



**NMAS 07.14**

**Risk Management in Mine Action**

**Edition 1**

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**Lebanon Mine Action Center-LMAC**

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## Foreword

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 NMAS in 2010 and were written to comply with the first edition of the International Mine Action Standards (IMAS). Since then, the scope of the IMAS has been expanded to include more components of mine action and amended to mirror the most recent changes to standards as required in today's operations. These changes, as well as changes in the local context of Lebanon, necessitated a review and update of the NMAS in 2018. This document has been added in 2020 because a related IMAS was published in 2019.

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 made available on the LMAC's website [www.lebmac.org](http://www.lebmac.org) or can be obtained through contacting the LMAC via the email [info@lebmac.org](mailto:info@lebmac.org).

## Acronyms

IA	Implementing Agency
IMAS	International Mine Action Standards
LMAA	Lebanon Mine Action Authority
LMAC	Lebanon Mine Action Center
LMAP	Lebanon Mine Action Program
NMAS	National Mine Action Standards
LNMAS	Lebanon National Mine Action Strategy
SOPs	Standing Operating Procedures (Standard Operating Procedures)
TSG	Technical Standards and Guidelines

## **Introduction**

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

Risk management is not only about ensuring the safety of the people who will use land that is released and the deminers who will conduct the procedures necessary to prepare land for release. Every decision that mine action staff take involves managing risk, although many of those will be financial and reputational risks rather than the kind that is directly related to physical safety. All mine action staff from managers to deminers/searchers should be aware of the importance of risk management.

The principles and processes described in this document are applicable to any situation in which mine action IA managers must take decisions about achieving objectives, satisfying requirements, releasing land, and retaining stakeholder confidence.

The LMAC recognizes that some mine action IAs in Lebanon may already use a risk management system. This NMAS does not seek to dictate the detail of how risk is identified, assessed and managed, only that the system be comprehensive, effective and well documented.

## Risk management in mine action

### 1 Scope

This NMAS provides guidelines for the implementation of risk management principles, practice and processes in mine action agencies working in Lebanon. This standard guides the LMAC and shall also guide all mine action Implementing Agencies (IAs) in their day-to-day operations.

### 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 provide a list of 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:

- *Risk Assessment*: the systematic use of evidence from experience to evaluate the relative risks associated with an activity and those associated with alternative means of achieving the same end state.
- *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'.
- *Risk mitigation*: the selection of appropriate ways of managing risk by risk avoidance and/or by taking measures to reduce the severity of the consequences following a risk event. Risk mitigation may be referred to as 'Risk treatment' or 'Risk reduction'.
- *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 ERW/EO (explosive hazards) from hazardous areas safely. LMAC will determine the level of effort that is reasonable at any task. In the event of disagreement, the final arbiters of what is 'all reasonable effort' shall be the Government and Courts of Justice in Lebanon.
- *Residual Risk*: residual risk is the risk remaining following the application of all reasonable effort to safely identify, define, and remove all presence and suspicion of explosive ordnance through non-technical survey, technical survey and/or clearance.
- *Tolerable risk*: for the purposes of the Lebanon NMAS, tolerable risk is defined as the risk remaining after all reasonable effort has been applied to managing and mitigating

risk. The 'tolerable risk' remaining after an area has been searched, cleared and released is the risk of explosive hazards being beneath the required search depth in that task area. The 'tolerable risk' to demining staff is the risk remaining after all reasonable efforts have been made to train, equip and supervise staff in the conduct of inherently safe demining procedures. All reasonable effort includes the production of a formal task risk assessment designed to ensure that appropriate measures to mitigate risk are taken at each task. All formal risk assessments must be updated as work progresses and new information becomes known. The LMAC shall determine the level of risk that is tolerable at any task. In the event of disagreement, the final arbiters of what is 'all reasonable effort' shall be the Government and Courts of Justice in Lebanon.

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 risk management in mine action is to identify, assess, control and review risk wherever it may arise to ensure that the mine action IA's projects and activities are safe, efficient and effective.

## **5 Advantages and principles**

### **5.1 Advantages of having a formal risk management system**

The adoption of a formal risk management system can help the managers of mine action IAs in Lebanon to:

- ensure compliance with the NMAS and relevant legislation in Lebanon;
- increase safety for all people in Lebanon;
- avoid costly surprises by identifying and mitigating risk;
- achieve openness and transparency in decision-making;
- reduce losses caused by risk events;
- learn and share lessons from risk mitigation successes and failures;
- inform evidence based Quality Management decisions;
- improve stakeholder and donor confidence;
- allocate resources with informed efficiency; and



- improve communication and consultation, both internally and externally.

