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STANAG 2485 ENGR (EDITION 2) - COUNTERMINE OPERATIONS IN LAND WARFARE

Reference:
NSA(ARMY)0839-ENGR/2485 dated 14 December 2001 (Edition 1)

1. The enclosed NATO Standardization Agreement which has been ratified by nations as reflected in page iii is promulgated herewith.

2. The reference listed above is to be destroyed in accordance with local document destruction procedures.

3. AAP-4 should be amended to reflect the latest status of the STANAG.

4. The Army Board, NSA considers this an editorial edition to the STANAG; previous ratifying references and implementation details are deemed to be valid.

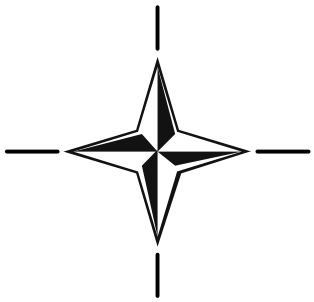
(Original signed)

Jan H ERIKSEN
Rear Admiral, NONA
Director, NSA

Enclosure:
STANAG 2485 (Edition 2)

STANAG Nº 2485
(Edition 2)

NORTH ATLANTIC TREATY ORGANIZATION
(NATO)



NATO STANDARDIZATION AGENCY
(NSA)

STANDARDIZATION AGREEMENT
(STANAG)

SUBJECT: COUNTERMINE OPERATIONS IN LAND WARFARE

Promulgated on 30 May 2002

(Original signed)

Jan H ERIKSEN
Rear Admiral, NONA
Director, NSA

RECORD OF AMENDMENTS

No.	Reference/date of amendment	Date entered	Signature
1	NSA(ARMY)1015 (french only)	21.11.2003	Mrs Vanbeginne

EXPLANATORY NOTES

AGREEMENT

1. This NATO Standardization Agreement (STANAG) is promulgated by the Director NSA under the authority vested in him by the NATO Military Committee.

2. No departure may be made from the agreement without consultation with the tasking authority. Nations may propose changes at any time to the tasking authority where they will be processed in the same manner as the original agreement.

3. Ratifying nations have agreed that national orders, manuals and instructions implementing this STANAG will include a reference to the STANAG number for purposes of identification.

DEFINITIONS

4. Ratification is "In NATO Standardization, the fulfilment by which a member nation formally accepts, with or without reservation, the content of a Standardization Agreement" (AAP-6).

5. Implementation is "In NATO Standardization, the fulfilment by a member nation of its obligations as specified in a Standardization Agreement" (AAP-6).

6. Reservation is "In NATO Standardization, the stated qualification by a member nation that describes the part of a Standardization Agreement that it will not implement or will implement only with limitations" (AAP-6).

RATIFICATION, IMPLEMENTATION AND RESERVATIONS

7. Page iii gives the details of ratification and implementation of this agreement. If no details are shown it signifies that the nation has not yet notified the tasking authority of its intentions. Page iv (and subsequent) gives details of reservations and proprietary rights that have been stated.

FEEDBACK

8. Any comments concerning this publication should be directed to NATO/NSA – Bvd Leopold III - 1110 Brussels - BE.

Agreed English/French Text

STANAG 2485
(Edition 2)

NATO STANDARDIZATION AGREEMENT (STANAG)

COUNTERMINE OPERATIONS IN LAND WARFARE

Annexes: A. Reporting of Minefield Breaching and Clearance Operations
B. Recording Performa

Related documents:

STANAG 2036 ENGR	-	LAND MINE LAYING, MARKING, RECORDING, AND REPORTING
STANAG 2389 EOD	-	MINIMUM STANDARDS OF PROFICIENCY FOR TRAINED EXPLOSIVE ORDNANCE DISPOSAL PERSONNEL
AAP-19	-	NATO COMBAT ENGINEER GLOSSARY
AEngrP-2	-	LAND FORCES COMBAT ENGINEER MESSAGES, REPORTS AND RETURNS
AEODP-6	-	EXPLOSIVE ORDNANCE DISPOSAL REPORTS AND MESSAGES
ATP-52	-	LAND FORCE COMBAT ENGINEER DOCTRINE
AC 243 (CET) TR/1	-	REMOTE DETECTION OF MINEFIELDS AND CLOSE-IN DETECTION OF MINES

Protocol on Prohibitions or Restrictions on the use of Mines, Booby -Traps, and Other Devices as Amended on 3 May 1996 (Protocol II as amended on 3 May 1996)

AIM

1. The aim of this agreement is to define countermine operations and standardize the marking, reporting and handover procedures for areas subject to countermine operations in Article 5 and Non Article 5 Operations.

AGREEMENT

2. Participating nations agree:

a. The reporting, breaching, clearing, proofing and marking of areas subject to mines, other unexploded explosive ordnance (UXO) and booby-traps will be in accordance with international law, rules of engagement, host nation restrictions on how the countermine operation is to be conducted, and established, agreed-upon procedures and techniques.

b. The split of responsibilities between Combat Engineers and EOD personnel during operations is a matter for national decision and is not the subject of this STANAG.

PART ONE: GENERAL

BACKGROUND

3. Within the spectrum of military activity, two distinct types of minefield breaching or clearance operations are envisioned. The first, during warfighting, achieves the military commander's objective, principally the provision of freedom of movement. It may be that, in these circumstances, a degree of risk may be acceptable. The second occurs in Non Article 5 Operations, where the greater involvement of the indigenous population and other agencies in clearance and demining operations will require higher standards and minimal acceptance of risk. Areas that have been cleared of mines or demined may be handed over by one NATO force to another or to an international organization or Host Nation. Handover of partly cleared areas may also be required. Therefore, it is necessary to standardize the actions that occur during countermine activities, in all types of military operations.

TERMS AND DEFINITIONS

4. Countermine Operations. In land mine warfare, an operation to reduce or eliminate the effects of mines or minefields. (AAP-6)

5. Minefield. In land warfare, an area of ground containing mines laid with or without a pattern. (AAP-19) (Note. For the purpose of this STANAG, minefields may include UXO and booby-traps.)

