



## **NMAS 09.33**

### **Guide for the Demolition of Mines and Explosive Ordnance**

**Edition 2.1**

**(replacing the former NMAS 09.31)**

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**Lebanon Mine Action Center-LMAC**

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### **Warning**

This document has been released on the date shown on the cover page. The National Mine Action Standards (NMAS) of Lebanon are subject to regular review and update, so users are advised to consult the most recent version. To ensure that you have access to the current version, contact the Lebanon Mine Action Center (LMAC) through the [www.lebmac.org](http://www.lebmac.org) website or by sending an email to [info@lebmac.org](mailto:info@lebmac.org).

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## Table of Contents

Foreword.....	iv
Acronyms .....	v
Introduction .....	vi
1. Scope.....	1
2. References .....	1
3. Key Terms and Definitions.....	1
4. General Guidelines .....	2
5. Demolition Procedures .....	3
5.1 Introduction.....	3
5.2 In-situ demolition .....	3
5.3 Prior warning of demolitions.....	3
5.4 Designated demolition sites .....	4
5.5 Conduct of Demolitions.....	4
5.6 Sentries.....	5
5.7 Charge Placement.....	5
5.8 Safety.....	5
5.9 Large Scale Open Burning and Open Detonation (OBOD).....	6
6. Roles and Responsibilities .....	6
6.1 Role of the LMAC.....	6
6.2 Role of IAs.....	7
ANNEX A: Normative and Informative References.....	8
NMAS 09.33 Edition 2.1 Amendment Record.....	9

## 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, have necessitated a review and update of the NMAS.

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 are reviewed as needed to reflect amendments in the IMAS as well as incorporate changes to international obligations and local requirements. Such revisions are 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).

In 2018, it was decided to adopt the numbering of standards used in the IMAS for the Lebanon NMAS. When the NMAS Guide for the Demolition of Mines and EO was published in 2018, it was numbered NMAS 09.31 because there was no IMAS with that number. A subsequent release of an IMAS numbered 09.31 has caused a numbering conflict so the number of this document has been changed. From the date of its dissemination, this document replaces the former NMAS 09.31 as the national standard providing a Guide for the Demolition of mines and EO and the 2018 NMAS 09.31 should no longer be used. Users should replace the former NMAS 09.31 with this document

## Acronyms

BAC	Battle Area Clearance
EO	Explosive Ordnance (of any kind)
EOD	Explosive Ordnance Disposal
ERW	Explosive Remnants of War
HMA	Humanitarian Mine Action
IA	Implementing Agency
IMAS	International Mine Action Standards
LA	Local Authority
LAF	Lebanese Armed Forces
LMAA	Lebanon Mine Action Authority
LMAC	Lebanon Mine Action Center
LMAP	Lebanon Mine Action Program
NMAS	National Mine Action Standards
OBOD	Open Burning and Open Detonation
SOP	Standard Operating Procedure
TSG	Technical Standards and Guidelines
VHF	Very High Frequency

## **Introduction**

This NMAS provides guidelines for the demolition of mines and all other Explosive Ordnance (EO). It focuses on ensuring that all demolitions are conducted safely, effectively, and with minimum impact on the surrounding population and environment.

Demolitions can scatter fragmentation over a wide area and unscheduled demolitions can cause unease and distress to the local population. Unauthorized demolitions may also cause unnecessary alerts among the LAs, local police, LAF and/or UNIFIL. To avoid these problems, the demolition of all EO shall always comply with the requirements of this NMAS.

The tightly controlled demolition of explosive hazards shall either occur inside the perimeters of task sites or in designated demolition areas that have been formally approved for that use by the LMAC.

All munitions and weapons caches discovered by implementing agencies (IAs) during demining work shall be reported to the LMAC immediately. The LMAC should arrange for them to be secured, transported when necessary, and ultimately destroyed.

Although the Government of Lebanon neither possesses nor maintains a stockpile of anti-personnel mines it is possible that while conducting demining operations implementing agencies (IAs) may come across abandoned anti-personnel mine caches or stockpiles placed by previous militias. These shall be recorded and formally demolished under the direction of the LMAC.

## Guide for the Demolition of Mines and EO

### 1. Scope

This NMAS provides standards and guidelines for the demolition of mines and all explosive hazards. It is designed to ensure that all demolitions that take place in Lebanon are conducted safely, effectively, and with minimum disruption.