### **5.1.1 Leadership and commitment**

As with all management systems, the success of risk management relies on support and respect for the system being evident at all levels from senior managers to field operatives.

### **5.1.2 Appropriate, comprehensive and inclusive system**

Each mine action IA's risk management system should:

- be appropriate to the mine action context, activities and expectations of stakeholders;
- reflect commitments to meet obligations under the NMAS and the legislation of Lebanon;
- address all types of risk relevant to the IA's context; and
- ensure timely and appropriate involvement of stakeholders, including consideration of their knowledge and experience.

### **5.1.3 Communication and consultation**

Each IA's risk management system should draw on the knowledge, expertise and experience of staff, the accident/incident record, and other information resources, to assist in the identification, analysis and evaluation of risk and in the establishment of risk criteria. The system should also make provision to communicate with relevant stakeholders so that they have the information they need in order to be aware of risks relating to their own activities and responsibilities and manage them effectively.

The LMAC recognizes its responsibility to establish a mechanism for the sharing of evidence relating to the management of risk amongst mine action stakeholders. To further the sharing of risk evidence, the LMAC maintains an accident/incident record of risk events related to explosive hazards and requires all mine action organizations in Lebanon to support its maintenance with the provision of honest and accurate accident/incident data.

### **5.1.4 Flexible and responsive**

The formal risk management system adopted by each mine action IA in Lebanon shall be designed to be refined, adapted, and improved as the context changes and as the availability of risk event evidence increases. In some cases, the system itself may need to be refined. In many cases, the risk weighting assigned to predictable risk events or the probability of their occurrence will need to be recalculated regularly.

Risk mitigation measures can inadvertently introduce new risks so the system must be flexible enough to be changed rapidly as the need arises.

### **5.1.5 Integration with information management**

Risk management and information management are integral to all management systems. Each with its own cycle of revision and refinement, they provide the foundation for quality management at all levels.

Risk management provides important inputs into other management systems and in turn relies upon information received from those systems to ensure that it is relevant, up-to-date and effective. Risk management can only be fully effective when it is integrated into all aspects of the mine action IA's management systems.

Up-to-date, accurate and comprehensive information management is an essential part of effective risk management. The timely provision of relevant information is essential to reduce uncertainty and so to reduce risk.

### **5.1.6 Human factors**

When assessing and managing risk in mine action, relying entirely on subjective human perceptions should be avoided because instinct, habit and emotion can all reduce an individual's ability to be objective.

To reduce the effects of possible cognitive bias, quantitative data and a structured system of analysis should be used whenever possible. When sufficient objective data is not available, having several people apply the same assessment system can reduce the influence of any individual's unconscious bias.

### **5.1.7 Age, gender and diversity**

Risk managers should recognize that the probability of a risk event occurring and the consequences if it does occur may vary greatly between different age and gender groups and persons with disabilities, as well as between different ethnic, cultural and religious groups.

Risk managers should ensure that women, girls, boys and men are appropriately included in consultation and participation processes and procedures within mine action risk management systems whenever appropriate.

### **5.1.8 Continual improvement**

Mine action risk management systems are not yet mature so should be subject to continual review and refinement. At any time, external factors may change and make a particular risk assessment out-of-date, but the system itself may also prove inadequate or require refinement. Improvements must be made urgently whenever a change would predictably achieve a higher level of safety for people.

## 5.2 Tolerable risk and all reasonable effort

Actions taken to avoid, reduce, mitigate or otherwise modify risk rarely remove the risk entirely but the risk remaining can be 'tolerable'. In Lebanon, tolerable risk is defined as the risk remaining after all reasonable effort has been applied to managing and mitigating risk. The tolerable risk remaining after an area has been searched, cleared and released is the risk of explosive hazards being beneath the required search depth in that task area. The tolerable risk to demining staff is the risk remaining after all reasonable efforts have been made to train, equip and supervise staff in the conduct of inherently safe demining procedures.

All reasonable effort includes the production of formal task risk assessments designed to ensure that appropriate measures to mitigate risk are taken at each task. All formal risk assessments must be updated as work progresses and new information becomes known. The LMAC shall determine the level of risk that is tolerable at any task and may require changes to a mine action IA's risk assessment and risk mitigation measures.