6. Minefield Breaching. The action to create one or more breaches through a minefield. (AAP-19)

7. Mine Clearance. In countermine operations, action to restore the freedom of movement within a mined area or along a mined route. (AAP-19)

8. De-mining. Activities to remove the hazard of all mines and other unexploded munitions from a defined area. (AAP-19)

9. Explosive Ordnance. All munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket and small arms ammunitions; all mines, torpedoes and depth charges; pyrotechnics; clusters and dispensers; cartridges and propellant devices; electro-explosive devices; clandestine and improvised explosive devices; and all similar or related items or components explosive in nature. (AAP-6)

10. Unexploded Explosive Ordnance. Explosive ordnance which has been primed, fused, armed, or otherwise prepared for action, and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations,

installations, personnel or material and remains unexploded either by malfunction or design or for any other cause. (AAP-6**)**

THE THREAT

11. General. Units conducting Countermine Operations must assume the following:

- All factions involved in war fighting may have at their disposal modern equipment and all techniques to lay mines or booby traps.
- In the theatre of operations not all areas are subject to mines, booby traps, or unexploded explosive ordnance may be marked or reported appropriately.
- It may be necessary to breach, clear and/or proof own minefields.
- Upon cessation of hostilities own minefields will have to be cleared in accordance with international law.

a. In war these units face numerous challenges including the enemy, terrain, and the mine systems available to the enemy. The ability of the enemy to interfere in countermine operations using direct fire, artillery, rotary and fixed wing aircraft, smoke, chemicals, mines (conventional and scatterable) and any other means available to him must be considered when planning and conducting the operation. When conducting countermine operations the doctrine and tactics of the enemy must be well understood to assist in determining how the enemy will employ its mine systems. In addition, units conducting countermine operations must keep in mind that the number of ways an enemy can employ its mines and mine systems is normally only limited by the imagination.

b. Units face similar numerous challenges when conducting countermine operations during Non Article 5 Operations. Non Article 5 Operations may not always be peaceful actions. Determined opponents may resort to fighting or other aggressive acts in attempt to defeat our purposes and promote theirs.

12. Types of Mines. Any of the types of mines listed below may be encountered.
NOTE: The terms used in this STANAG are defined in AAP-19

a. Anti-Personnel (AAP-19)

b. Anti-Tank (AT). (AAP-19)

c. Area Defense Weapon (AAP-19)

d. Off Route Mine. (AAP-19)

e. Anti-Helicopter Mine. (AAP-19)

f. Chemical Mine. (AAP-19)

g. Command Detonated Mine (AAP-19)

h. Scatterable Mine. (AAP-19)

13. Methods of Laying.

a. Placed. Placed mines may be laid either by hand or using mechanical systems.

(1) Hand Laid. Hand laying is laborious and time-consuming. Mines are hand laid in patterns or randomly. The mines may be buried or surface laid.

(2) Mechanical Laid. Mechanical laying is quicker than hand laying and also requires fewer men. The mines may be buried or surface laid.

b. Scatterable. Scatterable mines are placed mechanically by ground vehicle, artillery projectile missile, or aircraft-delivered munitions. They can be emplaced very rapidly and require few troops.

(1) Scatterable minefields are distinguished by their rapid and less accurate emplacement onto the battlefield. Artillery and aircraft emplacement allows minefields to be laid in the face of the enemy or in depth of his position. They are also well suited for use as flank protection during offensive operations. Scatterable mines may also be laid with ground-dispensing vehicles. Scatterable mines provide the commander with an extremely flexible system that has utility in both offensive and defensive mine laying.

(2) Scatterable mines having a limited laid life, will self-destruct or self-neutralize at the termination of their laid life period. The location of scatterable minefields and timings for destruction or neutralizing mines must be coordinated and recorded.

(3) Remotely-delivered mine. A mine not directly emplaced but delivered to the target area by any other means. Mines delivered from a land-based system from less than 500 meters are not considered to be “Remotely Delivered”. The exact position of the mines may not be known. (See also “scatterable mine” (AAP-19)). Provided that they are used in accordance with Article 5 and other relevant Articles of Protocol II as amended on 3 May 1996.

14. Methods of Actuating Mines (not an inclusive list). A mine’s firing mechanism may be actuated by the following methods:

- Applying pressure (including tilt rod).
- Pulling a trip wire.
- Releasing tension or breaking a trip wire.
- Releasing pressure.

- Passage of time (time-delay mechanism).
- Impulses.
  - Electrical.
  - Vibration.
  - Magnetic-influence.
  - Electromagnetic-frequency.
  - Infrared-sensor.
  - Acoustic.

15. Mine Fuses. A fuse is a device, which initiates an explosive train. (AAP-19) The fuse is the initial component of the firing chain in a firing mechanism of a mine. The fuse is actuated by an initiating action. Some basic fuse types are:

a. Mechanical. A spring drives a striker against a percussion cap, which fires the detonator.

b. Chemical. A small container of a chemical compound is broken by the initiating action. The chemical compound reacts with another substance to generate heat, which ignites the detonator.

c. Friction. The initiating action ignites substances inside the fuse by friction. The flame fires the detonator.

d. Electrical. The initiating action closes an electrical circuit, which functions an electrical detonator.

16. Mine Devices. The mines encountered during countermine operations may also contain internal or external devices that complicate the countermine operation. Some of the more common devices include.

a. Anti-Countermining Device. A device fitted to a mine, designed to prevent its actuation by a countermeasure. (AAP-19)

b. Anti-Handling Device. A device intended to protect a mine and which is part of, linked to, attached to or placed under the mine and which activates when an attempt is made to tamper with or otherwise intentionally disturb the mine. (Synonymous with Anti-disturbance device/anti-lift device). (AAP-19)

17. Other Hazards. Mines that have been in place for a long period of time can impose hazards. The results of weathering, freeze/thaw, breakdown of components and the resulting increased instability are significant hazards. In addition to mines, other hazards that may be encountered during countermine operations include:

a. Unexploded Explosive Ordnance (UXO). Explosive ordnance which has been primed, fused, armed or otherwise prepared for action, and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, personnel or material and remains unexploded either by malfunction or design or for any other cause. (AAP-6)

b. Booby Traps. Any device or material, which is designed, constructed, or adapted to kill or injure, and which functions unexpectedly when a person disturbs or approaches an apparently harmless object or performs an apparently safe act. (ESDP 99)

c. Improvised Explosive Device (IED). A device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals and designed to destroy, incapacitate, harass, or distract. It may incorporate military stores, but is normally devised from non-military components. (AAP-6)

d. Additionally, command detonated munitions may be employed. These munitions may be detonated by remotely controlled means.

