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## Operational procedures for Mine Detection Dogs

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## Foreword

International standards for humanitarian mine clearance programmes were first proposed by working groups at an international technical conference in Denmark, in July 1996. Criteria were prescribed for all aspects of mine clearance, standards were recommended and a new universal definition of 'clearance' was agreed. In late 1996, the principles proposed in Denmark were developed by a UN-led working group and the International Standards for Humanitarian Mine Clearance Operations were developed. A first edition was issued by the UN Mine Action Service (UNMAS) in March 1997.

The scope of these original standards has since been expanded to include the other components of mine action, and to reflect changes to operational procedures, practices and norms. The standards were re-developed and renamed as *International Mine Action Standards* (IMAS).

The United Nations has a general responsibility for enabling and encouraging the effective management of mine action programmes, including the development and maintenance of standards. UNMAS, therefore, is the office within the United Nations responsible for the development and maintenance of IMAS. IMAS are produced with the assistance of the Geneva International Centre for Humanitarian Demining.

The work of preparing, reviewing and revising IMAS is conducted by technical committees, with the support of international, governmental and non-governmental organisations. The latest version of each standard, together with information on the work of the technical committees, can be found at <http://www.mineactionstandards.org/>. Individual IMAS are reviewed at least every three years to reflect developing mine action norms and practices and to incorporate changes to international regulations and requirements

## Introduction

Mine Detection Dogs (MDD) can be used in many different roles within mine action programmes. They are best at working in areas where there are low concentrations of mines. As such, they are well suited for activities such as mine and ERW, including unexploded sub-munitions verification; area cancellation and delineation of boundaries; clearance of roads and road verges; clearance verification, including the rapid sampling of cleared areas (Quality Control (QC)), which can be done after both manual and mechanical demining; clearance or elimination of pockets of land unreachable to mechanical demining equipment; clearance of railways and sites heavily contaminated with metal; and creation of safe lanes for clearance start points.

Due to the many ways of using MDD, and the variety of demining scenarios in which they could be utilised, it is not possible to establish uniform standards that can be applied under all circumstances. There are, however, many common principles that can be applied to all MDD operations. This standard provides guidance about general and specific principles, which must be considered when establishing operational procedures for MDD. It is specific in areas where a common global practice has evolved, and general in areas where this has not yet happened.

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## Operational procedures for Mine Detection Dogs (MDD)

### 1. Scope

This standard provides specifications and guidelines for operational procedures to be adopted for MDD operations. This IMAS does not cover Remote Explosive Scent Tracing (REST) operations, which are covered separately in IMAS 09.43.

For the purposes of this standard, 'operational procedures' means procedures to be applied as part of a MDD operation. They include, but are not limited to operational accreditation, planning for MDD operations, preparation for MDD operations, MDD search procedures, MDD operations, environmental factors affecting MDD operations and rest and rotation of MDD, use of logbooks, and MDD health and capability checks.

### 2. References

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

### 3. Terms, definitions and abbreviations

A complete glossary of all the terms, definitions and abbreviations used in the IMAS series of standards is given in IMAS 04.10.

In the IMAS series of standards, the words 'shall', 'should' and 'may' are used to indicate the intended degree of compliance. This use is consistent with the language used in ISO standards and guidelines:

- a) 'shall' is used to indicate requirements, methods or specifications which are to be applied in order to conform to the standard;
- b) 'should' is used to indicate the preferred requirements, methods or specifications; and
- c) 'may' is used to indicate a possible method or course of action.

The term 'National Mine Action Authority (NMAA)' refers to the government entity, often an inter-ministerial committee, in a mine-affected country charged with the responsibility for the regulation, management and coordination of mine action.

Note: In the absence of a NMAA, it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all the functions, of a MAC or, less frequently, an NMAA.

The terms 'MDD organisation' in this IMAS refers to any organisation (government, NGO or commercial entity) responsible for implementing demining projects or tasks with the use of MDD. The MDD organisation may be a prime contractor, subcontractor, consultant or agent.

The term 'demining' refers to activities that lead to the removal of mines and ERW hazards, (including unexploded sub-munitions).

The term 'Mine Detection Dog' (MDD) refers to a dog specifically trained to detect the vapour from mines and ERW, which may be not only explosive vapours but also vapours from the case material and other substances. MDD training and deployment are often significantly different from those given to other search dogs.

The term 'target object' is used to describe the object that the MDD is supposed to detect during live mine/ERW detection. The target object may be a mine or ERW, or part thereof, of a type typically found during live operations in the area.