This NMAS should be read in conjunction with NMAS 09.20, Clearance Requirements, NMAS 09.11 Battle Area Clearance (BAC) and NMAS 09.30 Explosive Ordnance Disposal (EOD).

### 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 for a clearer understanding of this standard.

### 3. Key Terms and Definitions

The following key terms and definitions are used in this NMAS:

- *Deflagration*: the conversion of explosives into gaseous products by chemical reactions, at or near the surface of the explosive: burning through heat transfer rather than shock wave transfer as in a detonation.
- *Demolition (of EO)*: the process of converting EO or explosive material into a state that no longer presents an explosive hazard.
- *Demolition ancillaries*: ancillary items used by IAs during demolitions such as wires and exploders and parts which may be hazardous, such as detonators and primers.
- *Demolition Site*: an area authorized for the destruction of ammunition and explosives by any approved means. Also known as a *Demolition Ground* or a *Central Demolition Site (CDS)*.
- *Detonator*: a device containing sensitive explosives designed to produce a shock wave of sufficient force to start a detonation reaction in high explosives.
- *Explosive Ordnance (EO)*: all munitions or parts of munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket and small arms ammunition; all mines, torpedoes and depth charges; pyrotechnics; cluster munitions and dispensers; cartridge and propellant actuated devices; electro-explosive

devices; clandestine and improvised explosive devices; and all similar or related items or components that are explosive in nature (adapted from IMAS, 2nd ed., 2014).

- *Explosive Ordnance Disposal (EOD)*: the identification, evaluation, render safe, recovery and disposal of EO. EOD may be undertaken as a routine part of demining operations; upon discovery of ERW; to dispose of ERW discovered outside hazardous areas (this may be a single item of ERW, or a larger number inside a specific area); or to dispose of explosive ordnance which has become hazardous by deterioration, damage, or attempted destruction.
- *Explosives*: a substance or mixture of substances, which, under external influences, is capable of rapidly releasing energy in the form of gases and heat in a detonation.
- *Unexploded Ordnance (UXO)*: explosive ordnance that has been primed, fused, armed or otherwise prepared for use or used. It may have been fired, dropped, launched or projected yet remains unexploded either due to malfunction, design, or any other reason.

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

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. General Guidelines

It is the responsibility of the Implementing Agency to ensure that its staff conduct all demining and EOD activities in accordance with all NMAS and with detailed SOPs that have been approved by the LMAC for use.

Demolitions are a part of explosive ordnance disposal that may be preceded by authorized render safe or neutralization procedures. All demolitions and EOD work shall be conducted by appropriately trained and experienced staff who have the appropriate individual accreditation from the LMAC.

Some hazards present a specific or additional threat, such as sub-munitions, munitions containing white phosphorous or missiles containing propellant. Persons tasked to destroy these items shall be specifically trained and experienced to conduct demolition of the munition types and shall conduct their work in accordance with the IA's LMAC approved SOPs.



## **5. Demolition Procedures**

### **5.1 Introduction**

All explosive hazards found during demining operations should be destroyed using explosive methods unless an alternative method has been authorized by the LMAC. Alternative methods may, when authorized by the LMAC, include controlled burning and the use of disrupters and/or flares that may be designed to result in a deflagration rather than a detonation.

The EO located by an IA should be destroyed in the safest manner possible using disarming, neutralization or demolition procedures detailed in the IA's SOPS and approved by the LMAC. Those SOPs shall include details of when pulling procedures are conducted before handling or moving a device and include full details of the pulling equipment to be used.

Generally, the LMAC prefers that a pulling drill be used to move all anti-tank mines before neutralizing or disarming them. A pulling drill should also be used before handling or moving any other EO that may be booby trapped. In accordance with NMAS 09.20 IED Clearance, a pulling drill should be used for all hazards located during IED clearance.

Demolition of EO should be conducted at the end of each day or at a prearranged time daily. All EO located should be destroyed on the day that it is found unless formal LMAC approval has been granted for a variation to this requirement. If a hazard must be left overnight at a task site, the hazard shall be clearly marked and photographed before the IA leaves the site.

### **5.2 In-situ demolition**

The explosive demolition of EO 'in-situ' (without moving it from the place it is found) is often the preferred approach. However, with some munitions and in some contexts, this can be more hazardous than moving the munition. Some mines and EO may be safely moved for demolition nearby or neutralized for demolition elsewhere.