18. Units conducting countermine operations must be particularly conscious of encountering the following mining techniques:

a. Coupling/Daisy Chaining Mines. Coupling/daisy chaining is done by linking one mine to another, usually with detonating cord or trip wires. When the initial mine is detonated, it detonates the linked mine. This technique is done to defeat countermine equipment. Command-detonated munitions can also utilize the coupling/daisy chaining technique.

b. Boosting Mines. Buried mines are stacked atop one another. This reduces the probability of detection and increases the force of the blast.

c. Sensitizing AT Mines. On AT mines, modifications can be made to the actuating mechanism, or a pressure-fused AP mine can be placed on the top of an AT mine.

d. Mixing Training Mines with Live Mines. Hostile forces can employ training mines at the start of a minefield and emplace live mines toward the end. Personnel conducting countermine operations falsely believe that the minefield is phony and become complacent in countermine activities. When this technique is used, live mines could be painted to resemble training mines.

PART TWO: EXECUTION OF COUNTERMINE OPERATIONS IN ARTICLE 5 OPERATIONS

ENGINEER TASKS AND RESPONSIBILITIES

19. In general, it is a staff responsibility to collect, coordinate and disseminate information about mines, minefields and related matters. This task is often delegated to engineer staff branches. However, other staff organizations that can contribute to this effort include: Artillery, Air Attack, Air/Maritime/Special Operation Forces (SOF) and Host Nation Staff elements.

20. Engineers have many responsibilities during countermine operations. Engineers generally undertake the following tasks: countermine reconnaissance and intelligence, planned mine detection, minefield breaching, clearance and proofing. Minefield marking is also generally an engineer responsibility but may be carried out by all arms if time, the situation, and equipment permit.

21. The policy for bypassing mined areas is the responsibility of the tactical commander. Engineers may assist in the reconnaissance of bypass routes and may be required to clear routes and areas later in the operation.

INTELLIGENCE AND RECONNAISSANCE

22. All countermine operations require detailed intelligence to assist in planning. Having considered the commander's critical information requirements, the intelligence officer must assess where the enemy will most likely employ mines. The reconnaissance plan is developed based on this analysis of enemy and the terrain. Reconnaissance systems may include unmanned aerial vehicles and standoff mine detection systems as well as engineer reconnaissance teams. An additional source of intelligence information for countermine operations may be the local population.

23. Engineer reconnaissance teams are required to gather detailed countermine information in order to determine the optimum methods of mine breaching and clearance. Examples of countermine information are: obstacle location and size; terrain conditions (to determine the ability to use countermine equipment); presence of wire; gaps and bypasses; minefield composition (mines buried, surface-laid or positioned off the ground, presence of anti-handling devices, and the depth of buried mines); types of mines; location of enemy direct fire weapons; other measures designed to disrupt mine clearance operations and composition of complex obstacles and gaps between successive obstacle belts.

24. National mine documentation centers will exchange information in order to maintain a common level of knowledge. To support NATO headquarters prior to and during operations, they will supply information about mines and booby traps in the theatre when requested.

DETECTION

25. Mine Detection. Activities to discover the presence of and to locate individual mines. This may include the identification of their type and status. (AAP-19) There are two categories of detection:

a. Stand-off Mine Detection. Mine detection from positions outside of or at a certain distance from a mined area, mostly by using remote controlled equipment. (AAP-19) It may assist the tactical commander in his forward planning.

b. Close-in Mine Detection. Mine detection from positions within a mined area. (AAP-19) It may be accomplished through reconnaissance, or it may be unintentional (such as a vehicle activating a mine).

26. Methods of Detection. No current technology on its own will provide the necessary solution for hand-held, vehicle or remote detection. Methods of detection include the following; visual detection, scent detection, hand held detection, vehicle mounted detection, remote detection and biological sensor detection. A combination of these methods is a favoured solution, which offers increased probability of detection and reduced false alarm rate.

a. Visual Detection. This is part of all combat operations and will likely remain the most predominant method of detection. Personnel visually inspect the terrain with naked eye, optical amplification or photography. Mine indicators may include: surface laid mines, trip wires, ground disturbance and damaged vehicles.

b. Scent Detection. Relies on highly trained and effectively controlled dogs. This technique may be more suitable for demining operations but the performance of dogs is degraded by weather conditions, limiting the dogs range to a designated area (such as a lane), and exposure to hostile fire, or excessive explosive residue.

c. Hand Held Detection.

(1) The currently available technologies are: probing (this detection method is very time consuming), metal detection, thermal imaging, polarized thermal imaging, polarized visual imaging and visual imaging.

(2) In the near term, Ground Penetrating Radar (GPR), multi imaging and hyper-spectral imaging may be available.

(3) In the long term, the following technologies may be available: Quadrupole Resonance (QR), biological and chemical sensing, Light Detection and Ranging (LIDAR), conductivity, nuclear techniques and electrostatic sensing.

d. Vehicle Mounted Detection.

(1) The currently available technologies are; mechanical (mine rollers, for example are used to detect minefields in front of deployed tactical formations), metal detection, thermal imaging, polarized thermal imaging, polarized visual imaging, multi and hyper-spectral imaging, active infrared (IR) thermal and visual imaging.

(2) In the near term, GPR and passive millimetric radar.

(3) In the long term, QR, biological and chemical sensing, LIDAR, Laser 3D scanning, electrostatic backscatter, Thermal Neutron Activation (TNA), acoustic sensing and nuclear techniques.

e. Remote Detection.

(1) The current available technologies are: thermal imaging polarized thermal imaging, polarized visual imaging, multi and hyper-spectral imaging, active IR thermal and visual imaging.

(2) In the near term, Ultra Wide-Band (UWB) radar and active millimetric.

(3) Due to a lack of sensitivity performance, multi-sensor systems will be needed to achieve remote detection requirements.

f. Biological Sensor Detection. A biological sensor relies on analysis of air samples to detect explosive traces in the area. This sensor may be hand held or vehicle mounted. This method provides area information but does not pin point any object.