The term 'target odour' is used to describe the scent from the target object.

The term 'test item' is used for mines/ERW that are laid in the test site for detection by the MDD.

#### **4. MDD operational testing and accreditation of MDD organisations**

All MDD and their handlers employed on demining operations shall have passed all necessary operational testing, before being permitted to work-in an MDD-accredited organization. Specifications and guidelines for the operational testing of MDD and handlers are included in IMAS 09.42. Additional requirements for operational accreditation of MDD organisations may also be contained in relevant national standards.

#### **5. MDD records**

Demining organisations shall maintain records for each MDD to record important details concerning the health, training and work of the MDD. The records provide the demining organisation and external monitoring teams with a continuous written record of the MDD's health, training and work experience. The following information should be included:

- a) general data about the MDD such as breed, sex, genealogy, age (date of birth) and reproductive history;
- b) medical details. This should include basic medical statistics of the MDD, dimensions weight etc; records of any illnesses, diseases or injuries and the treatment given; dietary requirements; and records of all routine health checks and inoculations;
- c) training records to include the dates, duration and type of training carried out, including refresher training. Details should include instructors/handlers; environmental conditions (weather, atmosphere and site); operating procedures; target objects and laying details; results of training; and an analysis of the MDD's performance during training; and
- d) records of operational testing.

MDD records shall be managed in accordance with the requirements of the NMAA.

#### **6. Health and capability checks**

##### **6.1. General**

The ability of a MDD to perform properly can depend on its health and well-being, which means that a MDD's detection reliability may vary on a daily basis. It is therefore necessary for demining organisations to assess their MDD on a daily basis before and during any work sessions.

The assessment shall consist of a health check, and a capability test to provide confidence in the MDD's search capability. The capability test also acts as a 'warm-up' for the MDD.

##### **6.2. Health checks**

All MDD shall be given a health check each day before they are allowed to start work, and further checks should be made during the working day. If the check reveals that a MDD is ill or incapacitated in a way that might affect its detection ability, the MDD shall not be used until it has fully recovered. Guidance on the conduct of health checks is covered in IMAS 09.44. Further health checks are also required on completion of work each day.

Managers shall assess the MDD's working abilities in consultation with the MDD handler and the veterinarian (or MDD medic) before the MDD is allowed to work. If a decision is made to use a MDD with a minor health problem, particular attention must be given to the MDD's performance and well-being during the operations.

### **6.3. Capability test**

All MDD shall be given a capability test each day before they are allowed to start work. The aim of the capability test is to determine whether the MDD is capable of detecting the target odour, and is sufficiently lively, motivated and focused to work. The test can be undertaken in a number of ways, but the following is recommended:

- a) a test box should be prepared for each MDD in a safe area on the worksite, ideally some days in advance of the requirement for testing. The boundaries of the box should be marked. Mines or ERW (or parts thereof) of the types likely to be found during the demining operation should be placed in the ground. Small items may be placed just below the surface with tweezers or forceps. Additional spots within the test boxes should also show disturbance of the surface, and contain blind holes and non-mine targets; and
- b) prior to commencing work, each MDD will carry out a search in an individual test box with the MDD handler evaluating the MDD's obedience, motivation, concentration, and ability to detect the test items. When the MDD has demonstrated that it is searching and behaving satisfactorily, and can discriminate between the test items and other targets, the MDD can be considered fit for work for the day.

The same test box may be used for several days but it is recommended that new test boxes are prepared for use every second or third day. When using the same test box the search direction should be changed each day.

If a test box or lane is to be used several times, it is important to let each test item remain in the ground at the same location as it was originally placed. If the test items are moved the MDD may still detect the previous location due to soil contamination, so if test items must be moved, new sites should be built in a different location but in the same general area.

### **6.4. Recording**

Demining organisations shall maintain a logbook for each MDD that records details of the daily activities of the MDD such as results of internal testing, deployment location, site conditions, injuries or illnesses, and comments about the performance of the MDD.

If someone other than the MDD handler has written the logbook, the MDD handler shall sign the logbook after each entry to verify the entry and acknowledge the comment made.

MDD logbooks shall be kept on the site where the MDD are working and presented to monitoring teams upon request.

