
HMA Global SOPs 2018

CHAPTER 9: MINE DETECTING DOGS

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Mine Detection Dogs (MMD) or explosive detection dogs are not mine 'Clearance' dogs because dogs cannot 'clear' any explosive hazards. All a dog can do is search for targets which it has been trained to locate. Just as when searching with a metal-detector, the detector is controlled by a person and any hazards that the dog-detector locates are exposed and removed/destroyed by trained deminers.

The apparent advantage of using a dog instead of a metal-detector is that the dog should not signal on metal that has no explosive associated with it. The problem with using a dog is that an animal is not a machine that always works with a uniform degree of reliability. Knowing when a dog is searching and when its nose is caked with dust or it is distracted by the scent of a fox may be easy for its handler to see, but may not be. The requirements of this SOP are designed to give complete confidence that the dogs are searching appropriately for the targets that are anticipated in the task area.

CHAPTER 8: MINE DETECTION DOGS

These generic and global SOPs have been available since 2007. This Chapter has been updated and significantly changed for this 2018 release. Definitions that are necessary to understand this SOP are included at the start of the Chapter.

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1. Glossary

The terms defined below are listed in alphabetical order. Terms not used in this SOP may be included for clarity. A full Glossary of terms used throughout the Global SOPs is included in the introductory Chapter.

Capability Test: a ‘capability test’ is a daily test of an MDD set’s ability to find a target in ground similar to that in which it will work. This is analogous to the use of a metal-detector test piece to check that the detector is working. It does not guarantee that the MDD will reliably locate the explosive hazards that may be present in the working area.

Clear (Presumed Clear): when applied to land, the word ‘Clear’ is used to describe land where there is no evidence of there being any explosive hazards (No Threat Evidence, NTE). When this is a result of the explosive hazards having been removed/destroyed during Search & Clearance, the area must be described as having been ‘Cleared’. When land has been released by area Reduction, Verification or Cancellation, it has not been ‘Cleared’ but can be ‘Presumed Clear’ because there is no evidence of it being likely to be contaminated with explosive hazards (No Threat Evidence, NTE). The distinction between the use of ‘Presumed Clear’ and ‘Cleared’ is important because it can be critical in cases of litigation.

Clearance: ‘clearance’ is the removal or destruction of explosive hazards. Most in the industry describe what they do as ‘clearance’. In fact what most field people are doing most of the time is preparing ground and searching. If there are no explosive hazards there, there is nothing to be ‘cleared’ so clearance cannot be happening. In these SOPs, the activity of searching for and removing or destroying explosive hazards is referred to as Search & Clearance despite the fact that, at some times, no hazards will be found and no ‘clearance’ will be required.

Deminer (Searcher): a ‘deminer’ is a person engaged in Search & Clearance tasks in areas that may be contaminated with explosive hazards. A deminer must always be trained and qualified to carry our procedures related to searching. A deminer may also have EOD training, but does not have to be trained to appraise and manage the explosive hazards that are found. Persons with EOD training are called ‘EOD specialists’ and must also be trained as deminers/searchers.

High Probability Area (HPA): a ‘High Probability Area’ is a part of a task where there is a high probability that explosive hazards are present. This may be called a Confirmed Hazardous Area or CHA by other agencies. The threat in a High Probability Area is the same as that in a Low Probability Area when the same explosive hazards may be present. Typical HPA include mapped and marked minefields, areas where mines are visible, defensive positions, areas where there have been multiple explosive accidents, and areas where the presence of hazards has been reliably reported.

Indication: an ‘indication’ is the action of a Mine Detection Dog (MDD) when it detects the presence of a target which it has been trained to locate. An MDD indication may be at some distance from the target. See also the entry for ‘signal’.

Land release, releasing land: land that is designated a task area may only be ‘released’ after either being declared ‘Cleared’ or ‘Presumed Clear’. An entire task, or parts of the task area, can be released as Searched & Cleared, ‘Reduced’, ‘Verified’, or ‘Cancelled’ (see Chapter 3 for detailed explanations of these terms).

1. Land that is Searched & Cleared of all explosive hazards to a known depth is declared ‘Cleared’.
2. Land that is ‘Reduced’ by processes that result in confidence that thorough Search & Clearance is not necessary because there is No Threat Evidence (NTE) in the area can be declared ‘Presumed Clear’.
3. Land that is ‘Verified’ as having NTE in the area can be declared ‘Presumed Clear’.
4. Land that is ‘Cancelled’ as having NTE in the area can be declared ‘Presumed Clear’.

Low Probability Area (LPA): a 'Low Probability Area' is a part or parts of the task where it is possible that there are explosive hazards but there is not enough evidence of their presence to make it probable. Typically, land bordering a High Probability Area is a Low Probability Area. The threat in a Low Probability Area is the same as that in a High Probability Area when the same explosive hazards may be present.

MDD - Mine Detection Dog: also known as EDD – Explosive Detection Dogs – an 'MDD' is a dog that has been trained to detect various target substances related to mines and explosive hazards. The target substances may include specific mines, certain types of explosives, surface and sub-surface ordnance, and fragments of mines and UXO/AXO.

MDD handler: an 'MDD handler' is a person who has been trained and certified to work with MDDs using the processes and procedures described in the MDD SOP. Handlers must also be experienced in the maintenance of their MDDs' health and hygiene.

MDD Set: an MDD and its MDD handler is an 'MDD Set'. A handler may have two or more MDDs, each of which is a separate MDD Set when working with the handler. All handlers and MDDs must be suitably trained and accredited for the duties they will perform.

MDD team: an 'MDD team' is an operational unit comprising one or more MDD Sets and sufficient deminers and support staff under the control of an MDD team leader.

MDD trainer: an 'MDD trainer' is a MDD handler who is trained, authorised and certified to plan and implement the training of MDDs and of MDD handlers in accordance with approved methods. This person may also serve as the MDD coordinator.

MDD training: in these SOPs, 'MDD training' describes things done to extend, improve or to maintain an MDD's search capability. These SOPs do not cover the initial training of a dog so that it can become an MDD.

Safety distance: the 'safety distance' is the distance at which all staff must be from a deliberate detonation in order to avoid injury. This is also the distance at which staff must be from a demining procedure that may predictably detonate some devices (such as processing the ground surface using a machine). See also the entry for 'working distances'.

Search & Clearance (Searched & Cleared): **Search & Clearance** refers to the disciplined use of demining procedures that are reliably able to locate all anticipated explosive hazards to a specified depth beneath the ground surface and the removal/destruction of those hazards over an entire recorded area. Only areas that have been Searched & Cleared can be released as 'Cleared'.

Search depth: the 'search depth' is the depth beneath the ground surface to which reliable search for explosive hazards must be conducted. Unless otherwise directed by the NMAA or client, the search depth should be agreed during task planning and must be increased as soon as any evidence suggests that the hazards may be at a greater depth than was originally believed.

Task (demining task): a 'task' is a specified area of land on which a demining organisation must conduct activities detailed in a Task Release Plan in order to declare the area 'Cleared' or 'Presumed Clear' in preparation for land release.

Task site (demining Task site): a demining Task site is any place where some or all of the ground is processed to find mines and/or explosive hazards in preparation for land release. The perimeter of the task site must be accurately recorded on the task map and on the ground whenever practicable. When a task is linear (as with routes), the perimeter may be marked and recorded as work progresses.

Task Folder: the NMAA (or other authority) should provide a 'Task Folder' containing all relevant survey data about the task being undertaken. Information gathered during this organisation's internal Task Assessment will be added to the Task Folder to allow an informed Task Risk Assessment to be made. The Task Folder and the Task Assessment also provide an evidence base on which to make a preliminary Task Release Plan. The Task Folder may include agreements about the demining assets and procedures that must be used at the task.

Task Release Plan: the 'Task Release Plan' is the schedule of all demining activities that will take place in a demining task area. It includes maps of HPA and LPA showing all areas that will be released as 'Cleared', Reduced, Verified or Cancelled. All Task Release Plans should be revised regularly as work progresses and more becomes known about the task area. This is essential to allow the work to be conducted efficiently, so protecting the donor/client from

unnecessary costs. When the Task Release Plan must be approved by the NMAA, a provisional Task Release Plan sent to them before work starts should cover as many of the variations that may be required as can be reasonably predicted. When further revisions are required, the NMAA should appraise revised Task Release Plans without delay. When the revision is necessary to keep risk within tolerable limits, the NMAA should approve its immediate implementation pending the results of their formal appraisal.

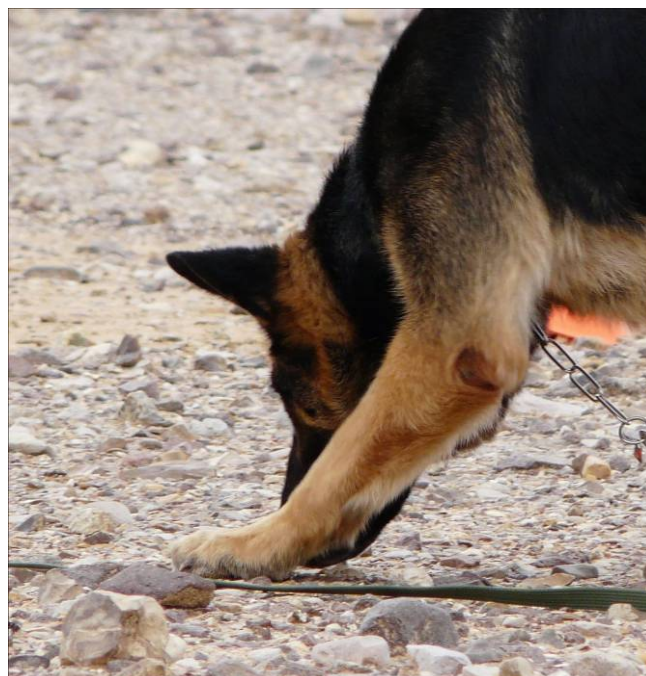
Working distance: the 'working distance' should make it unlikely that more than one person will be injured in a demining accident. Working distances can generally be shorter than safety distances because demining accidents are rare and injuries to a second worker rarer still. Reduced working distances can increase safety by improving the ease of supervision which ensures that procedures are conducted correctly and risks are appropriately managed. See also the entry for 'safety distances'.

1.1 Should, Must & Shall

Throughout these SOPs the distinction between the terms 'should' and 'shall' that is used by the International Standards Organisation (ISO) and in the International Mine Action Standards (IMAS) is adopted.

When 'shall' or 'must' is used, everyone working to these SOPs must comply with the requirements as they are written. No variation is permitted.