BREACHING OPERATIONS

27. Goal & Purpose. Breaching operations are conducted to allow maneuver despite the presence of obstacles. It is perhaps the single most difficult combat task a force can perform. Breaching is a synchronized combined arms operation under the control of the tactical commander. Minefield breaching will invariably be part of a combined arms operation. In many instances the minefield will be merely one of a series of obstacles to be breached; the overall obstacle, in this instance, is described as “complex.”

28. Types of Breaching Operations. There are two types of breaching operations, deliberate breaching and hasty breaching. The type employed by the tactical commander will depend on time available and the enemy situation.

a. Deliberate Breaching. This is the creation of a lane through a minefield or a clear route through an obstacle or fortification that requires extensive planning and detailed preparation. (AAP-19) Deliberate breaching operations can generally be divided into:

(1) Reconnaissance and study of the obstacle may include operations to determine the boundaries of the mined areas, minefields or mines.

(2) Choice of the breaching site(s).

(3) Neutralization of the enemy and securing the far side of the breach site. The tactical commander will determine the size of the secured area and the means appropriate for securing it.

(4) Creation of one or more lanes for the passage of friendly forces.

b. Hasty Breaching. The creation of a route through a minefield, obstacle or fortification using the means at hand or those readily available and made without pausing to make elaborate preparations. (AAP-19) Hasty breaching may include one or more of the above phases.

29. Methods of Breaching. The available breaching methods may be manual, direct fire, mechanical, water jet, explosive, electromagnetic, freezing or a combination of these. The detail of these methods is described under mine clearance at paragraph 33.

MINE CLEARANCE OPERATIONS

30. As with breaching operations, mine clearance operations are a synchronized combined arms operation under the control of a tactical commander. Mine clearance includes detecting, identifying, neutralizing, destroying, or removing mines. Mine clearance operations are normally less time restricted than minefield breaching and normally the operation is conducted in a lower threat environment than breaching operations. For this reason, forces conducting mine clearance operations may employ the full range of countermine systems available.

31. Mine clearance operations contribute to:

a. Route Clearance. In countermine operations, the removal of the immediate threat from mines or other UXOs and booby-traps along a route.

b. Area Clearance. In countermine operations, the removal of the immediate threat from mines or other UXOs from a defined area. .

32. Regardless of the clearance methods used, there exists a possibility of mines remaining along the route or in the area cleared. For this reason, the tactical commander, based on the recommendation of the engineer commander, must consider the risk involved when using cleared routes or areas.

CLEARANCE METHODS

33. Clearance Methods. The available clearance methods may be manual, direct fire, mechanical, water jet, explosive, electromagnetic, freezing or a combination of these. (The clearance methods described below are examples and include EOD methods.)

a. Manual. This method relies on dismounted soldiers to disarm, move or destroy mines. Techniques include the use of grapnel hooks and hand-emplaced explosives. The mines would be found with probes, mine detectors or other hand carried equipment. Manual methods are often used when stealth is required, operating in restricted terrain or when mechanical equipment is unavailable.

b. Direct Fire. This method relies on the use of ammunition to displace or destroy surface-laid isolated mines. Again, this method is of limited use because it is difficult to assess the results, is relatively slow, and may only sensitize the mines.

c. Mechanical. This mine clearance method relies on physically moving or destroying mines from a designated area or causing them to detonate through physical contact. Mechanical clearance equipment includes mine ploughs or rollers attached to tanks or other tactical vehicles and blades attached to engineer or armored vehicles. This equipment is routinely used

during breaching operations because of the relative speed in which these assets can create a lane in a minefield. However, systems such as the mine plough may not be the best choice when conducting mine clearance operations because the mine plough simply moves the mine from one location to another without necessarily detonating the mine, thus the mine remains a hazard on the battlefield. Flails are another example of mechanical equipment that can be used in mine clearance operations.

d. Water Jet. The use of a high-pressure water jet to disturb/displace mines causing detonation.

e. Explosive. This mine clearance method relies on the overpressure created by a detonation and/or sympathetic detonation of other mines to clear mines. Equipment and techniques included in this method of mine clearance could include:

(1) Rigid line-charge, either manually or mechanically pushed.

(2) Line or two-dimension charge (parallel line charges, explosive ladder, etc.) deployed by one or more rockets.

(3) Foam explosives.

(4) Gas explosives.

f. Electromagnetic. This method relies on a large electromagnetic signature to detonate magnetically fused mines. For example, a series of copper coils mounted to the front of a combat vehicle powered by the vehicles battery can produce a strong enough magnetic signature to detonate mines 2 to 5 meters to the front of the vehicle. Electronic methods are only effective against magnetically fused mines.

g. Freezing. This method relies on the temporary neutralization of a mine by making its initiation system inoperative through phlegmatization (for example, freezing with liquid azote). The period of neutralization is limited to only a few minutes and the temperature of the mine needs to decrease below minus 140 degrees Celsius. Currently no practical application is known. This method can be used on surface laid mines only.

34. No method by itself is capable of neutralizing all types of mines identified as part of the threat. A combination of methods will be required to carry out mine neutralization missions. The destruction of a mine or hazard may result in undesirable secondary damage and neutralization may be preferable. Clearance may be necessary outside the boundaries of the route or area to remove the threat from off-route mines and area defense weapons.

PROOFING

35. Goal. The goal of proofing is to demonstrate that an area or route subject to mine clearance or breaching is clear of mines and other UXOs to acceptable standards.

36. Proofing Methods. Possible proofing methods consist of the following:

a. During breaching operations, proofing is typically accomplished by passing a mine roller or other mine-resistant vehicle through a lane as the lead vehicle. Proofing is done during breaching operations when the risk of live mines remaining in the lane exceeds the risk of loss to hostile action while waiting. As some mines are resistant to some clearance methods (for example, magnetically fused mines may be resistant to a blast from a mine-clearing line charge), proofing should be done when time, threat, and mission allow.

b. During mine clearance operations, whether proofing is performed and what method of proofing is conducted is based on time, the enemy, equipment available, and the orders from the tactical commander.

c. Methods of proofing. There are no real proofing methods that can give us a 100% probability of finding a mine in a previous mined zone; that means that we must accept a risk in occupying such a zone. A combination of detection and clearance methods can be used. A detailed discussion of these methods is described under detection and mine clearance at paragraphs 25 and 31.