## **7. Planning for MDD operations**

When planning MDD operations there are a number of elements that should be considered:

- a) the possible hazards. An assessment of the hazards should be carried out to ensure that the MDD have been trained and tested for the target(s) being searched for or any other hazards that may be present (eg tripwires). If any hazards may be present that the MDD have not been trained or tested for, the MDD should not be deployed in the area until either these hazards have been removed, or the MDD have been trained to respond appropriately and that response appropriately tested;
- b) the number of MDD available for the task;

- c) the search procedures to be used. Details of MDD search procedures are covered in clause 9;
- d) the environmental conditions. The environmental factors that affect MDD operations are included in clause 10; and
- e) the task management requirements. The task management requirements will dictate the control and administration areas required. Details of these are included in clause 8.4.

## **8. Preparation for MDD operations**

### **8.1. General**

Preparation for MDD operations involves:

- a) ensuring that all training and testing requirements for the MDD (including accreditation of the MDD organisation) have been carried out and the MDD are ready for work. Details of the specifications and guidelines for the operational accreditation of MDD organisations are included in IMAS 09.42;
- b) ensuring that if the demining task is to take more than five days, temporary boxes in a suitable training area are prepared for on-site maintenance training;
- c) establishing the MDD worksite. The MDD worksite layout shall be established in accordance with the specifications and guidance included in this standard and IMAS 10.20; and
- d) ensuring that all necessary support for the operations is in place. Such support will include logistic and administrative support, but shall also include medical support, both for personnel and the MDD. IMAS 10.40 specifies the minimum requirements for medical emergency preparedness for demining operations. IMAS 09.44 provides guidelines for medical support to MDD.

### **8.2. MDD worksite preparation**

In establishing a MDD worksite it is necessary to ensure that:

- a) the on-site maintenance training site (where needed under 8b) has been installed;
- b) the minimum safety distances between MDD teams can be maintained;
- c) there are sufficient search areas for the number of MDD to be deployed on the task;
- d) any requirements for the management and supervision of the task can be complied with; and
- e) consideration is to be given to factors such as possible changes in wind direction, the humidity of the soil and vegetation, and areas of high moisture content that may prevent effective search.

### **8.3. Safety lanes**

Safety lanes, which are confirmed as clear of hazards, are used to provide access to and around the demining worksite. Safety lanes should not be less than 2.0m wide to allow safe passage for the handler and the MDD, and to allow casualty evacuation by stretcher in an emergency. Safety lanes shall be marked in accordance with the minimum requirements specified in IMAS 08.40.

#### 8.4. Search areas

Currently the most common method of deploying MDD is to divide the area into search boxes or panels with safety lanes between them. When this system is used, the following rules shall apply:

- a) clearly marked safety lanes are to be established around search areas. These may be cleared manually or by MDD with manual follow-up;
- b) the corners of each search box or panel shall be clearly marked so as to be visible to the MDD handler from all sides;
- c) when painted markers are used to mark the boundaries of search areas or other MDD working areas, they are to be painted a minimum of one week prior to starting operations to ensure that the paint is thoroughly dry; and
- d) the whole area inside the box or panel shall be visible to the MDD handler. If the vegetation is such that the handler is not able to observe the MDD at all times during the search, the vegetation shall be removed or the box or panel shall be divided into smaller sections.

#### 8.5. Control areas

Control areas for the management and supervision of the task shall be established for the MDD worksite in accordance with the specifications and guidance included in IMAS 10.20.

### 9. MDD operational procedures

#### 9.1. Search patterns

The two most common search patterns currently in use for MDD operations are:

- a) the search lane system. The MDD searches in a series of straight parallel lanes between 0.3m and 0.5m wide within a search box or panel. These lanes are typically up to 10m in length. The lanes may originate from any side of the search box or panel (depending on wind direction). The MDD may search with or without a leash, and the MDD may search on its way out from the handler only, or both on its way out and back; and
- b) the short-leash system. The MDD searches in a series of straight parallel lanes between 0.3m and 0.5m wide within a search box or panel. The lanes may originate from any side of the search area (depending on wind direction). The MDD handler will walk beside and behind the dog in the lane which has been previously cleared by his/her own dog. In high-risk areas, the area should have been searched by two MDD before the handler walks on the ground. This generally means that the area has been searched by an MDD on a long-leash before the short-leash system is used.

There are advantages and disadvantages in both the search patterns above, and some programmes prefer to search an area once with the long leash system, and once with the short leash. The relative advantages are:

- c) long leash can be faster, especially when the handler has clear oversight of the search lane; and
- d) short leash makes it easier for the handler to monitor the performance of the dog, to ensure complete search to the end of the lane, and to work in difficult terrain with limited visibility.