## 6 Risk management system

The mine action risk management system in use may vary between mine action agencies but all mine action IA's risk management systems should include:

- a risk management policy that ensures that all risks are identified and managed in a way that avoids the taking of unnecessary or 'intolerable risks';
- a risk register, identifying risks and recording the risk avoidance or mitigation measures that are undertaken, and their results;
- a risk-event register in which accidents, incidents, near misses, nonconformities and other risk-related issues and events, including lessons learned are recorded;
- a means of appraising, recording, refining and adapting a formal task risk assessment for each survey and/or clearance task and submitting it for LMAC approval;
- a systematic risk review process;
- adequate training in the implementation and maintenance of the risk management system; and
- the sharing of the up-to-date risk register and risk-event register with the LMAC when required.

## 7 Risk management process

Key elements of the risk management process are:

- understanding the context within which mine action operations take place in Lebanon;
- determining the scope of risk management activity, and establishing risk criteria to support appropriate, informed, and effective decision-making;
- identifying risks relevant to the achievement of mine action objectives;
- evaluating each risk to determine whether the level of risk is tolerable, or whether risk avoidance or mitigation is necessary;
- analyzing risks associated with each procedure to determine a level of risk that can be compared with alternative procedures;
- managing risks in a way that ensures that any residual risk remaining is tolerable; and
- reviewing risk decisions to ensure that the risk management system remains up-to-date, relevant and effective.



The graphic above illustrates managing a risk over time, during which the context always changes. Although 'cyclic', this is not strictly a 'cycle' because it is moving forward in time and responding to changes in the context as it does so.

### 7.1 Understanding the context

The risk management context is the external and internal environment within which the mine action IA works. The understanding of the external context in the various regions of Lebanon is a key responsibility of risk managers.

When assessing the external context, mine action IA managers should consider:

- social, cultural, political, legal, gender and diversity, regulatory, financial, technological, economic and environmental factors at national, regional and local levels;
- the requirements of the LMAC and of their accreditation to work in Lebanon; and
- external stakeholder relationships, perceptions, values, needs and expectations.

When assessing their internal organizational context, risk managers may like to consider their agency's:

- management structure;
- staff composition, including gender and diversity dynamics;
- standards, procedures and methods used;
- capabilities, in terms of resources and knowledge;
- data, information systems and information flows; and
- contractual relationships and commitments.

## 7.2 Scope of risk management

When deciding the scope of risk management in their agency, the managers should take into account the need for risk management to be integrated with other management systems in use. The scope of risk management in mine action should be determined with reference to:

- the operational, administrative and management activities being undertaken;
- an up-to-date and accurate analysis of the external context where the work is being conducted;
- an up-to-date and accurate analysis of the mine action agency's capabilities; and
- the needs, expectations, requirements and preferences of the LMAC and other stakeholders.

The scope should be adequate to encompass all risks that influence the mine action IA's ability to support the LMAC's mine action strategy for Lebanon.

## 7.3 Risk criteria

Risk criteria inform decisions about whether a specified level of risk is tolerable or not. Risk criteria adopted by the LMAC reflect a combination of globally established criteria and criteria reflecting the values, policies and objectives of the LMAC.

All mine action IAs risk criteria in Lebanon should include the following:

- the physical safety of person using land after it has been released;
- the physical safety of persons engaged in mine action work;
- the protection and safeguarding of all beneficiaries;
- the agency's need to comply with legal requirements in Lebanon and in their base country, when that is outside Lebanon;
- the agency's need to acquire and maintain a good professional reputation with the LMAC, their donors and the international community;
- the need to meet the agency's internal Quality Management requirements;
- the need to conduct work in an environmentally sensitive manner; and
- the agency's need to avoid financial loss.

## 7.4 Identifying risk

The purpose of risk identification is to identify and describe risks that may influence the ability of the mine action IA to achieve its objectives safely. Risk identification systems should remain up to date and relevant to the prevailing circumstances and conditions.

Mine action IAs should appoint risk managers who are appropriately trained to recognize risk. Mine action risks are not limited to those associated with explosive hazards. While the safety of members of affected populations and of mine action staff is of the highest priority, the ability of IAs to achieve their objectives depends on other factors ranging from the supply of equipment, through the competence of management, to the availability of a secure environment in which to work. Effective risk identification in mine action IAs should include consideration of areas of uncertainty and risk in relation to all aspects of the context in which work is carried out.

## 7.5 Analyzing risk

The purpose of risk analysis in mine action is to understand the characteristics and nature of risk including the level of risk. Risk analysis includes consideration of:

- the probability of potential risk events occurring;
- the nature and magnitude/impact of predictable consequences;
- interactions between risks and the complexity of those interactions;
- when an identified potential risk event is likely to occur;
- task or circumstance specific conditions; and
- the effectiveness of existing risk controls.