MARKING

37. Marking. All areas subject to mines, booby traps, IEDs or other UXOs have to be marked in accordance with STANAG 2036.

a. Marking during breaching operations. Initial marking of breaches through a minefield will consist of the minimal marking necessary to pass initial forces through the breach. The method of initial marking is a national decision. The unit/nation that creates a breach is responsible for reporting the method of initial marking to other units/nations that will use the breach. As soon as time and the enemy situation permits, the breach is to be improved to become a lane and will be marked to the standards specified in STANAG 2036.

b. Marking during mine clearance operations. The marking of cleared routes and areas is to be directed by the tactical commander. If marking is used, units must understand that the enemy may place mines in the route or area after clearance has been completed. The existing minefield marking, enemy and friendly should remain until post-conflict demining is accomplished.

REPORTING REQUIREMENTS

38. Reporting.

a. Reporting of Mined Areas. All areas and routes containing mines, booby traps, IEDs or other UXOs should be reported in accordance with AEngrP-2, OBSREP and AEODP-6 (EOD Incident Report), EODINCREP.

b. Reporting of Breached and Cleared Areas. All mined areas which have been breached or cleared are to be reported in accordance with AEngrP-2, MINCLRRECCEORD, MINCLRRECCEREP, MINCLRORD, MINCLRREP see Annex A.

c. Reporting of Mine Incidents. All incidents involving mines should be reported.

RECORDING REQUIREMENTS

39. Details of mine clearance and demining operations are to be recorded in a Mine Clearance Record. It should be supplemented further by maps, sketches and photographs. An example is at Annex B. This proforma includes 4 parts as follows:

- Part 1 - Details of mined area
- Part 2 - Details of mine clearance activity
- Part 3 - Record of mines and ordnance cleared
- Part 4 - Sketch map of cleared area/route

40. The Mine Clearance Record is to be completed in as much detail as possible at the end of the operation, or when the unit leaves the minefield for another task, including when the task is not complete. The minimum required copies are as follows:

- Copy 1 - Unit carrying out operation
- Copy 2 - Unit taking over area or operation, or civilian representative accepting responsibility for the area (e.g. NGO or local Mayor)
- Copy 3 - Engineer staff at formation Headquarters
- Additional copies may be required in theater (for example, Mine Information Center, Mine Action Center, Theater Engineer Staff)

HANDOVER/TAKEOVER REQUIREMENTS

41. During operation in Article 5 and Non Article 5 Operations there will be a requirement to handover a cleared or demined area or route to another military unit, civilian organization or local civil leader following any clearance or demining operation. Partially cleared or demined areas also require formal handover. Handover is to be supported by documentation recording all details of the operation. Details may be required again if further demining operations prove necessary and to inform local populations of areas available for civilian activity.

PART THREE: COUNTERMINE OPERATIONS IN NON ARTICLE 5 OPERATIONS

TASKS AND RESPONSIBILITIES

42. Countermine Intelligence. In Non Article 5 Operations, information about mines, minefields, and related matters has a very high impact on all aspects of operations. The responsibility for countermine intelligence is generally delegated to engineer staff branches. This also involves coordinating countermine intelligence between military units,

civil organizations, Mine Action Centers (support to MAC see paragraph 59), local population.

43. Countermine Information Exchange Requirements. Prior to an operation, consideration is required for: the formats for the exchange of information, gathering and disseminating information; including to/from mine action centers, and software standards. Engineer staff branches are normally best placed to advise on these matters.

44. Countermine Reconnaissance. The detailed reconnaissance of mines or areas suspected to include mines, booby-traps, IEDs or other UXOs is essential.

45. Mine Awareness Training. Early in an operation, mine awareness training could be carried out by military personnel. As the operation progresses this function may be transferred to civilian and host nation organization.

46. Marking of areas known or suspected to contain mines, booby-traps, IEDs, or other UXOs is primarily an engineer responsibility. All-arms, civil organizations and local populations may give assistance.

47. Mine Clearance. The execution of mine clearance operations in Non Article 5 Operations is often an engineer responsibility; subject to National decision. The execution of mine clearance operations is only conducted to support military objectives.

INTELLIGENCE AND RECONNAISSANCE

48. Intelligence and Reconnaissance. Generally, intelligence requirements for countermine operations in Non Article 5 Operations will be the same as may be needed in war. However, as in these operations the level of acceptable risks should be limited to the minimum, the degree of accuracy required will be much higher. Moreover, absence of direct threats and the possibility, under many circumstances, of employing as much time as may be needed for recce missions will allow an easier gathering process of countermine intelligence. A particular aspect of these operations is that, due to the special characteristics of Non Article 5 Operations, much of the information collected should be provided to civilian personnel and agencies. These personnel may not have previous knowledge about mines or countermine operations. In order to minimize confusion and subsequent risk an information exchange policy needs to be clearly defined and strictly implemented. Accordingly, coordination between military units involved, mine awareness teams, civil agencies, and organizations, and local population will be essential.

49. Countermine Information. In Non Article 5 Operations circumstances allow that the requirements for countermine information are much more detailed than in war operations. Examples of countermine information may be:

a. Mine employment doctrine of parties in conflict or former enemies.
b. Marking systems employed and sign characteristics.
c. Existence and extent of mined areas.
d. Composition of minefields (AP, AT, mixed).
e. Presence of antihandling devices, IEDs, booby traps and UXOs.
f. Technical data of mines and explosive devices employed in the area.

g. Methods and techniques of mine laying (surface laid, scattered, buried, mechanically or hand laid with or without a pattern.
h. Existence of mined areas where countermine operations (breaching or mine clearing) have been conducted (breaching or clearing techniques and standards employed; methods of marking; proofing standards).
i. Records and reports of mined areas.
j. Terrain characteristics including metallic contaminated areas.
k. Weather and environmental conditions.
l. Potential threats; level of awareness of civil population and agencies working in the area, attitude of parties involved.
m. Age of minefield.

50. Information Sources. Generally, it will be possible to use many potential sources and with a high degree of efficiency. Examples of potential sources are:

a. Engineer Reconnaissance and Explosive Ordnance Reconnaissance teams.
b. Civil demining organizations and agencies.
c. Military units.
d. Civil organizations and agencies.
e. Parties in conflict and former enemies.
f. Local population.
g. Victims and medical personnel.
h. Mined areas marking teams.
i. National and international mine/ordnance databases and mine action centers.