The following procedures apply when searching with MDD:

- e) the search shall follow the search pattern described in the demining organisation's SOPs;
- f) the MDD shall search the whole box or panel with no parts remaining un-checked;
- g) the MDD should search with its nose close to the ground at all times during the search; and
- h) neither the MDD handler nor any other person shall enter a suspected area before it has been searched by two MDD, except when a one-MDD search is carried out in accordance with the requirements of clause 9.3.

## **9.2. Safety distances**

IMAS 10.20 provides specifications and guidelines on the establishment of safety distances for demining operations. With MDD operations, the minimum safety distance also ensures that working MDD are not distracted by the presence of other MDD in the area.

## **9.3. Numbers of MDD used**

If MDD are used as the primary detection tool, then all areas are to be searched by at least two different MDD before being considered as cleared.

As an exception, one specially trained MDD can be used on its own in cases of urgent medical evacuation.

When used in technical survey, a search with one MDD may be sufficient, to raise confidence that no mines are present, but if mines are found, two MDD must then be used.

When MDD operations are carried out to provide secondary clearance or verification following manual or mechanical operations, or confidence building, one MDD can be used provided that clearance requirements as specified by the NMAA are achieved. Again, if mines are found, search with two MDD must be used.

## **9.4. Target indications**

MDD shall be trained to indicate targets as described in the demining organisation's SOP, for example by sitting or lying down next to the indication. When indicating, MDD shall not be in physical contact with the point of the indication.

If a MDD sits or lies down on the top of an indication or scratches at the ground during operations, training or testing, it should be withdrawn from operational service and re-trained until the fault is corrected.

The location of an indication by a MDD should be clearly and accurately marked. During marking, no person is to physically enter the uncleared area before it has been searched by two MDD.

The rewarding of MDD during operations should be avoided as much as possible, because it is impossible to judge whether the indication is a true target. If a MDD is rewarded during operations, the MDD shall not be permitted to enter any hazardous or un-searched area during the reward procedure. If a MDD is difficult to control during rewarding it should be withdrawn from operational service and re-trained until the fault is corrected.

When investigating MDD indications, the minimum area to be investigated is a 1m radius around the point of the indication. This should be extended and/or offset depending on the wind direction and other variables that the handler is aware of.

## **9.5. Recording search areas**

The location of each search area shall be surveyed and recorded along with the details of the MDD and handlers that worked in that area.

## **9.6. Quality Management (QM)**

MDD operations shall be subject to monitoring in accordance with IMAS 07.40 and post clearance inspections in accordance with IMAS 09.20.

# **10. Environmental factors affecting MDD operations**

## **10.1. Wind**

Wind has a significant effect on the conduct of MDD operations. A well-trained MDD should be able to indicate the exact location of a target with a head or side wind. The following rules should apply:

- a) MDD should not be used if the wind speed (at ground level) is greater than 18m/s;
- b) MDD should not be used if the wind speed is greater than 7m/s if the soil surface is very dry and dust is being raised; and
- c) MDD should not search with a tail wind greater than 2m/s.

## **10.2. Rain**

Light rain has minimal impact on the presence of target odours in the soil and subsequent evaporation may give a short-term release of odour that will improve the detectability of target items.

Heavy rain washes target odours deeper into the soil or disperses them over a wider area making MDD operations difficult.

After periods of heavy rain, demining organisations shall test MDD on test sites of identical soil conditions that have also been subjected to the same heavy rain to ensure that MDD can still satisfactorily detect target items. If MDD are unable to detect target items reliably then MDD operations shall not take place.

## **10.3. Snow**

MDD should not be used when the ground surface is covered with snow.

## **10.4. Humidity**

To ensure that MDD are capable of operating effectively in the prevailing humidity conditions, the MDD should be trained and tested under these conditions. If conditions change dramatically, additional training and testing should be introduced immediately to ensure that MDD are able to deal with the new conditions.

## **10.5. Atmospheric pollution**

Atmospheric pollution may prevent a MDD from working effectively, therefore MDD shall not be used in areas where the atmosphere is obviously polluted by gases, smoke or odours from petroleum products, fertiliser, chemicals, garbage, domestic burning (including vegetation) and traffic or factory exhausts.

## **10.6. Vegetation**

MDD should not be used in areas where vegetation prevents searching, or if vegetation restricts the ability of the MDD handler to view and control the search. Vegetation may be removed by cutting or burning.

