



LMAS 09.10 Annex E

CLEARANCE OF MOUNTAINOUS ROCKY TERRAIN AND OBSTACLES

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Note:

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1. Introduction

- 1.1 Mountainous and rocky terrain may cause difficulties during demining operations, i.e. searching visually and with instruments, walking, investigating signals, and marking.
- 1.2 There shall therefore be increased awareness by all personnel when conducting demining operations in these areas.
- 1.3 In circumstances where it is not possible to conduct a detector search, i.e. targets beyond the capability of instruments, interference from the terrain and environment, inability to conduct systematic search, then excavation may need to be conducted (i.e. full excavation).
- 1.4 There may be a requirement to remove rocks which impede the search and / or to aid safe movement. These rocks may be completely on the surface or partially buried and prior to removing the rocks, an assessment shall be conducted as to the method to be used to ensure that it is conducted safely.
- 1.5 The requirement to investigate and/or remove rocks shall be based on a pertinent risk assessment with consideration to the conflict history, i.e. the type of mines/ERW, the likelihood of mines/ERW being located beneath rocks (were the rocks in position before or after the mines were laid, ERW dropped, fired, launched?), the possibility of disturbing / initiating mines/ERW when removing rocks.
- 1.6 Mine Action Organisations shall details methods for the investigation and removal of rocks, i.e. detector search, excavation, manual lifting, remote pulling, mechanical, EOD.
- 1.7 Consideration shall also be made as to the possibility of booby-traps or secondary devices which may be initiated through the removal of rocks and the procedures for dealing with this.
- 1.8 If booby-traps are suspected at the demining site then the SMACO shall be informed, a pertinent risk assessment shall be conducted prior to the SMACO authorising a commencement of operations. This shall be detailed in the Implementation Plan.
- 1.9 Depending on the risk assessment (i.e. no booby-traps, secondary devices suspected), it should be acceptable to remove surface rocks by hand as long as it is conducted in a controlled and safe manner.

2. Example of Procedure for Manual Lifting of Rocks

- 2.1 The Deminer shall conduct a visual inspection of the immediate area to be searched, in accordance with the SOP.
- 2.2 The Deminer shall conduct an instrument search of the rock(s) if possible, in accordance with the SOP.
- 2.3 Any signals detected shall be marked, in accordance with the SOP.
- 2.4 If there is a signal(s) beneath the rock(s) to be removed then the Deminer shall report to the supervisory person, who shall confirm the signal(s) using the detector.
- 2.5 Note: Bedrock which it is possible and / or required to move, shall require a visual inspection and may be an instrument search of any crevices.

3. Example for Actions on Locating a Surface Rock with No Detector Signal

- 3.1 The Deminer shall conduct a visual inspection of the rock / surrounding area, looking for hazards.
- 3.2 If assessed as not safe to lift, i.e. rock too large / heavy or may cause disturbance to ground during lift, or there are hazards, the Deminer shall mark the rock and report to the supervisory person for guidance.
- 3.3 If the rock is assessed as safe to lift and there are no hazards, the Deminer shall carefully lift the rock (vertically) and remove it to a clear area
- 3.4 The Deminer shall conduct a visual inspection of the area where the rock was moved, looking for any hazards.
- 3.5 If there are no hazards then the Deminer shall conduct a detector search of the complete area, in accordance with the SOP, before progressing forward.

4. Example for Actions on Locating a Surface Rock with a Detector Signal

- 4.1 The Deminer shall isolate and mark the signal, as per the SOP.
- 4.2 The Deminer shall conduct a visual inspection, looking for hazards.
- 4.3 The Deminer shall report to the supervisory person who shall conduct a visual inspection and detector search, to confirm the situation.
- 4.4 On confirmation that there is a signal, the supervisory person shall decide on the optimum procedure, always taking into consideration safety.

5. Example for Actions on Locating a Surface (partially buried) Rock with a Detector Signal

- 5.1 The Deminer shall isolate and mark the signal, as per the SOP.
- 5.2 The Deminer shall conduct a visual inspection, looking for hazards,
- 5.3 The Deminer shall report to the supervisory person who shall conduct a visual inspection and detector search.
- 5.4 On confirmation that there is a signal, the supervisory person shall decide on the optimum procedure, always taking into consideration safety.

6. Example for Options after Assessment of a Surface or Partially Buried Rock

- a. Lift and remove the rock.
- b. Mark and bypass the rock.
- c. Remotely pull the rock.
- d. Excavate the rock.
- e. Mechanical removal of the rock.

- f. EOD - destroy or dislodge the rock, i.e. by demolition or a disrupter (**note:** this would normally be as a last option and a 'sympathetic detonation' of explosive ordnance must be considered).

7. Clearance of Other Obstacles

- 7.1 In hazardous areas with obstacles that contain a threat of mines/ERW, a procedure for clearing obstacles should be used. The following are considered as potential obstacles:
 - a. Former trenches in defensive positions.
 - b. Any ditches in mine/ERW hazardous areas.
 - c. Fortified wire entanglements.
 - d. Abandoned vehicles.
- 7.2. During the clearance of mine/ERW hazardous areas, obstacles shall be identified and distinctive clearance drills should be adopted, e.g., sapping, pulling, EOD.
- 7.3. Obstacles should ideally be cleared 360 degrees around or along its axis on both sides.
- 7.4. Those obstacles that cannot be cleared immediately shall be marked, recorded (i.e. site map and work sheet) and if necessary fenced for future clearance operations.
- 7.5. No clearance should be conducted closer than 50 cm to these obstacles however in circumstances where it must be closer, i.e. to provide vital access then it shall be no closer than 20 cm and the obstacle shall not be disturbed.
- 7.6. The supervisory staff shall give consideration to the approach and clearance method used for each type of obstacle encountered.