DETECTION

51. Mine Detection. No current technology on its own will provide the necessary solution for hand-held, vehicle or remote detection. Methods of detection include the following; visual detection, scent detection, hand held detection, vehicle mounted detection, remote detection and biological sensor detection. The details of these methods are described under Methods of Detection at paragraph 26.

MINE CLEARANCE OPERATIONS

52. Goals and Purpose. The goal is the freedom of movement and to sustain military operations, in order to accomplish military goals in support of political objectives. Reasons for conducting mine clearance include:

a. To support NATO policy and operational requirements.

b. Support the mission.

c. Facilitate the mission by minimizing interference by the local population in the military phase of an operation.

53. Types of Mine Clearance. In Non Article 5 Operations, there are three types of mine clearance operations conducted by the military:

a. Route Clearance. To gain freedom of operation/movement.

b. Emergency Route Clearance. For casualty evacuation.

c. Area Clearance. For military purposes.

54. Clearance Methods. The clearance methods used are generally the same as those described in paragraph 33 considering collateral damage, Rules of Engagement, and the constraints of clearance methods used.

55. Clearance Standards. At the start of the clearance operations the standard to be achieved must be specified. To ensure that this standard is achieved, a quality assurance system must be put in place and continually monitored by the commander of the operation.

56. When mine clearance operations are executed by third parties, NATO forces should monitor these operations.

DEMINING

57. Demining is the term used by the UN to describe all aspects of mine clearance. The purpose of demining is to safeguard the civilian population and allow the land to be returned to the local community. Armed forces do not normally conduct demining operations. They are frequently executed by contracted organizations. However, military forces, especially engineers, may provide special expertise; train demining organizations and monitor demining.

PROOFING

58. The proofing methods used could be the same as those described in paragraph 36, considering collateral damage, Rules of Engagement, and the relative advantages and disadvantages of proofing methods used.

SUPPORT TO MINE ACTION CENTERS

59. Goal and Purpose. When it is necessary (crisis situation in a country, with lack or inability of local authorities), NATO may create and could possibly finance an interim structure, called Mine Action Center (MAC). A MAC's major task is the coordination of all demining activities in the country and the development and establishment of a national demining institution.

a. A MAC directs the following:

(1) Mine awareness
(2) Collection of information about minefields
(3) Constitution of a minefield database
(4) Participation to demining operations
(5) Establishment and publication of standards destined to become national standards
(6) Preparation of a demining policy

(7) Demining activities co-ordination

b. The nature of these activities shows that a MAC is called to continue its task after NATO Forces depart. Actually, the MAC is a long-term organization, whose aim is to organize and establish a national demining institution.

c. NATO Forces operating in country must liaise closely with the MAC. In fact, they may contribute to MAC policy, which will continue after their departure.

60. Types of Support. NATO forces must:

a. Establish liaisons with the MAC: The positioning of NATO liaison officers in the MAC is essential. This assists communication and information exchanges.

b. Exchange information: The MAC database is destined to become the national minefield database. So, information must be exchanged and shared. If necessary, these exchanges may include the provision of means (software and hardware).

c. Co-operate in training activities: NATO Forces have the means (human and material) of assisting the MAC in its training activities.

d. Standards: The mine clearance standards that are used by the NATO Forces may meet the MAC demining standards. If so, areas cleared by NATO Forces and declared safe by local MAC authorities may be opened to the civilian population.

e. Co-ordinate mine clearance actions: Mine clearance operations organized by NATO Forces focus on military operations. If the situation allows they should be coordinated with MAC activities to avoid duplication of effort.

MARKING

61. During mine clearance operations, the goal of marking is to identify remaining hazardous areas and/or routes through them for the purpose allowing safe movement and operation in the area. The focus is on marking the area that has not yet been cleared, rather than marking the cleared area. Once the area is cleared, the hazard markings are removed. The commander, responsible for the area of operations, establishes initial fencing and marking. The procedures are at his discretion but at the earliest time possible, remaining hazardous areas or routes through them will be marked to the standards specified in STANAG 2036.

MONITORING

62. Effective monitoring is essential to the successful application of the agreed demining policy. Monitoring of demining operations is the observation/overwatch of the activity being undertaken by one or more teams executing demining, in order:

a. To ensure that demining operations are executed at the assigned location by full demining teams and in the manner required to be deemed effective.

b. To assess the demining teams' performance according to the applied standards and operating procedures.

c. To verify the number of mines, booby traps, IEDs and UXOs lifted, cleared, and/or destroyed taking into account the available mined area records.

d. To verify the final disposal in accordance with theater policy.

63. Monitoring activities will be conducted by Monitoring Teams. Each monitoring team should consist of one or more specialists and their support staff, such as a driver or radio operator, and it may be of any size according to the local circumstances and force protection rules. The monitoring team must include a Senior Monitor, who is responsible for assessing and reporting on the demining Team's performance. The Senior Monitor should be an engineer and, in particular, must be able to fulfill the following requirements:

a. Correlate the information provided in any mined area records and other such supporting documentation with the visible situation on the ground and assess the technical complexity and likely duration of the task.

b. Observe the activities of the demining Team and judge whether it is competent in all aspects of the physical execution of the task throughout its duration.

c. Assess the safety of the practices employed and the overall demining team's performance.

64. Where possible, monitoring must be conducted from outside the mined area and at an appropriate safe distance. It is recommended that the monitoring team take appropriate measures to ensure their safety.

65. Monitoring includes the requirement to submit post operation reports.

REPORTING REQUIREMENTS

66. The reporting requirements are in accordance with paragraph 38. These reports also must be passed to the Mine Action Centers through the appropriate chain of command.

RECORDING REQUIREMENTS

67. The recording requirements are in accordance with paragraphs 39 and 40. Mine Clearance operations are to be recorded in accordance with Annex A. This record is also to be passed to the MAC through the appropriate chain of command.

HANDOVER/TAKEOVER REQUIREMENTS

68. The handover/takeover procedures used are the same as those described in paragraph 41.

IMPLEMENTATION OF THE AGREEMENT

69. This STANAG is implemented when the nation has issued the necessary orders/instructions to its forces concerned, putting into effect the procedures detailed in this agreement.