Vegetation cutting may disturb the scent picture above target items and affects the scent plume. When vegetation cutting is required, irrespective of how the cutting is to be carried out, training and testing shall be carried out prior to any MDD operations taking place to determine:

- a) the safe time delay between cutting and a MDD search; and
- b) the indication accuracy of the MDD after vegetation cutting.

Burning of vegetation may have a negative effect on MDD detection capability. MDD shall not be used to search in areas where the vegetation has been burned unless they have been proven capable of detecting target items in burned areas.

## **10.7. Channelling of target odours underground**

Plants with extensive and widespread root systems, or tunnel systems, (eg those made by rodents or insects), could result in target odours being transferred away from a target item. Under such circumstances a larger area should be investigated if nothing is found at the site of an indication.

## **10.8. Recording of environmental data**

Demining organisations should establish procedures for a long term collection, recording and storage of environmental data during MDD operations and training.

The most useful data to measure and store are temperature, rain (before and during search), humidity in air/soil, wind speed/direction, solar radiation, soil conditions and vegetation type.

### **10.8.1. Use of a weather station**

Weather stations should be considered as part of the MDD organisation's 'toolkit'. Weather stations typically measure wind velocity and direction, humidity, air pressure, and temperature in soil and air, but can measure most of the data listed in clause 10.8. The measurements can be done manually, but modern weather stations provide automatic recording of data at low cost.

## **11. Rest and rotation of MDD**

### **11.1. General**

Dogs are highly individual in their characters. While some MDD are capable of working continuously for several hours, others need frequent breaks. Environmental conditions also influence the work of MDD.

Demining organisations shall establish procedures for the rest and rotation of MDD that takes into account environmental conditions and the individual natures of the MDD.

### **11.2. Length of search periods**

The length of search periods should be determined solely by the handler based on the capabilities of the MDD and the conditions under which the MDD is working.

### **11.3. First and second search MDD**

All MDD are required to be operationally accredited independently. Thus if MDD are used as a pair, either MDD can work as the first or second search MDD. In order to ensure that a second-search MDD does not use odours from the first MDD to assist its search, the roles of the MDD should be changed regularly.

To ensure that the MDD is detecting the target odour in both roles, it must be trained not to indicate the MDD scent from the first search.

## **12. Responsibilities**

### **12.1. The National Mine Action Authority (NMAA)**

The NMAA, or an agency acting on its behalf, shall:

- a) establish a clear and sustainable national policy on the use of MDD within the mine action programme;
- b) develop and implement relevant national standards and other guidelines governing the use of MDD within the mine action programme;
- c) develop and implement procedures for the QM of MDD operations (including operational accreditation and the monitoring of performance in the field) within the mine action programme and ensure that all personnel, male and female, charged with MDD QM are suitably qualified and experienced for their roles within this task; and
- d) assist demining organisations employing MDD with the establishment of testing and training areas and other facilities to support MDD.

### **12.2. The demining organisation**

The demining organisation carrying out MDD operations shall:

- a) establish SOPs for the use of MDD on demining operations. These SOPs are to be consistent with relevant national standards, or in the absence of national standards, with the IMAS 09.4 series of standards;
- b) establish places at each work site for daily on-site training where necessary;
- c) ensure that testing of MDD teams is carried out on a regular basis under operational conditions; and
- d) establish systems, procedures and facilities to ensure the occupational and general health care of dogs.

In the absence of a NMAA, the demining organisation should assume additional responsibilities. These include, but are not restricted to:

- e) assisting the host nation, during the establishment of a NMAA, in framing national standards for MDD operations; and
- f) establishing liaison with other demining organisations employing MDD to ensure a consistency in standards for MDD operations and cooperation in the testing of MDD teams.

## **Annex A (Normative) References**

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of the standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of the standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid ISO or EN:

- a) IMAS 04.10 Glossary of mine action terms, definitions and abbreviations;
- b) IMAS 07.40 Monitoring of demining organisations;
- c) IMAS 08.40 Marking mine and ERW hazards;
- d) IMAS 09.20 The inspection of cleared land: Guide to the use of sampling procedures;
- e) IMAS 09.40 Guide for the use of Mine Detection Dogs;
- f) IMAS 09.42 Operational testing of Mine Detection Dogs and handlers;
- g) IMAS 09.43 Remote Explosive Scent Tracing (REST);
- h) IMAS 09.44 Guide to occupational health and general dog care;
- i) IMAS 10.20 S&OH - Demining worksite safety; and
- j) IMAS 10.40 S&OH - Medical support to demining operations.

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