When 'should' is used, everyone working to these SOPs must follow the requirements unless they have a reason to vary them that has been approved by the senior staff with operational responsibility. Variations must be recorded in writing in the Task Release Plan and the person(s) making the variation must be identified.



2. Introduction

MDD procedures are a part of an integrated approach to demining that aims to achieve a standard of Search & Clearance in compliance with the International Standards for Mine Action (IMAS). The MDD is a search tool that may, unlike a metal-detector, have unpredictable limitations. Despite the confidence that a handler may have, it is not possible for an objective observer to know with complete confidence whether or not a dog is concentrating and searching effectively at any particular time. To try to ensure the reliability of MDD search, two MDDs must be used in any search and both MDDs must have been trained to find all of the anticipated hazards at the site to the required search depth. The second search provides a QA check on the performance of the first dog so the second dog should be run over the ground in a way that prevents it simply following the path of the first dog whenever possible. If both dogs have been inadequately trained, both may miss the same hazard, so the appropriateness and quality of MDD training is a critical quality requirement.

MDDs should be sourced from a provider that has proven expertise in the effective training and preparation of MDDs. MDDs that have been previously trained in another country or context must receive sufficient continuation training in the area of operation to give complete confidence in their ability to search reliably in that context. Male MDDs are usually selected because they usually have fewer unproductive days in any month.

The way in which MDDs are deployed is based on field experience and has very limited flexibility. However, all tasks are different and the procedures described in these SOPs have been developed to maximise the use of MDDs in a varied context. All variations to the actual procedures given in these SOPs must be approved by the MDD coordinator and, when appropriate, the National Mine Action Authority (NMAA) before implementation.

The MDD coordinator and MDD handlers must demonstrate the ability to analyse complex situations and make reasoned judgements that restrict the use of MDDs to areas in which there is complete confidence in their ability to search reliably. The MDD coordinator must make the final decision over whether a search task can be conducted by the MDD team.

These SOPs presume an integrated use of demining assets that are detailed in a Task Release Plan (which includes a Task Risk Assessment) before implementation. The use of MDD search in the Task Release Plan must be approved by the MDD coordinator and, when appropriate, the NMAA before the plan is finalised.

2.1 How MDDs can be used

MDDs must have been trained to search for targets accurately representing explosive hazards in/on ground similar to the task area(s) where they will work. The MDDs can only reliably locate the targets that they have trained to search for, so they must not be used when they have not been trained to find the entire range of explosive hazards that are anticipated at a task.

To complete their basic training (and facilitate continuation training) local MDD training areas must be established and the appropriate targets concealed. All MDD sets must be trained in the MDD training areas until their performance gives full confidence of their ability to search reliably in the required task areas.

NOTE: *An MDD set is the MDD and its handler. A handler may have two or more dogs, each of which is a separate MDD set when with that handler. An MDD team comprises at least two MDD sets and sufficient deminers and support staff under the control of the MDD team leader.*

MDD sets are frequently used to search wide areas for random explosive hazards or lines of mines. When the pattern(s) of a mined area is known, MDD sets can be used to search for any

mines that are outside the anticipated pattern(s). MDD search can also be used to confirm the absence of the predicted potential hazards from any area.



The MDD must concentrate at all time while it works.

3. Deployment of MDD teams

In general, appropriately trained MDD teams may be deployed as described below.

1. MDD sets may be used to search breaches across Low Probability Areas (LPA) and into any High Probability Areas (HPA) during a Technical Survey. MDDs should be withdrawn as soon as explosive hazards are found and not redeployed until there is confidence that any concentration, line, pattern or cluster of explosive hazards has been passed.
2. MDD sets may be used for wide area search in areas where isolated missing mines, nuisance mines or other randomly scattered explosive hazards (that have featured in the MDD training) may be present.
3. MDD sets may be used for Internal Quality Control (QC) search over areas first searched with other methods.
4. MDD sets may be used to search in confined areas (ditches or buildings) where isolated hazards are anticipated.
5. MDD sets may be used to conduct wide area search after mechanical ground processing when there have been no detonations and there is no visible evidence of explosive hazards.

MDD teams cannot be deployed unless the MDD coordinator approves their use. This decision will be made with reference to:

- each MDD set's training and state of readiness;
- the weather;
- the anticipated hazard(s) and the Task Release Plan;
- the predicted efficiency of MDD search (compared with other available assets);
- the Task Risk Assessment which shall include an assessment of the safety of the MDDs (MDD sets must not be used to search at any task where the MDD coordinator is concerned about the safety of the MDDs or their handlers); and
- the ground conditions at the task which must be such that the MDD coordinator has complete confidence in the MDD sets' ability to reliably locate all of the anticipated explosive hazards.

The deployment of MDD teams is further constrained by the restrictions listed under Part 3.2 in this Chapter.

3.1 Potential MDD team search tasks

When the correct conditions are met, MDD teams comprising at least two MDD sets can be used to perform the following searches. In all of them, as soon as explosive hazards are discovered, manual demining Search & Clearance assets should be deployed.

1. An MDD team may be deployed to confirm the absence of hazards in areas where there is no direct evidence of a hazard. Linear cross country tasks, such as the proposed route for a new road, railway or pipeline fall into this category.
2. An MDD team may be used to prepare breaches into a task area (subject to the constraints listed under Part 2.2 in this Chapter).
3. An MDD team may be deployed to search the area leading up to a concentration of hazards, such as a pattern or lines of mines, so helping to determine the perimeter of the area that must be searched using manual area Search & Clearance methods.
4. An MDD team may be deployed to search for missing mines in LPA areas where mines may have moved.
5. An MDD team may be deployed to confirm the safety of land following mechanical ground preparation where no detonations have occurred and there is no visible indication of a hazard but must be withdrawn if a high density of parts of hazards is found.
6. An MDD team may be deployed to locate the borders of areas where mines have been broken or detonated following mechanical ground preparation where detonations may have occurred (after an appropriate length of time has passed).
7. An appropriately trained MDD team may be used to search land inside ditches and trenches.
8. An appropriately trained MDD team may be used to search low walls and piles of rock.
9. An appropriately trained MDD team may be used to search buildings.
10. An appropriately trained MDD team may be used to search vehicle wrecks or abandoned machinery.
11. An MDD team may also be used as a QC tool following manual Search & Clearance of an area as long as hazard marking is left in place, or enough time has elapsed, to prevent the MDD signalling where hazards have been removed. If hazards have been destroyed in-situ, the use of MDD for QC should be avoided.

Land that has only been searched by a single MDD set shall not be considered adequately searched until the result has been confirmed by a second search using a different MDD set. When both MDD have been trained to find the same things, both may miss a target that was not represented in their training so all potential targets must be represented in MDD training.

3.2 Where MDD search cannot be used

MDD search cannot be used in the situations described below.

1. MDDs cannot be deployed when there is high wind which makes the position of their indications unreliable. Acceptable wind speeds vary according to training, dust levels and available angles of approach. The MDD coordinator, MDD team leader and handler(s) must judge whether the wind is too high for reliable MDD deployment. A weather station should be used during both training and deployment.
2. MDDs should not be used to search during rain. This may be varied at the discretion of the MDD coordinator, making reference to the MDD sets' familiarity with the prevailing conditions and success during training in similar conditions.
3. MDDs must not be deployed when the temperature is too low or too high. The acceptable temperatures must be determined by the MDD coordinator, making reference to the MDD's familiarity with the prevailing conditions and success during training in similar conditions.

4. MDDs should not be deployed to search in areas where the dog's paws may be injured or where its muzzle may become irritated. Such areas include those where there is thorny or sharp vegetation, broken glass or sharp stones. Leather paw boots may be worn as long as the MDD has been trained to search while wearing them.
5. MDDs should not be deployed to search where the ground is contaminated with high levels of salt or other chemicals, or with trash, faecal matter, or corpses. In some instances, the MDD may be used to search up to the contamination.
6. MDDs must not be deployed to search where there is vegetation that prevents the controlled movement of the dog over the area to be searched or that prevents the handler maintaining an unobstructed line-of-sight to the dog.
7. MDDs should not be deployed to search in areas with a high density of hazards or explosive contamination (such as from hazards broken by the passage of a demining machine), although they may be deployed to locate those general areas.
8. MDDs must not be deployed to search in areas where the MDD is not visible to the handler at all times during the search. The handler must not begin a search over an area where he/she will not have full visual contact with the MDD throughout the entire search.
9. MDDs should not be deployed to search in areas with an insect infestation that is known to disturb the concentration of the MDDs, or of their handlers.
10. MDDs must not be deployed to search in areas where intact tripwires are anticipated. Use of a machine to remove all vegetation in the area can ensure that any remaining explosive hazards do not have intact tripwires.
11. MDDs should not be deployed to search within five metres of the site of an explosive detonation unless a suitable time has elapsed. The time required must be determined by the MDD coordinator with reference to experience gained in conditions similar to the task area.
12. MDDs should be withdrawn from search when the MDD indicates more than three times in an area ten metres square. The handler must decide whether the dog may become confused by the number of odour sources and so either fail to indicate or indicate falsely. Generally, the MDD must be withdrawn and the area searched using other methods. Before deciding to withdraw, a second MDD set may be used to search the area to determine whether the first MDD set was working reliably.

MDD search may be used in the areas listed above when the restricting conditions have changed.

4. Safety rules and operational variations

All MDD sets must have been trained to approved standards before they can be used in operational areas. Their training must cover the type of search required and, when appropriate, have been adapted to ensure the MDD and its handler's safety.

The deployment of the MDD shown below was not for 'search' because the roadside IED had already been marked and could be clearly seen. The MDD was being used to confirm that it was an explosive hazard but it had not been trained not to put its nose onto the device.



4.1 General rules for the deployment of MDD sets

The following are basic rules for MDD set safety in all working scenarios.

1. MDDs should be kept on a leash at all times when in the operational area.
2. The handlers must visually check the working area before and during the work. If the handler can see a mine or explosive hazard in the search area, he/she must withdraw the MDD and inform the MDD team leader. When this occurs, the MDD set should work in another area while manual demining assets are used to breach into the device using approved procedures. No land that has not been searched by two MDD sets is deemed safe to walk over, so the manual deminers must use approved manual Search & Clearance methods that start in a known safe area to make a breach lane to the visible device.
3. MDDs should not be left unattended when they are outside the kennel facilities.
4. All MDD sets must complete a daily Capability Test before starting work at a task. An MDD that does not pass the Capability Test must be withdrawn. The area(s) in which that particular MDD worked on the previous day should be searched again. The handler may repeat the Capability Test using another MDD with which he/she has been trained.
5. During the first MDD search of an area, the handler must not walk in the searched area (must use a long leash). Land is considered safe for the handler to walk on only after a second MDD search has been conducted. Because the handler always walks on the searched side of a short leash MDD, the second search can be conducted using a short leash. Alternatively, the second search may be conducted using a long leash from a different start line. The second search must always be conducted in a manner that prevents the MDD merely following the track of the first MDD.