Risk analysis in mine action is semi-quantitative in nature because the necessary data to conduct a strictly quantitative (so statistical) analysis is not gathered, so not available. The IA's risk managers should liaise closely with the LMAC to identify opportunities to collect relevant data to increase the potential for quantitative and statistical analysis of risk whenever it is feasible and efficient to do so. When an assessment is based on qualitative input, the experience and opinion gathered should be as broad as possible.

The IA's risk managers may like to use established risk analysis techniques some of which can also be used for risk identification. Examples that may be considered can be found in Annex B of the IMAS 07.14 risk Management in Mine Action.

## 7.6 Evaluating risk

Risks are evaluated in order to decide whether a risk is at a level that can be reduced or avoided by the application of mitigation measures. It is sometimes possible to avoid risks by using alternative tools or procedures but the avoidance can introduce new risks that must then be identified, analyzed and managed. Whenever there is an intolerable risk to the safety of people, the risk must be reduced to a tolerable level. Whenever there is an

intolerable risk to assets or equipment, the risk should be reduced to what the mine action IA considers to be a tolerable level.

Risk criteria are used to make decisions about the tolerability of risk. Tolerable risk is defined in Lebanon as the risk remaining after all reasonable effort has been applied to managing and mitigating risk. The 'tolerable risk' remaining after an area has been searched, cleared and released is the risk of explosive hazards being beneath the required search depth in that task area. Explosive hazards being left at or above the search depth would be intolerable, so the search procedures and equipment used at a task must have been proven to be effective at locating all the explosive hazards that could be reasonably anticipated to the agreed search depth.

The 'tolerable risk' to demining staff is the risk remaining after all reasonable efforts have been made to train, equip and supervise staff in the conduct of inherently safe demining procedures. All reasonable effort includes the production of a formal task risk assessment designed to ensure that appropriate measures to mitigate risk are taken. All formal risk assessments must be updated as work progresses and new information becomes known.

The risk evaluation must be documented and approved by the LMAC.

## **7.7 Mitigating risk**

Risk mitigation in mine action is the process of deciding actions that will ensure that intolerable risks are avoided, then implementing those actions, then monitoring those actions to ensure their effectiveness. Because RM is not a science, it is not only intolerable risks that should be mitigated. When the consequences of any identified risk event would predictably involve human injury, action should be taken to ensure that the probability of the event occurring is always as low as possible.

### **7.7.1 Options for mitigating risk**

When an identified risk is not already at or below a tolerable level, potential ways of mitigating the risk include:

- avoiding the risk by not undertaking the activity or avoiding the circumstances that give rise to the risk;
- removing the source of the risk by taking action to move, destroy or otherwise separate the source of the risk from intended activities;
- taking action(s) to make it less likely that the identified risk event will occur; and
- taking action to reduce the consequences to a tolerable level if the risk event occurs.

Risk mitigation measures are not mutually exclusive and a combination of ways of making a risk tolerable may be appropriate. For example, reducing the probability of the risk event

occurring should always be accompanied by taking action to reduce the consequences of the potential risk event.

The IA's risk managers should always consider the possibility that risk mitigation measures may introduce new risks that then need to be identified and managed.

## **7.8 Residual risk**

'Residual risk' is the risk that remains after all reasonable measures have been taken to achieve the goal safely

The level of risk following risk mitigation should be assessed and shared with the LMAC. If the LMAC determines that the level of risk remaining (the residual risk) is tolerable, further risk management measures will not be required. If the LMAC determines that the residual risk is not tolerable, the IA risk managers will be required to take further risk mitigation/reduction measures until a tolerable level of risk can be achieved.

## **7.9 Risk ownership and liability**

The 'risk owner' is the person with the responsibility and authority to manage a risk. In Lebanon risk ownership is divided between the LMAC (as the national authority) and the managers of the mine action IAs conducting approved tasks. As long as the risk is managed in accordance with the NMAS, the liability for the consequences of a risk event is limited but, in exceptional cases, risk ownership in Lebanon may also be subject to requirements of national legislation. For each IA, risk ownership may be delegated in job descriptions or by default, but the risk owner will always remain the mine action IA's most senior manager in Lebanon because the responsibility for ensuring that risks are identified and appropriately managed lies with the manager.

The LMAC provides Quality Management oversight but cannot be present at all times, so does not have responsibility for making risk assessments or for ensuring that they are revised in a timely manner. However, if the IA has done all that was reasonable to manage risk and has documented its risk management decisions and actions appropriately, they will have complied with this standard and limited any liability should a risk event occur.