Surface laid mines incorporating an MUV type fuze may be moved a short distance, provided that the fuze is sleeved and pinned and the mine is undamaged. Buried mines incorporating an MUV type fuze shall not be moved for demolition without formal (written) LMAC approval.

Live fuses incorporating a cocked striker mechanism which have become separated from a mine should be destroyed in-situ. However, when deemed safe to move by the Site Supervisor, they may be moved short distances providing that they are sleeved and pinned or they are moved with an LMAC approved removal tool/grab.

### **5.3 Prior warning of demolitions**

All IA's conducting demolitions shall have reliable contact with the LMAC, the local Lebanese Armed Forces (LAF) Units and, when appropriate, the UNIFIL Operations Room. For security reasons, at least four hours before the firing of any explosive charge, the LMAC

and the LAF Units shall be told the time and place where the detonation will occur and the type of munitions being destroyed. The UNIFIL Operations room should be given the same information at least two hours in advance of the demolition. IAs conducting demolitions should also ensure that the LAs, any local military establishments, police stations, and local communities know about the demolition so that it does not cause unnecessary concern.

The bulk demolition of EO shall be avoided whenever the detonation, or potential detonation, is of a size that would predictably cause avoidable damage to the environment or unnecessary security concerns. For this reason, bulk demolitions should take place in a designated demolition site whenever possible.

#### **5.4 Designated demolition sites**

When practicable, the LMAC shall make available designated demolition sites for the use of accredited IAs. These sites may be designated temporary or permanent, and their authorised use may require a commitment for the user to rehabilitate the area for other uses after a period of time.

IAs may propose suitable designated demolition sites to the LMAC for their consideration. Generally, sites that minimise the risk of fragmentation hazard and of disturbance to the public should be selected.

Any IA that is authorised by the LMAC to use a designated demolition site shall take full responsibility for all actions they conduct at the site, including the maintenance of security and the safety of all persons and property in and around the site during its use.

When low-order, deflagration or burning demolition techniques are authorised for use, the safety distance requirements shall be the same as those used when similar items are disposed of using explosive charges.

Any IA that plans to use a designated demolition site shall submit detailed SOPs covering the use and management of the site to the LMAC. The use of demolition sites may be part of the IA's EOD SOPs. The SOPs shall be assessed and, when appropriate, approved. Notwithstanding LMAC approval, the responsibility for the consequences of any accident or incident that occurs during transit or at a demolition site shall be the sole responsibility of the IA involved.

#### **5.5 Conduct of Demolitions**

Demolitions shall be planned and conducted using procedures and equipment that are described in detail in the IA's SOPs that are submitted for the approval of the LMAC before use.

A demolitions supervisor who has been authorized to control demolitions by the LMAC should be responsible for the coordination and control of all demolition activities whether in

the field or at an authorized demolition site. The demolitions supervisor's responsibilities should include the following:

- selection and preparation of the demolition area;
- handling of explosives and ancillaries;
- testing of safety fuse or electrical cable;
- preparation and placement of all explosive charges or disruption equipment;
- maintenance of authorized safety requirements including a safety cordon;
- control of the firing;
- rehabilitation of the demolition area after detonation of charges; and
- the submission of relevant completion reports to the LMAC.

## **5.6 Sentries**

Sentries controlling access to the area are essential for the safe conduct of all demolitions. The IA shall ensure that sentries are positioned at appropriate intervals to prevent or report any unauthorized access around a perimeter cordon which is established outside the potential danger area for the demolition.

Sentries shall be briefed about their responsibilities and shall have effective communication with the demolition supervisor until the 'all-clear' is given. Whatever communication system is used, it shall be tested before and after the sentries are posted.

## **5.7 Charge Placement**

When destroying buried hazards in-situ, the approved procedure should involve removing as little of the ground as is necessary to gain access to the hazard. The demolition charge should be placed as close as possible to the hazard without touching it.

The high explosive charge(s) used should be of sufficient quantity to ensure complete destruction of the hazard. The type, age, and origin of explosives used to make charges may dictate how much explosive is appropriate to use.

Demolition charges should also be placed so ensure that the blast and fragmentation are directed away from vulnerable areas. When necessary, the use of sandbags or other protective works should be used to contain the effects of the detonation.