The photograph shows an MDD working on a short leash. The rope marks the edge of the searched area.



4.2 PPE for MDD handlers

Personal protective equipment must be worn by dog handlers when controlling MDD search operations at any task. In general, the body protection must match or exceed that used by manual deminers as detailed in Chapter 2 of these SOPs. MDD handlers must have unobstructed voice control over their dogs, so goggles or short visors like that shown alongside are preferred for eye/face protection.



4.3 Working distance between MDD sets

The minimum working distance for MDD sets should not be less than the approved working distances for manual demining at a task and may be extended when there is a need for the MDDs not to distract each other. Generally, MDDs should work at least ten metres apart. In High Probability Areas, the actual working distance must be based on the MDD coordinator's assessment of the working parameters.

In areas where there are obstructions on the ground, the MDD team leader and MDD coordinator should plan an MDD search approach that avoids distraction for the MDD.

4.4 Constraints according to the Task Risk Assessment (TRA)

The Task Risk Assessment (TRA) is described in Chapter 14. It should list the hazards that are anticipated, their depth beneath the ground surface and the condition that they may be in. It should also take account of additional risk factors such as vegetation, slope, ground conditions and obstructions. In some cases, this will make the use of MDD search inappropriate in all or part of the task area. The Task Release Plan should indicate which areas are suitable for MDD search and make plans to allow the MDD sets to safely access those areas.

Before MDD sets are deployed to search an area, any significant undergrowth must have been removed. All searches must involve searching the area with two MDD sets. Whatever search patterns are used, the MDD handler(s) must always be prepared to walk over the area after two MDDs have searched it without indicating, or after all indications have been investigated and hazards removed by the manual deminers in the team.

The 'L shape' search approach can be used to cover wide areas or in defined areas where missing mines/hazards may have moved.

The 'Baseline' search approach can be used to make breaches or to search linear tasks, such as routes.

The 'Box' search approach may be used in any area.

5. MDD area search team structure

The recommended minimum MDD assets for efficient deployment in wide area search tasks are six dogs and three handlers/trainers. These numbers should be increased according to need and may be reduced for specialist search tasks (such as in buildings). One of the handlers should be the MDD team leader. The team leader and all handlers should report to the MDD coordinator on all MDD issues.

An MDD team usually has the following staff:

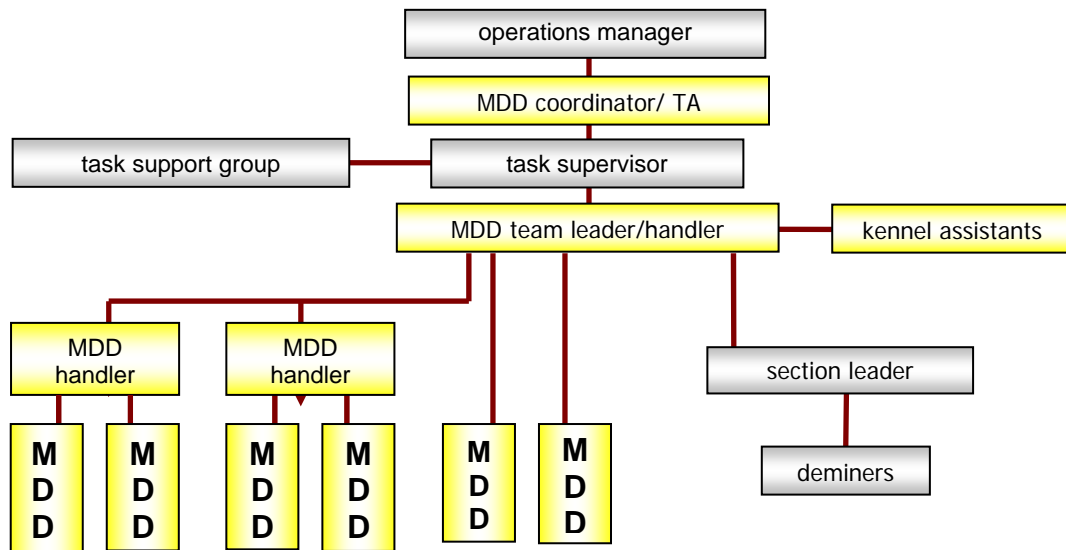
- an MDD coordinator;
- an MDD team leader (responsible for the control of all MDD team members at a task);
- MDD handler(s), each with two or more dogs;
- kennel assistants (suitably trained);
- driver for MDD Transport;
- manual deminers (a sufficient number for the task); and
- manual demining section leader (under the direction of the MDD team leader).

An MDD team should include a sufficient number of manual deminers for the task they must undertake. A single section of manual deminers may be controlled by a section leader. If more than one section is required, a task supervisor should control the sections in cooperation with the MDD team leader. While MDD sets are operational, the associated manual demining assets should fall under the site control of the MDD team leader.

While working with an MDD team, the manual demining section(s) must use normal demining procedures with the exception of the MDD specific area marking requirements.

The MDD assets may be split into two MDD teams when required. Each MDD team will have its own team leader (usually also an MDD handler) who is responsible for the appropriate and safe deployment of the MDD sets and manual deminers.

The MDD team structure and chain of command is shown in the diagram below.



The team structure shown above may be adapted as the number of MDDs or MDD sets varies.

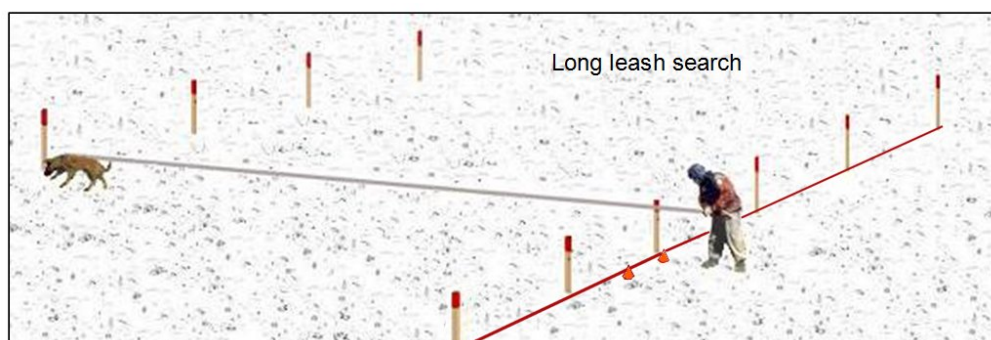
A paramedic and ambulance should always be within five minutes of the area being searched before any MDD set can be deployed to search. The paramedic and ambulance may be shared with others working at a task when this avoids duplication of medical cover.

6. Approved MDD search patterns

Search patterns used by the MDD sets are dictated by the length of the leash used by the handler. Generally, the first search pattern should use a long leash. A second MDD must be used for the second search, which can be conducted using either a short or a long leash (and will often be conducted by the same handler). After two searches have been conducted without indications, the area is considered free from the explosive hazards on which the MDDs have been trained and the baseline moves forward to a metre less than the extent of the search (50cm in from each side and one metre in from the forward extent).

6.1 Long leash

MDDs on a long leash are trained to search from a baseline in a safe area. The MDD searches a strip 50cm wide straight forward for ten metres from the baseline. On command the MDD turns around and searches the adjacent 50cm strip, returning to the handler. The handler remains at the baseline and guides the MDD through the search using the leash and voice commands.



This search pattern may be used for the first search of a breach into the task area. The search must be repeated over the same area using a second MDD, usually on a short leash in a breach that is five (or more) metres wide.

6.2 Short leash

A short leash MDD is held on a short leash while the handler walks closely at its side during the entire search. The MDD handler walks on ground that the dog has already searched and guides the dog with the leash and by voice command.

The second search conducted over an area will often be made with the dog on a short leash. The handler must always walk on the side of the MDD that has been searched by two MDDs.

To conduct a short leash search, the handler places a baseline tape/rope at the edge of the safe area (the baseline) and takes the MDD to the left of the rope. Generally, all short leash searches must be conducted in the same direction, such as from left to right.



On command, the MDD starts searching just beyond the baseline tape/rope with the handler walking on the safe (previously searched) side of the rope. When the MDD reaches the right side, on the handler's command it turns right into the safe area. The handler moves the baseline tape/rope forward 50cm (or less) and walks the MDD back to the left hand side without searching.

On the handler's command, the MDD steps into the unsearched area and starts searching from left to right again. The handler walks beside the MDD and on the searched side of the baseline tape/rope. In this way, the search progresses over the suspect area in 50cm 'slices' with the MDD always searching while walking in the same direction. The handler is always on the same side of the MDD, walking on land that the MDD has searched.

7. MDD search approaches

A search with MDDs will use one of four 'search approaches'. The appropriate search approach will be decided by the MDD team leader in consultation with the MDD coordinator.

The four possible search approaches are:

- The 'Box' search approach;
- The 'Long Box' search approach;
- The 'L shape' search approach; and
- The 'Baseline' breach search approach.

A search is conducted using the appropriate search approach by two MDDs using search patterns that are appropriate for the ground and weather conditions.

7.1 The 'Box' search approach

The Box search approach is used when the area has been prepared by manual deminers or MDDs making breach lanes to enclose areas extending 10 metres into the area to be searched with each box 10 metres wide. The boxing allows the MDDs to enter the search area from any side, so can be used whatever way the wind is blowing. The handler always steps on ground that has been previously searched by two MDDs and so declared safe. Search boxes can be extended as far as necessary into the area to be searched, but the preparation of the safe lanes between the boxes can be very time consuming. The MDD Baseline breach search approach should be used to help prepare boxes when appropriate.

The Box search approach may be used anywhere inside a task. It may be preferred when some of the manual breaches have already been made during a Technical Survey and manual Search & Clearance. The method may also be preferred when the manual deminers in the MDD team would be idle if not preparing boxes.

