC as required;
- comply with the terms and requirements of the signed MoU, the NMAS and the Task Dossier;
- conduct internal QC before presenting any task or task area as 'cleared';
- investigate all QC failures to determine the reasons behind non-conformities and correct them; and
- maintain and make available clear and detailed records of their search and clearance activity and, when necessary, any re-clearance conducted.

7.3 Donors, clients and other stakeholders

Those organisations contracting or funding mine action operations in Lebanon shall:

- specify and agree their QM requirements to those mine action IAs that they support in clear and unambiguous terms; and
- include compliance with the LMAC's QM requirements in contracts, memoranda of understanding and other relevant documentation.

**ANNEX A: Normative and informative references**

September 2023

The documents listed below constitute normative references and form an integral part of the provisions of this standard:

- NMAS 05.10 Information management;
- NMAS 07.14 Risk Management;
- NMAS 07.30 Guide for the Accreditation of Implementing Agencies;
- NMAS 07.40 Monitoring Demining Organizations and Operations;
- NMAS 09.10 Clearance Requirements;
- NMAS 09.40 Guide for the use of MDD;
- NMAS 10.10 General Guidelines for Safety and Occupational Health; and
- NMAS 04.10 Glossary of Mine Action Terms, Definitions, & Abbreviations used in the Third Edition of the NMAS;

The documents listed below constitute informative references to this standard:

- IMAS 07.12 Quality Management in Mine Action;
- ISO 2859 Sampling Procedures for Inspection;
- ISO 9000 Quality Management: <http://www.iso.org/iso/home/about.htm>; and
- IMAS 09.20 The Inspection of Cleared Land; Guidelines for the Use of Sampling Procedures.



NMAS 07.14, Edition 3.0: amendment record

September 2023

The NMAS are subject to a comprehensive or partial review by the Review Board periodically. Changes in the context as well as safety requirements and efficiency considerations may necessitate amendments to individual NMAS standards more frequently. If this occurs, such amendments shall be given a number, dated, and detailed in the table below. The amendment should also be indicated on the header under the NMAS edition number.

Whenever the formal review of the NMAS is completed, a new edition shall be issued. Amendments that have taken place before the review date shall be incorporated in the new edition and the amendment record table cleared. Consequently, the recording of amendments shall start again until the next review.

The most recent revisions of the NMAS shall be posted on the Lebanon Mine Action Center (LMAC) website on www.lebmac.org.

Number	Date	Amendment Details