Liability refers to any legal responsibility, duty or obligation that an individual or a mine action IA may have. Liability in relation to an event such as an accident involving an explosive hazard or the discovery of an explosive hazard in an area declared cleared, shall be assessed by the LMAC in terms of non-compliance with the agreed clearance plan, the IA's approved SOPs and their risk management system. When appropriate, the IA may be required to take corrective measures or, in extreme cases, may have their accreditation to work in Lebanon withdrawn.

The application of an effective risk management system that is well documented should ensure that any risks associated with legal liability are always tolerably low.



## 7.10 Monitoring

Risk management processes are monitored by the LMAC. Indicators used when assessing the effectiveness of risk management in Lebanon include:

- the mine action IA's use of a coherent and appropriate risk management system and its consistent application;
- any deviation from agreed task planning that may render the associated risk assessments invalid;
- the occurrence of accidents/incidents and their potential or actual severity;
- the occurrence of quality nonconformities that could impact on safety;
- the occurrence, type and severity of environmental nonconformities; and
- complaints and other stakeholder feedback.

Mine action IA managers should identify and establish other indicators relevant to the scope and context of their agency's operations.

## 7.11 Review

Reviewing the effectiveness of risk management activities is essential to ensure that the selected risk avoidance/mitigation activities have been effective. The review also ensures that the changing context and increased knowledge about a task have not altered the relevant risk assessments. Generally, whenever new information about a task is gathered, such as the discovery of unanticipated explosive hazards or ground conditions, or an accident/incident occurs, the risk assessment for that task must be reviewed urgently.

Mine action IA's that are conducting survey or search and clearance activities shall include a unique risk assessment for that task in the work plan that they submit to the LMAC for approval.

### 7.11.1 Recording, reporting and communicating

The risk management system adopted by the IA shall be included in the agency's SOPs and submitted for the approval of the LMAC as soon as is practicable. A mine action IA's accreditation to work in Lebanon cannot be renewed unless the IA complies with this requirement, which is also a requirement of the IMAS.

The mine action IA's risk management system should detail their risk management procedures, defining the risk context, scope and risk avoidance/mitigation criteria. It should assign risk management responsibilities and shall require the maintenance of documented evidence that the risk management system has been effectively implemented.

Information to support the continual improvement of risk management in mine action should be communicated to the LMAC as required.

## **8 Roles and responsibilities**

### **8.1 Role of the LMAC**

The LMAC shall:

- communicate criteria and guidance on the management of risk in mine action within Lebanon;
- require mine action IAs to establish internal risk management systems that are coherent and appropriate in accordance with the requirements of this NMAS;
- gather and make available evidence of previous risk events and risk management activities to inform evidence based risk assessments;
- monitor and review the IA's management of risk as part of the LMAC QM systems; and
- act appropriately on the conclusions and recommendations of risk management reviews.

### **8.2 Role of IAs**

All mine action IAs shall:

- establish and maintain an effective and documented risk management system;
- establish risk management policies, processes and procedures appropriate to the scope of the agency's activities in compliance with this NMAS;
- apply management practices, and risk management and operational procedures adequate to ensure the effective and efficient achievement of safety objectives;
- maintain accurate and honest documentation that records the management of risk at every task and make that documentation available to the LMAC as required.

### **8.3 Donors, clients and other stakeholders**

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

- specify and agree their risk management criteria to those mine action implementing agencies that they support in clear and unambiguous terms; and
- include details of the LMAC's risk management requirements in contracts, memoranda of understanding and other relevant documentation.

**ANNEX A: Normative and informative references**

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

- NMAS 04.10 Glossary of Mine Action Terms, Definitions, & Abbreviations used in the Second Edition of the NMAS;
- NMAS 07.11 Guide for Land Release;
- NMAS 07.12 Quality Management (which includes a “Guide for the inspection of cleared land”);
- NMAS 07.30 Guide for the accreditation of Implementing Agencies; and
- NMAS 07.40 Monitoring Mine Action Organizations and Operations.

The documents listed below constitute informative references to this standard:

- ISO 31000 – Risk Management: <http://www.iso.org/iso/home/about.htm>;
- The accident/incident record in Lebanon (LMAC); and
- Annex B of IMAS 07.14 Risk Management in Mine Action.

## NMAS 07.14, Edition 1: amendment record

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](http://www.lebmac.org).

<b>Number</b>	<b>Date</b>	<b>Amendment Details</b>