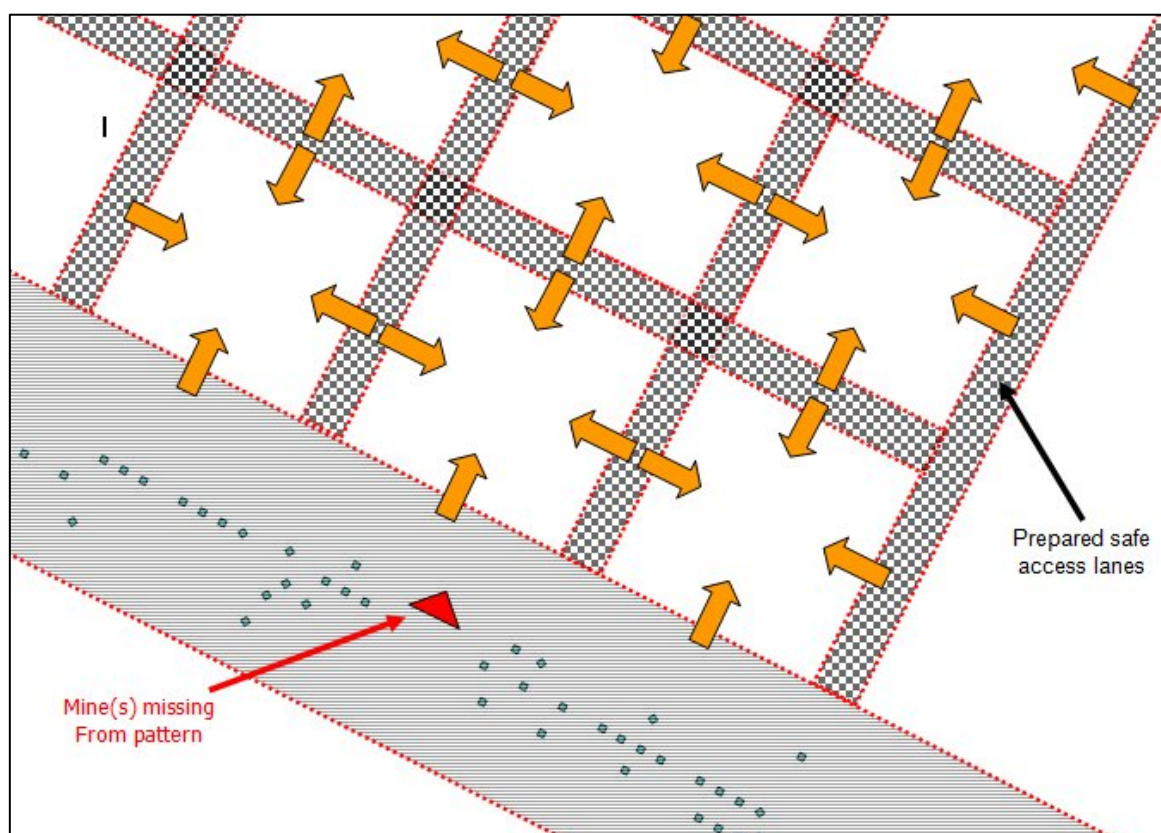
The Box search approach allows access from the four sides of the area. The box side marking allows the handler to read off the coordinates of an MDD indication, so allowing the indicated area to be easily located by the second MDD handler and the follow up deminers.

The Box search approach can be used in internal QC of previously Searched & Cleared land without a second search of the breaches (which have already been declared safe) but the area to be QC checked must be searched by two MDD sets.

The Box search approach can also be used where large areas must be searched for missing mines that may have been disturbed by human intervention, bombardment, or natural events such as rainwater runoff or earthquake movements.

Areas already Searched & Cleared using manual processes should be used as part of the box grid whenever possible, so reducing the manual preparation needed.

When mines are missing from a pattern, the MDDs may be used to search for them in the area where they may have been moved. The areas to be searched will be determined by reference to the slope of the ground and any obstructions that may be present.



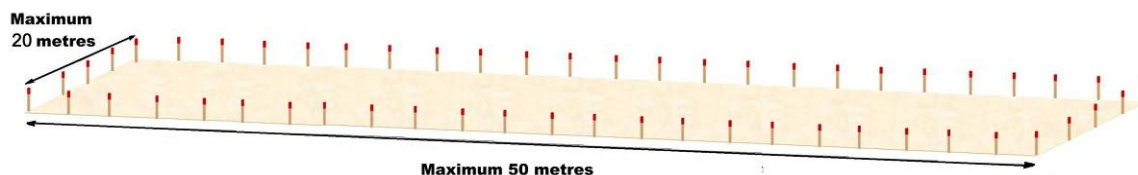
The drawing showing an area prepared for a Box search and the possible search directions over that area.

As with all MDD deployment, this search approach can only be used where there is no vegetation or other obstacles that can prevent the work of MDDs.

7.2 The 'Long Box' search approach

The Long Box search approach is used when the area has been prepared by manual deminers or MDDs searching breach lanes to enclose areas up to 50 metres long extending 10 metres into the area to be searched. The boxing allows the MDDs to enter the search area from three sides and allows the handler to reference the MDD's position against the marking opposite while a long leash search is conducted. Using a Long Box requires less manual preparation than the ordinary square box approach. The MDD Baseline breach search approach should be used to help

prepare long boxes when possible. The Long Box search approach may be preferred when some of the manual breaches have already been prepared. The method may also be preferred when the manual deminers in the MDD team would be idle if not preparing boxes.



The drawing shows an area prepared for a Long Box search approach.

The Long Box search approach allows MDD access from the two long sides of the area with full visibility of the opposite marking. The marking allows the handler to read off the coordinates of an MDD indication, so allowing the indicated area to be easily located by the second MDD handler and the follow up deminers.

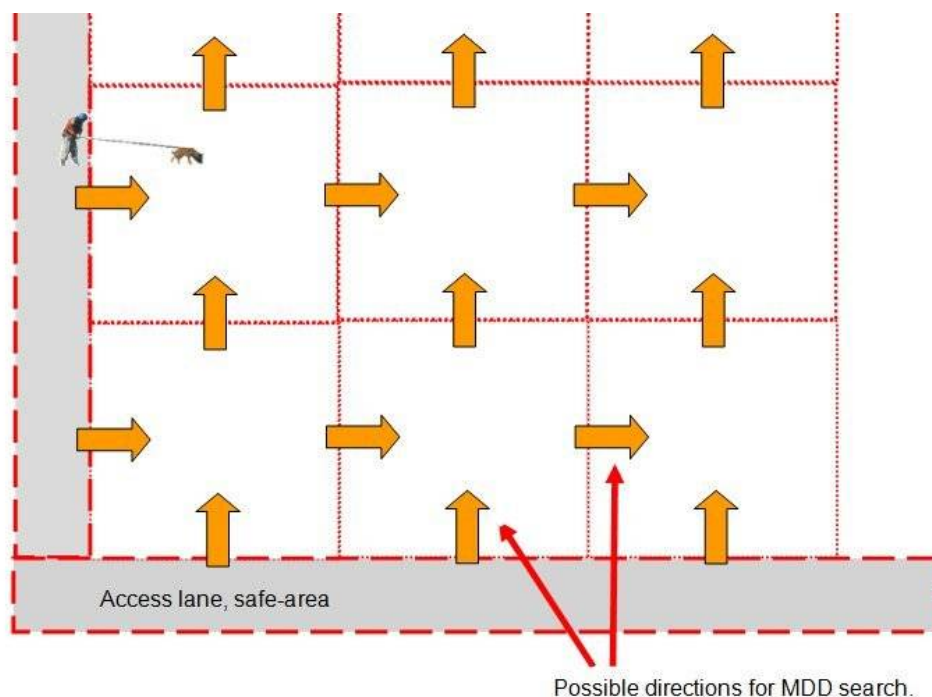
The Long Box search approach can be used in internal QC and in tasks which involve searching large areas. It may be used where large areas must be searched for missing mines that may have been disturbed by human intervention, bombardment, or natural events such as rainwater runoff or earthquake movements.

Areas already Searched & Cleared using manual processes should be used as part of the box whenever possible, so reduced the breaching needed. As with all MDD deployment, this search approach can only be used where there is no vegetation or other obstacles that can prevent the work of MDDs.

7.3 The 'L shape' search approach

The L shape search approach uses less manual preparation of safe lanes than the box approach without reducing safety. The MDDs can still work in varied wind directions and the handlers never have to step on land that has not been searched either by two MDD or manually.

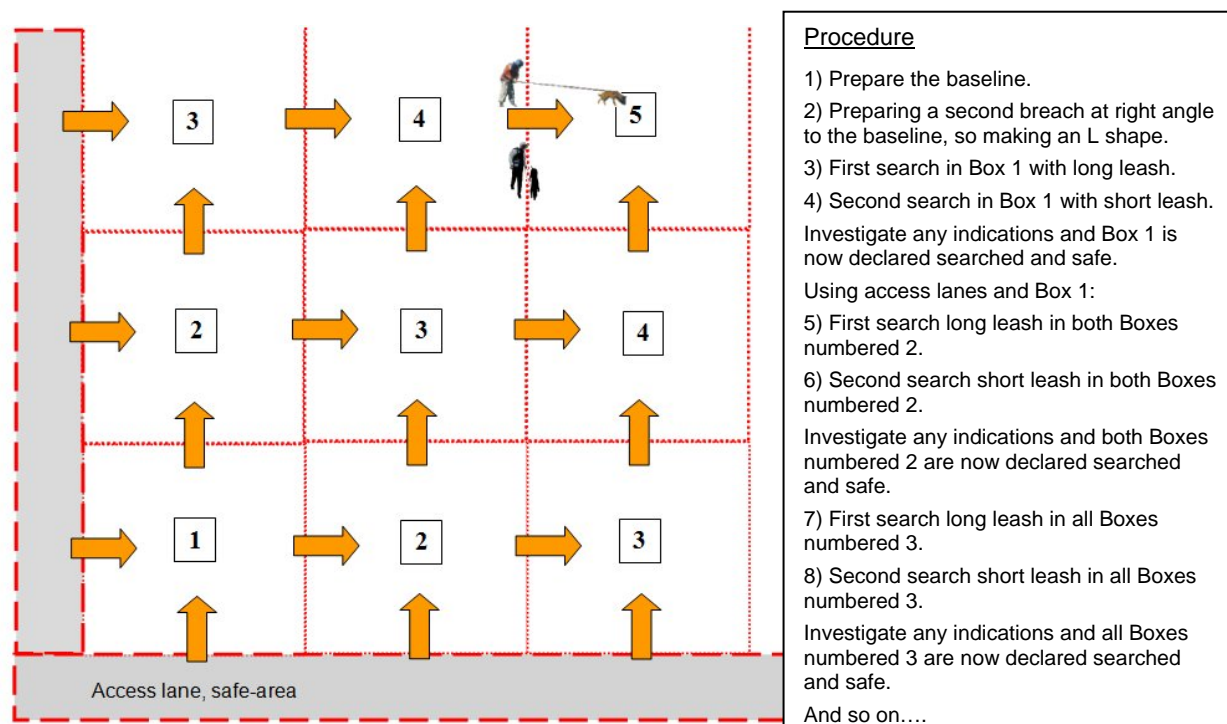
When the L shape approach is used, safe lanes must be prepared that are at right angles to each other, so making an L shape. These can extend as far as necessary into the area to be searched.