ANNEX A to
STANAG 2485
(Edition 2)

REPORTING OF MINEFIELD BREACHING AND CLEARANCE OPERATIONS

MINCLRRECCEORD = Minefield Breaching/Clearing Recce Order
MINCLRRECCEREP = Minefield Breaching/Clearing Recce Report
MINCLRORD = Minefield Breaching/Clearing Execution Order
MINCLRREP = Minefield Breaching/Clearing Completion Report

PURPOSE

The purpose of this group of messages is to provide the means for reporting information relating to the breaching and clearing of minefields by friendly forces.

Information Required	MINCLR RECCEORD	MINCLR RECCEREP	MINCLR ORD	MINCLR REP	AEngrP-2 Serial No.
Name of Report	M	M	M	M	200/A
Task Serial Number	M	M	M	M	202/A
Clear Minefield?	M	M	O	M	202/B
Obstacle Category	M	M	M	M	203/A
Obstacle Zone/Belt Name or Number	O	O	O	O	209/A
Obstacle/Target Number or Nickname	O	O	O	O	209/B
Generic Mine Type	M	M*	M*	M*	210/E
Map Sheet Numbers	M	M*	M*	M*	214/A
Name of Nearest Town or Feature	O	O	O	O	214/B
Minefield Boundary	O	O*	M*	M*	214/C
Engineer Control HQ	O	-	O	-	214/L
All Arms Control HQ	O	-	O	-	214/M
Traffic Control Post	O	-	O	-	214/N
No Reconnaissance Before	O	-	-	-	216/A
Reconnaissance to be Completed By	O	-	-	-	216/B
Reconnaissance Competed at	-	M	-	-	216/C
Reconnaissance Report to be submitted by	M	-	-	-	216/D
No Work Before	-	-	O	-	217/A
Start Task at	-	-	O	-	217/C

Task to be Completed Before	-	-	M	-	217/D
Actual Completion Time of Task	-	-	-	M	217/E
Anti-handling Devices (%)	-	-	O	O	219/D
Mine Rows	O	M	M	O	219/E
Minefield Density	O	M	M	O	219/F
Minefield Dimensions (m)	O	M	M	O	219/G
Mine Laying Method	O*	M	M	O*	219/I
To be Marked?	O	O	M	-	219/L
Is Marked?	O	M	M	M	219/M
Additional Minefield Obstacles	O*	O*	O*	O*	219/N
Number of Lanes and Gaps	M	M	M	M	228/H
Lane or Gap Identification	M	M	M	M	229/A
Lane/Gap to be marked?	O	O	M	-	228/I
Lane/Gap is marked?	-	-	-	M	228/J
Lane/Gap Priority	O	O	M	-	229/B
Entrance and Exit	M*	M*	M*	M*	229/C
Lane/Gap Width (m)	M	M	M	M	229/D
Breaching Method	O	M	M	M*	229/H
Name of Route to Task Site	O*	O*	O*	-	245/A
Start Point	O	O	O	-	245/B
Intermediate Points	O*	O*	O*	-	245/C
Release Point	O	O	O	-	245/D
Engineer Assembly Area	O*	M*	M*	-	246/A
Manpower Data	-	M*	M*	-	261/A
Unit Providing the Manpower	-	O	M	-	262/A
Manpower RV and Time	-	O	M	-	262/B
Antitank Mines Recovered	-	-	-	O	263/C
Antipersonnel Mines Recovered	-	-	-	O	264/C
Mines and Explosives Disposal Site	-	-	-	M	266/C
Explosives Detail	-	O*	M*	-	265/A
Mine and Explosive Dump	-	M	M	-	266/A
Mine and Explosive Available at Time	-	M	M	-	266/B
Mines and Explosives Disposal Site	-	O*	O*	-	266/C
Heavy Equipment Data	-	M*	M*	-	267/A

Unit Providing Heavy Equipment	-	O	O	-	268/A
Heavy Equipment RV and Time	-	O	O	-	268/B
Equipment Data	M*	M*	M*	-	269/A
Unit Providing the Equipment and/or Material	O	O	O	-	271/A
Equipment and Material RV and Time	O	O	O	-	271/B
Material Data	M*	M	M*	-	270/A
Unit Providing the Equipment and/or Material	O	O	O	-	271/A
Equipment and Material RV and Time	O	O	O	-	271/B
Name of the Unit which Coordination is Foreseen or Necessary	M	O*	M	-	288/A
Radio Frequency/Call Sign of Unit Concerned	O*	-	O*	-	288/B
Own Call Sign	O	-	O	-	288/C
RV Details	M	-	M	-	288/D
Name of Unit Providing Protection	-	-	M	-	289/A
Radio Frequency/Call Sign of Unit Concerned	-	-	O*	-	289/B
Own Call Sign	-	-	O	-	289/C
RV Details	-	-	M	-	289/D
Remarks	O	O	O	O	297/A
Acknowledge	M	M	M	M	299/A

Legend:
M = Mandatory entry
O = Optional entry
M* = Mandatory entry with optional repeatability
O* = Optional entry and, if selected, offers repeatability
- = No entry requirement

ANNEX B TO
STANAG 2485
(Edition 2)

MINE CLEARANCE RECORD

This record is intended to detail mine clearance activity wherever it is carried out. The record is to be completed in as much detail as possible at the end of a clearance operation, or when a unit leaves the mined area for another task, including when the task is not complete. The minimum required copies are as follows:

Distribution:

- Copy 1 – Unit carrying out the operation: ……... ...
- Copy 2 – Unit or civilian (e.g. Mayor) taking responsibility for an area: …… ... .
- Copy 3 – Engineer staff at formation HQ: ……... ..

PART 1 - DETAILS OF MINED AREA.

1. Mine clearance record number[1]		2. Name of Cleared Area and Map Grid Reference	
3. Map name		4. Map edition	
5. Map sheet number		6. Scale of map	

LIST OF ATTACHED DOCUMENTS		
Serial	Title of document	Description (e.g. Map, Sketch, Photograph)
7.		
8.		
9.		
10.		
11.		
12.		
13.		

DECLARATION			
DECLARATION BY OFFICER OR NCO IN CHARGE OF CLEARANCE OPERATION			
I declare that the area has been cleared of landmines and unexploded ordnance as described in this report.			
Rank and Name		Unit	
Signature		Date (DTG)[2]	

ACCEPTANCE BY THE RESPONSIBLE AUTHORITY			
Name and details of organisation taking over the cleared area			
Grade or Rank and Name		Organisation or Unit	
Signature		Date (DTG)[2]	

[1] Numbering system as designated by the theatre HQ.