Electrical initiation should be the preferred means of firing explosive demolitions.

## **5.8 Safety**

The IA shall provide full details of their safety regime in the detailed demolitions SOPs submitted to the LMAC for approval before use.

The following should be required during demolitions:

- the minimum number of persons (one) should be involved in the preparation and placement of explosive charges or disruption ancillaries;
- all uninvolved staff shall stay at the firing point or place of safety until the demolitions supervisor instructs otherwise;
- smoking shall be forbidden within 25 meters of explosives;
- a suitably trained and experienced person shall be the designated demolitions supervisor;
- in case of a misfire, a *minimum* ten minute wait period for electrical misfire and a thirty minute wait period for non-electrical initiation systems should be applied;
- detonators shall be protected and kept separately from explosives (including detonating cord) until they are used;
- detonating cord shall be treated as explosives;
- electrical firing cable should be a minimum of 150 m in length, two-strand cable, with an appropriate resistance and tested for continuity before use;
- the minimum hazard radius applicable shall be calculated and adhered to;
- the minimum safety distance between VHF radios and any electrical firing circuit shall be 25 meters; and
- the minimum safety distance between mobile phones from all electrical firing circuits shall be 15 meters.

The wearing of PPE during demolitions shall be as described in the IA's LMAC authorized SOPs and should require eye protection to be worn at all times.

## 5.9 Large Scale Open Burning and Open Detonation (OBOD)

When planning large scale open burn and open detonation (OBOD) operations, the rules and guidance given in NMAS 09.32 should be applied. Particular attention should be given to the revised way of calculating the fragmentation and evacuation safety distances.

## 6. Roles and Responsibilities

### 6.1 Role of the LMAC

The LMAC shall:


- accredit demining organizations before assigning any tasks involving demolitions to them, in accordance with NMAS 07.12 Guide for the Accreditation of Mine Action Organizations and Operations;
- assess the IA's EOD and demolitions SOPs and, when appropriate, approve their use;
- oversee and provide certification and quality assurance of EOD qualifications;

- maintain a list of dedicated demolition sites to be shared with IAs, and approve and license disposal sites when appropriate;
- monitor the demolitions work of IAs to assure quality operations; and
- collect, analyze and store all relevant data related to demolitions.

## **6.2 Role of IAs**

In their capacity as demining organizations, IAs shall:

- acquire LMAC accreditation to conduct EOD and demolitions;
- comply with the national standards related to EOD and demolitions;
- provide appropriate and effective Standard Operating Procedures (SOPs) for EOD and demolitions for LMAC assessment and, when appropriate approval. These standards shall cover all demolitions procedures they will use in their work;
- ensure appropriate and timely data gathering, documentation, and reporting; and
- inform the relevant authorities and local communities before any demolitions.

	<b>LEBANON NATIONAL MINE ACTION STANDARDS</b>		<b>Edition 2.1</b>	<b>NMAS 09.33</b>
	<b>ANNEX A: Normative and Informative References</b>			
				<b>March 2020</b>

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

- Current LMAC and IMSMA reporting formats (request copies from the LMAC);
- NMAS 08.40 Marking Hazards;
- NMAS 07.11 Guide for Land release;
- NMAS 09.30 EOD;
- NMAS 09.32 Guide for Large Scale Demolitions and Burning;
- NMAS 12.10 Mine/ ERW Risk Education;
- NMAS 13.10 Mine Victim Assistance; and
- NMAS 04.10 Glossary of Mine Action Terms, Definitions, & Abbreviations used in the Second Edition of the NMAS.

In addition to the normative references listed above, the following informative references may be consulted:

- National Mine Action Policy 2007;
- IMAS 01.10 Guide for the Application of International Mine Action Standards (IMAS)
- Convention on Cluster Munitions;
- Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to be Excessively injurious or to Have Indiscriminate Effects; and
- The 1997 Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction, which is often abbreviated to the Anti-Personnel Mine Ban Treaty or the Ottawa Convention.

## NMAAS 09.33 Edition 2.1 Amendment Record

The NMAAS 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 NMAAS 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 NMAAS edition number.

Whenever the formal review of the NMAAS 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 NMAAS 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>
1	March 2020	Change of numbering from 3.1 to 3.3 because of numbering conflict with a new IMAS.
2	March 2020	Minor revisions throughout.