Drawing showing a prepared L shape area and the possible directions of search.

The L shape search approach allows access to unsearched land from two different directions. By choosing which dog will work across the wind, the MDD handler is able to work in varied (but not all) wind directions. The L shape approach still allows the handler to mark an indication by placing markers on two sides of the 'L', so allowing the indicated area to be located during the second MDD search and by follow up deminers.

The diagram below describes how each area is processed in 10 metre boxes but without cutting manual breaches between boxes. The procedure is described on the right of the diagram.



Drawing showing the L shape search approach.

The area searched by the two MDDs becomes the next safe area on which the handler can stand to control the MDD searching the adjacent area. In this manner, verification of extensive linear tasks can be conducted with the minimum number of safe lane breaches made at right angles from a safe lane.

The L shape search approach can be used in QC and in tasks which involve searching large areas. It is especially useful where large areas must be searched for missing mines that may have been disturbed by human intervention, bombardment, or natural events such as rainwater runoff or earthquake movements.

Areas already Searched & Cleared using manual processes should be used as safe lanes whenever possible, so reducing the additional manual Search & Clearance needed.

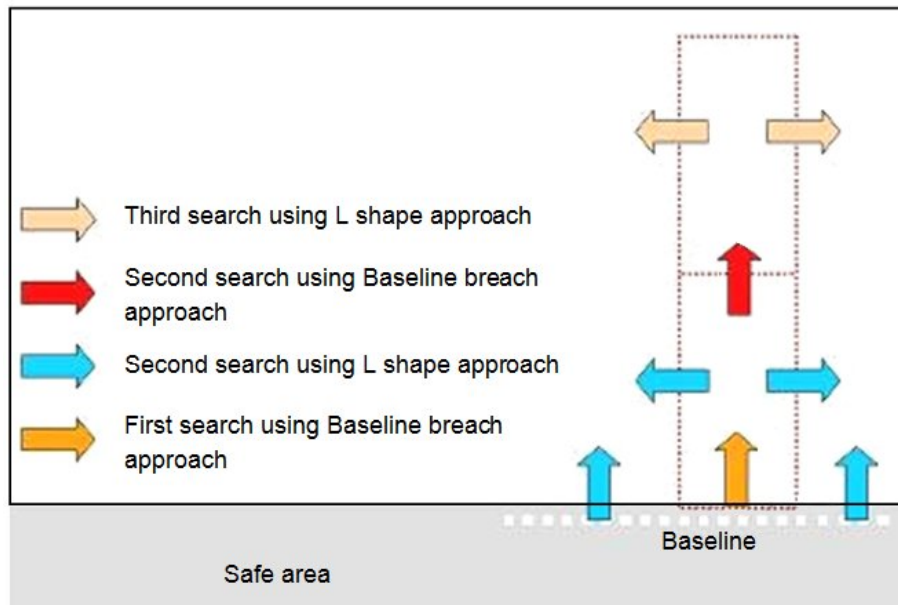
When mines are missing from an anticipated pattern, the MDDs may be used to search for them in the area where they may have been moved. The areas to be searched will be determined by reference to the slope of the ground and any obstructions that may be present.

As with all MDD deployment, this search approach can only be used where there is no vegetation or other obstacles that can affect the work of MDDs.

7.4 The 'Baseline' breach search approach

The Baseline breach search approach can be used to reduce manual preparation for the Box or L shape approaches without reducing safety. It can only be conducted when the wind direction permits, but should be used to prepare breach lanes whenever possible to maximise the efficient use of resources. The MDD team leader and the MDD coordinator must determine when the approach is appropriate to use.

When the Baseline search approach is used, either an existing safe area is used for the baseline or a safe lane must be prepared on which the baseline will be marked.



The drawing shows a prepared Baseline search approach area and the direction(s) of search that may follow the first breach.

The breach is five or more metres wide, but when side marking is placed after two MDD sets have completed the search, the side marking is placed 50 cm in from each side to guarantee a search overlap.

The breach is up to eleven metres long, but when end marking is placed after two MDD sets have completed the search, the end marking is placed one metre back from the end to ensure overlap. The breach is then ten metres long and four (or more) metres wide.

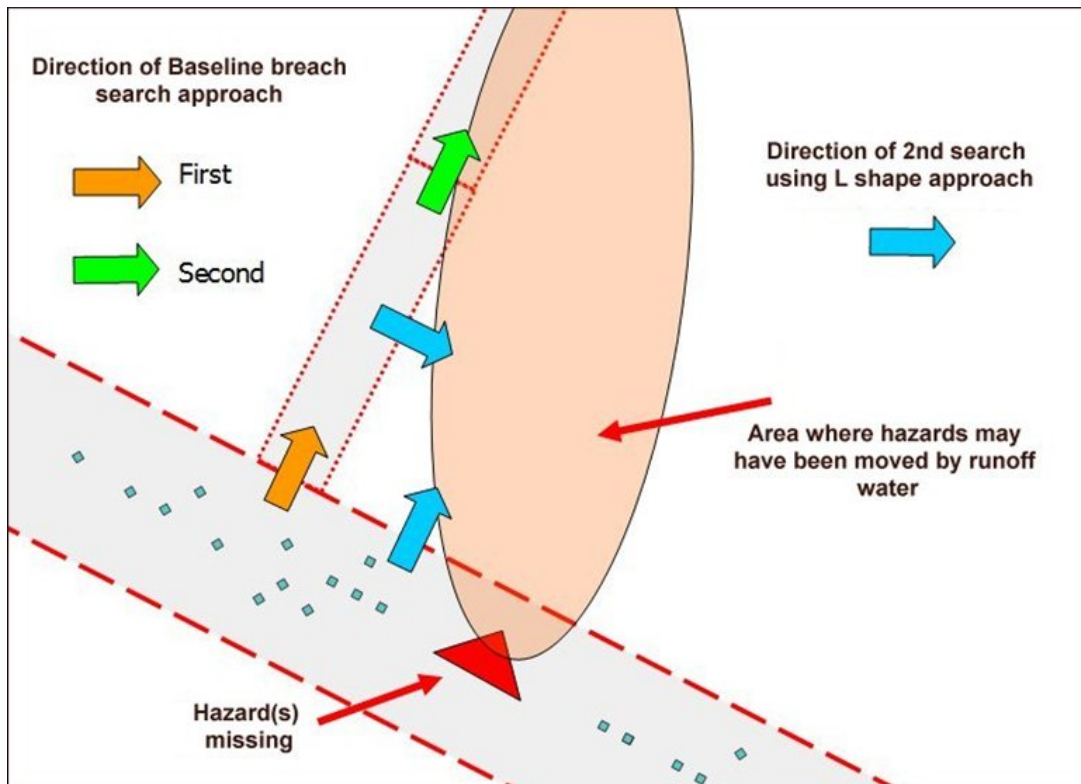
When the first MDD indicates during a Baseline breach search, the area leading up to the indication must be searched by another MDD set using a short leash approach. After the second search, the handler places a marker 50cm before reaching the place of the first MDD's indication. Manual deminers will then investigate the indication as described in Part 9 of this Chapter.

The area searched by the MDD sets becomes the next safe area on which the handler can stand to control the MDD searching to extend the breach. In this manner, the MDD team can make lengthy breaches into extensive linear tasks (such as during road search).

The Baseline search approach can be used to search breaches that then describe an L shape, allowing the L shape search approach to be used afterwards.

The Baseline search approach can also be used to make breaches into an area that other demining assets later use as a safe lane.

When mines are missing from an anticipated pattern, the MDDs may be used to search for them in the area where they may have been moved. The areas to be searched will be determined by reference to the slope of the ground and any obstructions that may be present.



Drawing showing an area prepared for making a breach using the Baseline breach search approach.

The main constraints on this search approach are the wind and terrain. As with all MDD deployment, this search approach can only be used where there is no vegetation or other obstacles that can prevent the work of MDDs.

8. MDD target indications

A target indication is the response that an MDD makes when it has located a target. This is normally to sit down. When it is indicating, an MDD's attention must be directed towards the target and it must not scratch at the ground.

An MDD generally changes its behaviour and increases its interest before making an indication. The MDD handler is trained to recognise changes in MDD behaviour as it searches. Any change of behaviour may be a sign of a positive indication so the handler should, for safety reasons, withdraw an MDD that behaves in an unusual manner and then does not indicate a target. The MDD team leader should assess the MDD's need for refresher training.

- A **correct indication** is a positive detection of a target object or substance featured in the MDD's training. This includes traces in the ground or on parts of a broken device.
- An **incorrect indication** is one where the MDD indicates an object or substance that is not within the group of targets on which they have been trained.
- A **false alarm** is when the MDD indicates a target without any reason being present.

NOTE: *When small bits of explosive residue have been spread in/over the ground by detonations or after a ground processing machine has passed, locating the small parts of explosive may not be possible. In these cases, a correct indication should usually be presumed and MDDs no longer used to search that area.*

After the MDD has indicated a target, the handler should call back the MDD which will turn to its left side and then return. The handler should reward the MDD after it has returned to the safe

area. When the MDD has returned to the baseline, been rewarded, and is again under close control, the handler's next actions will depend on the search approach.

Two MDDs are used to search the same 11 x 5 metre breach in the start line search approach. If the first MDD indicates, the length of the MDD's leash is noted and the MDD is withdrawn. The second MDD is used to make a short leash search approaching the area of the first MDD indication. The baseline tape/rope is moved forward as the search advances. The search with the second MDD search is stopped at least 50cm before the first MDD's indication and a marker placed for manual Search & Clearance of a Spot Task extending two metres ahead of the marker and across the width of the 5 metre breach. Spot Task Search & Clearance of MDD indications is described in Chapter 6, Part 4.3.2.

NOTE: *The second MDD is used to check that the first MDD was searching properly, but the first search also provides a check that the second MDD is working properly. If either MDD indicates, the area around that indication must be Searched & Cleared by manual deminers. If it is found that one of the dogs failed to indicate on a hazard, that dog must be withdrawn for refresher training. When an MDD indicates and no hazard is found, the handler must decide whether the MDD indicated on 'clutter', needs to rest or should be withdrawn for refresher/continuation training.*

8.1 Marking an MDD indication

The purpose of marking an MDD indication is not to record the location of a target, but to record the approximate location of a target. The methods used may vary but must always indicate a position that is reached 50cm before reaching the place of indication. A red painted stone, red marking picket laid on the ground or a red plastic cone may be used. Lightweight markers should not be used when conditions are windy.

8.1.1 Marking during a long leash search

The MDD leash that is used during a long leash search pattern is 11m long and marked every 50cm. When the MDD indicates, the handler will read the actual length of the leash and so know the distance from the baseline to the indication.