[2] DTG: Date Time Group DDTTTT Month YY (e.g. 310730A OCT 98).

PART 2 - DETAILS OF MINE CLEARANCE ACTIVITY	
14. Mine clearance record number (repeat number in serial 1)	No: ……
15. Unit carrying out clearance	
16. Rank and name of clearance party commander	
17. Date & time of start of operation (DTG)	
18. Date & time of end of operation (DTG)	
19. Methods, type of equipment and technologies used for detection [3]	
20. Depth of detection (metres) [4]	
21. Description of methods, equipment and technologies used for removing mines and ordnance[5]	
22. Depth of removal (metres) [5]	
23. Description of methods, equipment and technologies used for proofing	
24. Depth of proofing (metres) [5]	
25. Is the area now metal free?	YES/NO
26. Ground conditions at start and end of the operation. (dry, wet, snow, frozen etc)	
27. Weather conditions at start and end of the operation. (dry, rain, snow etc)	

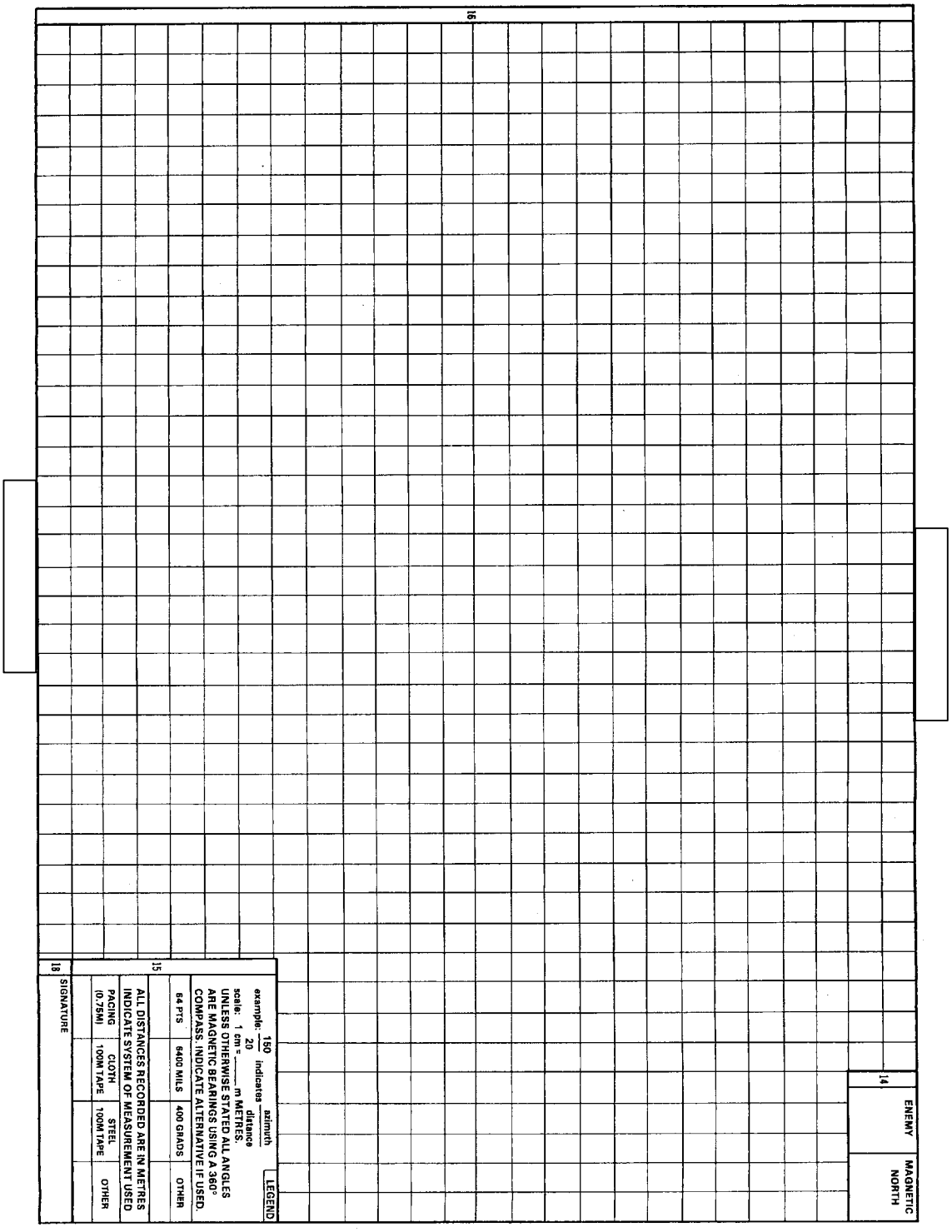
[3] Examples are: Manual/prodding, Magnetic, Electrical, Nuclear Resonance, Anomaly Detector, Seismic, Thermal Imagery, Radar, Photography, Satellite, Dogs etc.

[4] Record the depth to which the equipment is effective.

[5] Include details of techniques and equipment for example: Flail, Plough, Dozer, Screening, Mechanical, Explosive, Fire, Chemical, High Pressure Water.

PART 3 - RECORD OF MINES AND ORDNANCE CLEARED				
28. Mine clearance Record Number (repeat number in serial 1)		No: ……..		
LANDMARKS (To identify the cleared area. Include these in sketch at Part 4)				
Serial	Map Grid Reference (UTM)	Description		
29.				
30.				
31.				
32.				
33.				
MINED AREA BOUNDARY (Details of boundary corners and changes of direction of boundaries)				
Serial	Map Grid Reference (UTM)	Description of marker (including location if marker is buried)		
34.				
35.				
36.				
37.				
38.				
39.				
40.				
MINES AND ORDNANCE				
41. State type of mined area (e.g. scatterable, patterned/ single, anti-tank, anti-personnel or mixed minefield				
Serial.	Type and designation of Mine, Booby trap, IED and UXO	Total	Description of any special features including detail of anti-handling devices if fitted.	Disposal
42.				
43.				
44.				

PART 4 - SKETCH MAP OF CLEARED AREA/ROUTE	
Mine clearance Record Number (repeat number in serial 1)	No: ……..



(Refer to STANAG 2036 Annex C for directions)