If the search uses the Baseline breach approach, a second MDD is used to search the area leading up to the indication. After the second search, the handler moves forward, always stepping on land that has been searched by two MDDs, and places a marker 50cm before reaching the place of indication, then withdraws.

If the search area uses the L shape approach, there should be marking placed at one metre intervals on the other side of the 'L' from the side being used as a baseline. Handlers are taught to project the position of the markers into the searched area and, combined with the leash length, gain coordinates giving the position of the indication.

If the search uses the Box approach, there will be marking placed at intervals on the opposite side of the box. The handler uses these to read the number of metres along the other side of the box and, combined with the leash length, can give close coordinates for the indication.

NOTE: *When the area leading up to the indication has not been searched by two MDDs, either another MDD must search the area leading up to the indication, or a breach must be made using approved manual Search & Clearance methods. No one should walk over the area leading to an indication unless it has been searched by two MDDs or reliably searched and all hazards cleared using other assets.*

The MDD team leader should ask a manual deminer to investigate the indication. A deminer will approach the location of the MDD indication over land searched by two MDDs and will 'Search &

Clear' any hazards in the area around the indication as a Spot Task. The Search & Clearance of MDD indications is described in Chapter 6, Part 4.3.2.

If the investigation shows the indication to be 'incorrect', the MDD search can begin again. Any MDD indication inside the area that has been manually searched can be considered 'clutter'.

8.1.2 Marking during a short leash search

A short leash search pattern should be used for the second search over an area where a long leash search has already been conducted whenever practicable.

When an MDD on a short leash indicates during the second search of an area, the handler must place a marker 50cm on the safe side of the MDD's indication (on the safe side of the baseline) and withdraw the MDD.

The MDD team leader should instruct a manual deminer to investigate the indication. A deminer should approach the location of the MDD's indication over land searched by two MDDs and investigate the indication as described in Chapter 6, Part 4.3.2.

If the investigation shows the indication to be 'incorrect', the MDD search can begin again. Any MDD indication inside the area that has been manually searched can be considered 'clutter'.

When an MDD locates a hazard that is not amongst the explosive hazards anticipated in the area, the MDD training, Task Release Plan and the Task Risk Assessment must be reviewed and revised as appropriate.

9. Investigating an MDD's indication

A manual deminer should conduct Spot Task Search & Clearance of at least four square metres around the indication. The deminer should approach the position marked by the MDD handler(s) walking only on ground searched by two MDDs. When two MDDs have not searched the ground, no marker will have been placed. When a deminer must investigate the indication of a single MDD, the deminer must make a breach lane to the area from a known safe area.

At a marked indication, the deminer should place a hazardous area picket/stone approximately 50cm before the marker placed by the handler, then place two more hazardous area pickets/stones one metre to left and right of the central marker. These mark the manual search start line (baseline). When approaching a baseline breach indication, two further hazardous area pickets/stones must be placed to the left and right, so marking a 4 metre baseline. The deminer should then follow the Spot Task procedures given in Chapter 6 of these SOPs.

NOTE: *If at any time during manual Search & Clearance in support of MDDs a hazard is found which is not represented in the MDD's training, the use of MDDs as a search tool in that area should cease until the MDDs have received appropriate training extensions.*

When the MDDs are following mechanical ground preparation, MDD search should be suspended if an MDD becomes confused by too many signals from parts of broken devices. Generally, a ground engaging machine should not be used to process a known line of mines or other hazards but this may occur when none of the hazards are initiated by pressure so the machine operator is unaware of their presence.

9.1 Action after an explosive hazard is found

After an explosive hazard has been found, the MDD team leader should decide whether it should be removed or marked and removed/destroyed later. This decision should be made with reference to the need to maximise MDD working time as long as safety is not compromised.

If there are three or more positive indications in a 10 x 10 metre search area, the MDD team leader must decide whether there is a risk of the signals becoming mixed/confused and withdraw the MDD set(s) from that area if it would compromise safety to continue.

NOTE: *At all times, the safety of the MDD set(s) is important but the primary safety concern is the risk of leaving hazards in an area that will later be declared 'Cleared'.*

The perimeter of the area successfully searched by the MDDs must be marked before the MDD team leaves the area.

10. MDD Marking systems

In many cases, the MDD team will arrive at a task that already has some safe lanes and breaches prepared, and some marking in place.

To avoid site confusion, the MDD team will use the same marking as the manual deminers when possible. Existing task marking, Control Point and other site requirements may be used as long as the MDDs have a suitable rest area without disturbance. When the manual deminers assigned to the MDD team need to establish metal-detector test and calibration areas, etc, they must follow the site layout as detailed in Chapter 4 of these SOPs. The manual demining marking system is fully detailed in Chapter 5 of these SOPs. The MDD team also uses some MDD specific marking that should be removed or replaced when the MDD team leave a task.

10.1 Basic area marking for the MDD team

As with all marking used during demining, the primary goal is to ensure that there is never any potential confusion between areas that have been Searched & Cleared and those that have not. A secondary goal is to accurately mark MDD indications and the places where hazards have been discovered. Some flexibility about the marking used is permitted as long as these goals are achieved and all those working at a task are familiar with the marking used.

Hazardous area pickets/stones. Pickets with the top 10cm painted red are placed at one metre intervals to indicate the extent of the searched area perimeter (except where baseline tape/rope is used instead). When marking corners, a hazardous area picket/stone is placed to mark the corner, and two more are placed 30cm from the corner picket along the boundary between the safe area and the hazardous area. Hazardous area pickets may also be used to mark the position of hazards that are located during the MDD search before they are removed. After the hazard is removed the pickets should be removed and the appropriate 'found hazard' marker placed where the device was found.

Baseline (start line) tape/rope. This can be made of any suitable material, (such as cloth, plastic or nylon). When the baseline tape/rope is used to mark the baseline between searched and un-searched areas during a short leash search, it must be easily moved forward as work progresses. The ends of the baseline tape/rope should be anchored so the baseline cannot be accidentally moved.

Baseline (start line) steel/wooden pickets. When used, baseline pickets stand above the ground and are painted white with red tops. A tape or rope should be stretched along the ground surface between the pickets to park the baseline from which the handler sends the MDD forward when using a long leash search. Painted stones may be used as alternatives to pickets when visibility permits.

Orientation pickets. These are used to help the handler to identify the position of an indication when he/she is using a long leash and has two or more angles of approach to the area. Orientation pickets may be painted either red or blue. Painted stones may be used as alternatives to pickets when visibility permits. The pickets are placed in alternating colours at one metre

intervals along the side of the area that the handler is not using. When the opposite side is accessible, that is preferred, but when using the L shape approach, the side of the 'L' not being used as the start line should be marked with orientation pickets. In all cases, hazardous area marking pickets/stones may be used in place of pickets as long as they can be easily seen.

When used on the side opposite to the handler, the orientation pickets also help the long leash handler to ensure that the MDD has covered all of the ground in straight lines.

Start/end pickets. These are wooden or steel pickets used to mark the start and finish of work over an area. They should be placed in a 'cross' to indicate the end of the search in an unfinished search area.

10.2 Operational marking during MDD tasks

Operational marking varies, but is always designed to ensure that there is never confusion between areas that have been searched and those that have not. When necessary, the MDD team leader should require more than the minimum marking to be used.

10.2.1 Minimum marking requirement

The minimum marking requirement is a baseline (start line).

In Boxed areas, side making should extend around the box at one metre intervals before the MDD is deployed.

During L shape and Baseline breach searches, when the handler is confident that the area has been fully searched, the handler instructs the manual deminers to place side and end markers (painted stones or pickets) at two metre intervals around the sides of the area searched that are not already marked. To achieve overlap between adjacent search areas, the side and end markers should be positioned a minimum of 50cm in from the sides of the area searched and one metre back from the extent of the search. The MDD handler must supervise the marking to ensure that there is no confusion about where marking is placed.

The MDD handler is responsible for recording the area searched as required by the MDD team leader, who is directed in this by the MDD coordinator or the task supervisor.

10.2.2 Marking of search Boxes

Search Boxes should be marked with hazardous area pickets/stones or orientation pickets/stones placed every metre around the box to identify its borders. The section leader in charge of the boxing process is responsible for marking and giving an ID number to each prepared box before the MDD are used to search them.

When a Box has been searched by the MDDs, the MDD team leader is responsible for ensuring that the ID number for the box is recorded as required by the MDD team leader, who is directed in this by the MDD coordinator or the task supervisor.

10.2.3 Marking for long leash search patterns

Before deploying an MDD, the handler must identify a baseline and, when possible, place red and blue metal orientation pickets at one metre intervals within the safe area on the side opposite, or at right angles to the baseline. Alternating the colours of the orientation pickets makes them easier to reliably count from a distance.

The MDD handler must then mark a starting position by placing two start/end markers at the baseline. The handler should move the start/end markers between 50cm and one metre to the right along the baseline every time the MDD has finished searching and returned to the line. In this way the MDD set progresses along the baseline.

Whenever a handler leaves a search area uncompleted, the start/end markers should be moved 50cm back from the last searched line (to ensure overlap when resuming the search), then placed in a cross on the ground.

When an unboxed area has been searched by two MDD sets, the second handler should ask the manual deminers to place side and end markers (painted stones or hazardous area pickets) at two metre intervals on the sides of the area searched that are not already marked. To achieve overlap between search areas, the side and end markers should be positioned a minimum of 50cm in from the sides of the area searched and one metre back from the extent of the search. The MDD handler must supervise the marking to ensure that there is no confusion about where marking is placed.

The MDD handler is responsible for recording the approximate area worked as required by the MDD team leader, who is directed in this by the MDD coordinator or the task supervisor.

10.2.4 Operational marking for the short leash search pattern

The MDD handler should approach the baseline and select a starting position at one end of the baseline. The handler must set up a baseline tape/rope across the baseline. The MDD will search on one side of the baseline tape in the unsearched area while the handler monitors the MDD by walking on the other side of the tape/rope in the safe area. When the MDD reaches the other end of the baseline, the handler moves the baseline tape/rope forward 50cm (or less) and the process is repeated (always with the MDD searching in the same direction).

As the search progresses, the baseline tape/rope is moved forward toward the far end of the search area. When physical obstructions prevent the tape/rope being moved forward, the search should continue on only one side of the obstacle. The MDD team leader must decide how best to search the area around or over the obstacle.

If the handler leaves a search area incomplete at the end of a shift, the tape/rope indicates the baseline between the searched and unsearched area. When an area has been completely searched by two MDD sets, the second handler should ask the manual deminers to place side and end markers (painted stones or hazardous area pickets) at two metre intervals on the sides of the area searched that are not already marked. To achieve overlap between search areas, the side and end markers should be positioned a minimum of 50cm in from the sides of the area searched and one metre back from the extent of the search. The MDD handler must supervise the marking to ensure that there is no confusion about where marking is placed.

The MDD handler is responsible for recording the approximate area worked as required by the MDD team leader, who is directed in this by the MDD coordinator or the task supervisor.

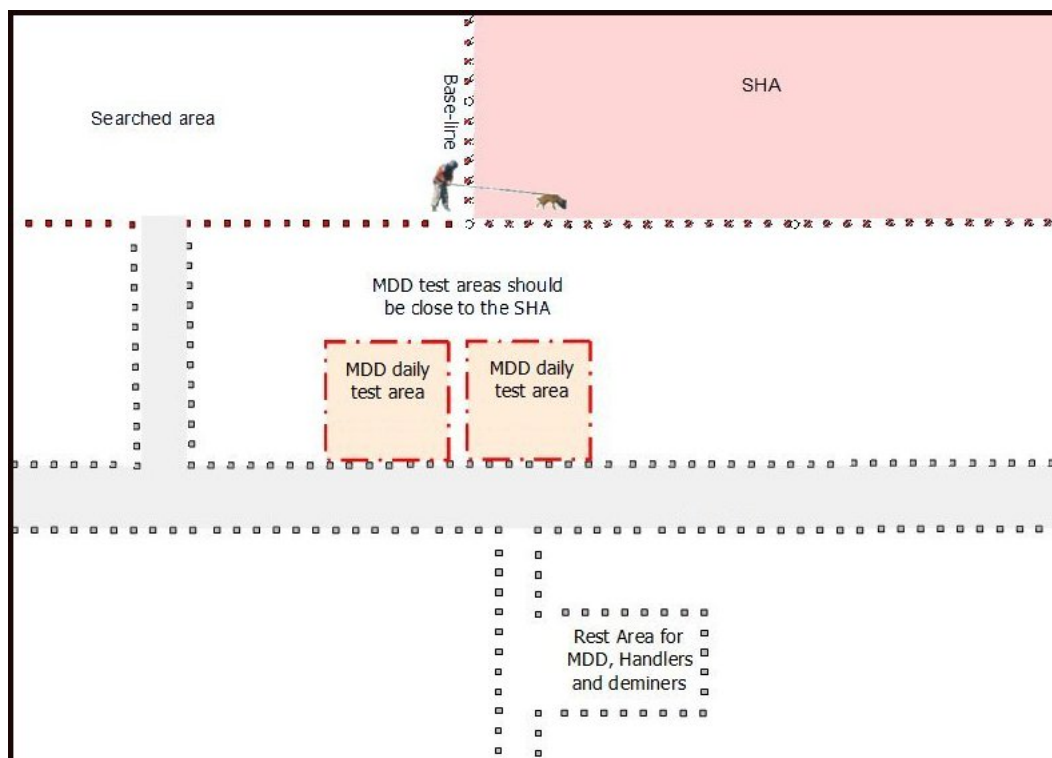
11. MDD site preparation and layout

The needs of the MDD team vary from other demining assets and in some cases task areas may need to be duplicated. For example, the MDDs must not rest in any area that is close to a collection point for recovered hazards or the place where demolition consumables are stored, so a separate MDD rest area may be needed.

11.1 General MDD requirements

The general requirements for site preparation and layout are given in Chapter 4 in these SOPs. The MDD site variations are described in Chapter 4, Part 3.4 of these SOPs.

Specific MDD requirements are shown in the drawing below.



An ambulance and paramedic are not shown on the drawing above because they are shared with adjacent assets whenever possible. They should always be within five minutes of a working site before MDD sets are deployed to search.

MDDs should be protected from direct sunlight during the day and rested in the shade whenever necessary.

When using metal-detectors, the site must have a detector calibration and test area close to the place where the deminers are working.

Car parking and other areas should be positioned in order to reduce unnecessary movement of staff within the area. It can be important to avoid disturbing the MDDs, so a detailed plan of each site organisation should be made by the MDD coordinator liaising with the task supervisor.

11.2 MDD test areas

On site MDD test areas must be used during the Daily Detection Capability Test by all operational MDDs. The position of MDD test areas must be regularly changed. The position of targets concealed in the MDD test areas must also be regularly changed.

NOTE: *MDD test areas are not training areas. They are similar to metal-detector ‘test pieces’ which are only used to confirm that the detector is ‘working’, not what it can reliably do. The MDD test area is used to determine whether the MDD set is ‘awake’ rather than to train it or assess its limitations. The training of the MDDs should be reinforced each day and their performance assessed in a dedicated training area.*

MDD test areas must be positioned within or close to the task area. The conditions inside the test boxes should be as close as possible to the conditions in the task area. When inside the task area, they should be in an area that has been searched and no mines or explosive hazards found.

The test areas should be marked as described in Chapter 4, Part 3.4. All non MDD staff should avoid the area.

Target objects used for MDD testing may be small fragments of explosives, fragments of mines or rendered safe explosive hazards. Ways of preparing some mines for use as MDD targets are described in Chapter 10. Ideally, the MDD test areas will be established and the target objects placed before the MDDs are deployed to the task. The MDD coordinator must keep a detailed sketch that indicates the location of all target objects within the MDD test area. When a task is extensive, several test areas should be established in different places at the site.

During the test, MDD handlers should wear PPE and reproduce working conditions as accurately as possible.

The following constraints apply to the MDD test areas:

- targets must accurately represent the explosive hazards anticipated at the task;
- targets must include some at the required search depth at the task;
- the dog handler must not know where the target objects are located;
- target objects must be further than two metres away from each other; and
- if the designated test area has been mechanically prepared, a minimum soak time of seven days must be left before the area is used.

See also Part 12 in this Chapter.

11.3 MDD Transport

MDDs must be transported in a safe and secure manner. The following conditions should be met.

1. Handlers must ensure that sufficient drinking water is available to the MDDs at all times.
2. The transport cages used during travel must be safe and well ventilated.
3. The MDDs must be protected from wind and direct sun.
4. If MDDs are driven on dusty roads or in a convoy, the vehicles transporting MDDs should travel at the head of the column to avoid them breathing dust unnecessarily.
5. During transport over long distances by vehicle, the MDDs must be walked every two hours or more frequently.
6. MDDs must be under constant supervision by handlers or other MDD team staff during transport.
7. Whenever MDDs must make long trips by train, ship or air, the MDDs should not be fed before departure.

12. MDD training, accreditation and testing

MDDs and handlers need to be trained and retrained in order to maintain the high standards of work required. Each MDD set must be internally accredited by passing tests before it is ready for deployment. External testing may also be required by the NMAA. When external accreditation to international standards is conducted, the MDD coordinator must ensure that the entire MDD team does everything possible to facilitate the testing.

12.1 Internal MDD training and testing

Before they arrive, MDDs are trained to make patterned searches on a long or a short leash and to keep their noses close to the ground, searching constantly. On command, they turn and return in a straight line, obeying voice and leash commands issued by their handler. When they locate a target, they are trained to sit. When an indication is positive, they are rewarded with either praise or play. This basic training must be reinforced and extended with internal 'continuation training' in a process designed to keep the dogs focussed and motivated.

Internal reinforcement training should be conducted daily in dedicated training areas where targets accurately representing the anticipated hazards have been in place for at least a month and were placed using all possible means of avoiding leaving human tracks or traces. When this is not practicable, daily training using MDD training carousels must be conducted. The use of a carousel for training during inclement weather is recommended.

12.1.1 Internal monthly test and evaluation

All MDD sets should undergo a monthly internal test and evaluation. The MDD coordinator is responsible for planning and conducting this test in which the MDD set must successfully search an area of at least 200 m² and locate all concealed targets (which have been in place for at least one month). The targets must represent every kind of explosive hazard anticipated in the working areas and must be concealed at the required search depth.

All test results must be recorded. If an MDD set does not pass the test by locating all of the hazards, the MDD set must be withdrawn from operational work and undergo appropriate refresher/continuation training. After the training a new test must be carried out.

12.1.2 Daily capability test

A test of each MDD's ability to detect targets must be carried out daily. This is similar to testing a metal-detector's ability to locate its test piece. At the discretion of the MDD coordinator and MDD team leader, the daily test may be repeated at any time during a working day to ensure that the MDD is still 'switched on' and able to detect the test targets.

MDDs must search the test area using varied approaches while their behaviour, concentration, and the accuracy of their detections is assessed. Any MDD whose behaviour is erratic or which shows poor concentration must fail the test. Any MDD that misses a target must fail the test.

If an MDD fails the capability test, the MDD must be taken out of operational deployment. The area searched by the MDD since the last capability test (which may be the entire area searched during the last working day) must be searched again by other MDD sets. The MDD that failed should be given intensive retraining and pass an internal monthly test and evaluation before being redeployed.

12.1.3 Testing to reinstate operational status

MDDs will automatically have their operational status revoked after annual leave, sick leave or any other disruption of work lasting more than 10 days unless their daily training routine has been continued throughout the break.

In order for operational status to be reinstated, MDD teams must first spend at least three days in continuation training, then pass the internal monthly test.

NOTE: *An MDD failing an internal test does not affect any accreditation issued by a third party.*

12.1.4 Internal accreditation of MDD sets

An MDD set is an MDD and its handler. When the handler has more than one MDD, the testing process must be completed with each MDD.

An MDD set will only achieve operational status when the following conditions have been met:

- the handler must have completed and passed the internal course for MDD handlers;
- the handler must be a trained deminer; and
- the MDD set comprising one dog and its handler must have passed the internal certification test conducted by the MDD coordinator.

12.1.5 Internal certification test

In order to obtain operational status, MDD sets must pass an internal certification test. Unless otherwise authorised, the test parameters should be as described below.

1. The MDD must conduct a total of 700 m² of successful searching conducted over a period of three days. The 600 m² comprises:
 - a. 300 m² of searching in an area in which there are pieces of explosive and dispersed explosive hazards.
 - b. 300 m² of searching in an area that contains five hazards of at least two types.
2. The targets must represent every kind of explosive hazard anticipated in the working areas and must be concealed at the required search depth for a minimum of one month.
3. At least 100 m² of land where there are no targets must be included in the test.

The number of acceptable false indications is twice the number of targets present or, in the target free area, one false indication for every 40 m² of land searched.

If the MDD indicates on all targets within one metre of the target, and if the overall search, intensity, focus and indication behaviour is satisfactory, the MDD set will be issued an Internal operational status certificate and may undergo an accreditation test by the NMAA when required.

12.2 External accreditation of MDD sets

When MDD sets have qualified for internal certification, they may be required to apply for accreditation by the NMAA. Accreditation can be granted without a formal test if the NMAA is satisfied with the internal training. If an examination is required, the NMAA should arrange for the MDD set(s) to be tested by a suitably qualified examiner within a reasonable timeframe.

When an external accreditation test is required, it should be conducted on a test site that is unknown to the MDDs and their handlers, and where the conditions are as required in the MDD IMAS or relevant NMAS.

When the NMAA does not have appropriate testing areas or expertise, their representatives may attend the internal certification tests as observers (by arrangement).

12.3 MDD continuation training

The successful deployment of MDDs in mine action relies on the animals having been appropriately trained from a young age and then had constant continuation training, testing and

the objective analysis of results in relation to the working context. Attention to these factors, in addition to an emphasis on dog health, hygiene and nutrition, allows the MDD coordinator to make informed predictions about the capacity and reliability of MDDs deployed in operational work.

Continuation training is critical to the maintenance of an MDD's detection ability and its reliability. It must be conducted with the handler(s) with which the MDD is familiar.

The MDD coordinator must implement an internal training program that is appropriate for each MDD and handler. This allows for the targeted correction of unwanted behaviour and the reinforcement of desirable behaviour. In this way the MDD coordinator can ensure that each MDD performs as well as it is able when deployed for operational work.

12.3.1 Requirements of an MDD continuation training area

The area selected for in country MDD continuation training must be as similar as possible to the area where they will be deployed. The area should be similar with respect to topography, soil type, ground conditions, type and density of vegetation, pollution and waste.

The targets concealed in the training area should include a sample of the complete range of target hazards (rendered safe) anticipated in the working area(s) and must include a complete range of the target substances found in the explosive hazards anticipated in the working area(s).

The marking of the training area should be consistent with the marking used during operations.

It is very important to have absolutely accurate maps of all areas used for MDD training because, generally, targets should not be disturbed when an MDD indicates their presence. These maps must record the correct position of targets, the types of target, and the date when each target was put in the ground. The map must also record the names of the people who were responsible for preparing the area.

Access to the training area by people or livestock should be restricted and it should be maintained whenever necessary but at least once every second week.

Continuation training activities are normally carried out for at least twelve hours a week while the MDDs are operational. The MDD training can be carried out before and/or after work in the field each day or during normal working hours when the MDD coordinator decides that it is necessary. Weekends can be used to ensure that the MDDs are prepared for the coming week and so limit downtime.

Additional MDD training or testing is obligatory when:

- there is an extreme change of environmental or climate conditions in the area of operations;
- after any disruption or break of operational work and of daily training of more than ten days; and
- if any MDD set does not satisfy the daily detection capability test or an internal test.

MDD training should be carried out under the supervision of the MDD coordinator. The MDD training plan must detail the objective or problem that needs attention and how the training will achieve the required result.

A detailed internal record of each MDD's training must be kept by the relevant team leader. This record facilitates an understanding of the individual capabilities of various MDD sets in varied conditions.

12.3.2 Physical stamina and Endurance Training of MDD

In order to maintain an MDD's physical ability to work at maximum capacity, regular endurance/stamina training is necessary. This training should include long walks and may include

swimming. When possible, swimming can be a particularly important part of endurance and strength training because it is not time consuming or arduous for handlers or kennel staff.

13. Internal MDD team documentation

Reporting requirements at each task site are managed by the task supervisor. The MDD team leader must provide progress and performance reports as described in Chapter 14.

In addition to task reporting, the MDD team leader must ensure the maintenance of the MDD team reports described below.

13.1 MDD team daily report

The MDD team keep a daily record of the MDD team's activity whenever the MDD team is deployed to an operational task. The daily report must record:

- date (day/month/year);
- name and surname of the MDD coordinator and MDD team leader;
- number of all persons present and deployed on the task site (handlers, deminers, and others);
- working hours;
- downtime;
- data on all searched areas (ID number, size, MDD sets involved in the search, type and number of all hazards located etc., including GPS coordinates of perimeter turning points);
- sketch of the area searched including the positions of all hazards found;
- comments related specifically to the Task Risk Assessment and Task Release Plan (especially any recommended changes as a result of information gained during the day's work); and
- additional remarks.

13.2 Internal list of MDD operations

This is a record of all MDD team activities carried out at a specific task that is kept by the MDD team leader. Each MDD handler keeps an record of their operations and these are combined by the MDD team leader every working day.

The Internal List of Operations must record:

- MDD set work schedule by area ID;
- time of entering/leaving task site;
- hours worked by each MDD;
- weather conditions;
- findings; and
- other remarks and observations.

13.3 Daily ability test records

The MDD team leader must keep a record of the daily detection ability test that each MDD set must complete before deployment.

The daily ability test record must show:

- the names/ID of each tested MDD set;
- the number of target objects located in each test area;

- the number and type of any missed target objects;
- the number of false indications and where; and
- remarks and observations.

14. MDD MEDEVAC and healthcare

General MEDEVAC procedures are documented in Chapters 6 and 7 of these SOPs. Additional instructions that are relevant to the MDD team are given here.

In case of an accident close to a deployed MDD, the handler will remove the MDD from the area and guide it to the nearest safe area. If the handler is needed to assist with an evacuation, the MDD may be left unattended but must be secured.

14.1 Action when an MDD is injured

If an accident has caused injuries to both people and an MDD, the medical treatment of the people must always have first priority.

When any injured staff are receiving help, the MDD team leader and/or MDD handlers may turn their attention to any injured MDD. If the MDD is inside a hazardous area, it must be approached using approved manual demining Search & Clearance procedures to ensure that the recovery team is not put at risk. MDD handlers are trained deminers and may make a breach to the MDD when appropriately equipped.

If the MDD is seriously injured with wounds that are likely to be fatal or that will cause severe disability, the MDD should be humanely destroyed without moving it from the accident site. If the MDD is in an uncleared area or was in a 'Cleared' area where it initiated a device, the area around the MDD must be manually Searched & Cleared before the corpse is removed. If the MDD is injured in an area where there may be fragmentation mines or tripwires, a breach should be made and the corpse should be pulled into the safe area from a safe distance before it is carried away for disposal.

If the MDD is not seriously injured, it should be encouraged to make its way back to the baseline and given appropriate first aid. After the MDD has received first aid, it should be transported to an appropriate veterinary institution.

If the MDD is seriously injured and has wounds that are likely to be fatal or that will cause severe disability, the MDD must be humanely destroyed as soon as possible.

Severe injuries include:

- high amputation of extremities (above elbow on a front extremity; above ankle on a back extremity);
- injuries to the skull or head including cranium fractures;
- injuries to the spinal cord;
- injuries to the pneumothorax, caused by penetrating wounds through the body; and
- injuries that, on the surface, cover more than 1/3 of the abdomen.

The MDD coordinator or MDD team leader must decide whether the MDD should be destroyed in order to minimise unnecessary pain and discomfort.

14.2 Procedures for medical transport of an MDD

In case an MDD requires emergency MEDEVAC, the MDD team should react as described below.

The MDD handler should:

- identify wounds on the injured MDD's body and report them to the MDD team leader and MDD coordinator;
- monitor the MDD's behaviour, looking especially for signs of extraordinary stress, passivity or aggressiveness; and
- arrange for first aid to be administered or, when no more qualified person is available, provide emergency first aid to the MDD.

The MDD team leader should:

- provide first aid to an injured MDD;
- manage the emergency transport of the injured MDD;
- inform the MDD coordinator;
- retain overall control of the rescue efforts unless/until more senior people are present;
- ensure that the borders between searched and unsearched areas are clearly marked so that staff attending the injured MDD remain safe at all times;
- conduct first aid on the injured MDD when he/she is not needed to assist with human casualties and if no more qualified MDD staff are available to do so;
- review the MDD's injuries and decide whether it is necessary to destroy the animal; and
- ensure that a driver is on standby for the transport of the injured MDD.

14.3 MDD First Aid

During MDD operations and training, MDD first aid kits must be available at all times. The first aid kit should be located in the vehicle used by the MDD team leader.

In case of an MDD injury, the handler can give first aid to the dog but the MDD team leader is responsible for ensuring that all treatments are conducted correctly. In case of serious injury, the dog must be transported, as soon as possible, to a suitable veterinarian facility.

Application of serum or injections against snake bites may be carried out as required in the field.

The following should be treated by a veterinarian:

- injuries involving fractures;
- open wounds that are longer/deeper than 2 cm;
- burns; and
- infected wounds regardless of size.

14.4 MDD health care

The purpose of the MDD health care program is the prevention of disease. Health care starts in the kennel with hygienic living conditions and a dog food that provides the right balance of vitamins, minerals, protein and fat.

14.4.1 Annual health check by veterinarian

In order to prevent disease and maintain good health among MDDs, regular and periodical health checks are essential. Thorough health checks of each MDD must be carried out by a veterinarian in adequate facilities at least once annually and should include:

- analysis of the MDD's general physical condition;

- blood and urine analysis; and
- check of internal organ functions.

The MDD coordinator is responsible for arranging the detailed health check with a qualified and properly equipped veterinarian.

14.4.2 Daily health check by handlers

Daily health checks conducted by handlers involve the inspection of the following:

- general physical condition of dog;
- temperature check;
- mouth and teeth;
- ears and eyes;
- hair and skin;
- urine and droppings;
- genitals and anal region;
- need for water; and
- appetite.

14.4.3 Yearly vaccinations

Once a year, vaccination against the following diseases should be carried out:

- Rabies;
- Distemper;
- Parvovirus; and
- Leptospirosis.

Other vaccinations may be required at the discretion of the MDD coordinator and, when appropriate, the NMAA.

De-worming and protection from external parasites should be carried out every three months or as necessary.

15. MDD working hours

The working times of the MDDs will vary. The working hours in a day should be eight hours and the MDD working week will normally be for five days. The eight working hours for MDDs includes morning and afternoon training and exercise periods so the time working in the field will be considerably less, and may be further reduced by weather constraints.

During operations, an MDD must have at least a five minutes break after every 30 minutes working. Handlers must pay attention to the MDD during work and take breaks when necessary to ensure that the MDD is comfortable and so can search with concentration. The stamina of MDDs varies and every effort must be made to avoid any element of competition between handlers, who may mistakenly equate speed with achievement. The search must be thorough and reliable, not necessarily fast.

Working hours and shifts should be very flexible and dependant on the weather and the season. MDDs need daily care and attention so the MDD team usually works longer than other staff. MDD handlers should not expect to have the time off that other staff enjoy because animals need to be cared for seven days a week. Because an ability to work closely with animals is essential, the appointment of each MDD team member must be approved by the MDD coordinator.