

DDAS Accident Report

Accident details

Report date: 19/05/2006	Accident number: 396
Accident time: 11:30	Accident Date: 18/02/2003
Where it occurred: MF 1087, OES 4, El Wazzani	Country: Lebanon
Primary cause: Unavoidable (?)	Secondary cause: Field control inadequacy (?)
Class: Excavation accident	Date of main report: 24/03/2003
ID original source: Bol: 001/2003 MJF	Name of source: MACC SL
Organisation: Name removed	
Mine/device: No.4 Israel AP blast / frag	Ground condition: grass/grazing area rocks/stones
Date record created: 27/02/2004	Date last modified: 23/03/2004
No of victims: 1	No of documents: 3

Map details

Longitude:	Latitude:
Alt. coord. system: GR 36 744892 685475	Coordinates fixed by:
Map east:	Map north:
Map scale:	Map series:
Map edition:	Map sheet:
Map name:	

Accident Notes

inadequate investigation (?)
victim working prone (?)
partner's failure to "control" (?)

Accident report

What follows is the original Board of Inquiry report, edited for anonymity and with excess pictures removed.

REPORT FOR ACCIDENT INVESTIGATION BOARD OF INQUIRY – No001/2003
DEMINEING Accident that occurred in OES 4 on 18th February 2003 in which [Demining group]
Deminer Mr. Blessing Mangezi was injured.

Map Reference: UNIFIL Genimap 1:50,000 Sheet B (Marjayoun).
References: A. Janes Mines Manual.

Introduction

1. In accordance with the National Technical Standards and Guidelines (TSGs), the MACC SL Programme Manager issued a Convening Order on Tuesday 18th February 2003, for an accident investigation Board of Inquiry. Annex A details the Convening Order.
2. This is a comprehensive report by the Board of Inquiry into the Demining Accident that occurred on the 18th February 2003. Based on the investigation, [Demining group]'s internal report, the statements from [Demining group] personnel involved in the accident (see Annex B); visits to the accident site and the photos from the accident site, this accident is considered preventable.
3. The information provided by [Demining group] to the MACC SL QA Section in the "IMSMA Accident Report", attached at Annex C is confirmed. The accident occurred at approximately 1130 hrs on the 18th February 2003 in Minefield (M/F) No 1087 at El Wazzani, GR 36 744892 685475, (Seat of Detonation); Annex D details a map of the general area.

Events leading up to the Accident

4. [Demining group] manual clearance assets had been operational in M/F 1087 for a total period of 51 x operational days. From the start of the manual clearance operation, a total of 1 x main access lane, 1 x base lane and 4 x cut lanes had been cut into M/F 1087, resulting in the location of the 4 x minefield mine rows as per the minefield record. The clearance methodology for M/F 1087 was as per the standard methodology for all Israeli Forces (IF) laid and recorded M/Fs.
5. On the day of the accident [the Victim] was working with his No2 Deminer, [deminer no.2] on the third row of mines, physically clearing the mine row in an Easterly direction. The clearance lane had been positioned on the left hand side of the mine row and the excavation of the mines had been restricted to the back portion of the mine, therefore ensuring that the probing and excavation was away from the mine igniter system; up to the time of the accident 16 x Israeli No4 mines had been located and excavated.
6. [The Victim] had detected the seventeenth mine of the day with his Mine-Lab Detector and had moved into the prone position, probing the previously detected signal prior to excavation. At approximately 1125hrs, Team Leader [name excised] gave an order to stop work, as he was preparing to dispose the previously located mines and he required all the Deminers to retire to the safe area. On hearing the signal to stop work, [the Victim] then continued to probe around the mine in an attempt to identify the body perimeter of the mine, when there was an uncontrolled detonation.

Events following the Accident

7. At approximately 1130 hrs an uncontrolled detonation occurred in the clearance lane that [the Victim] was working. Following the uncontrolled detonation, Deminer [No.2] was the first to the accident scene whereupon he saw that [the Victim] had fallen back into a cleared area, he informed Medic [name excised] and then went to assist [the Victim].
8. On the arrival of Medic, an initial medical examination, immobilisation and on-site stabilisation took place. [Demining group] Senior Medic [name excised] was in the area and also moved to the accident scene to assist with the medical aid of the casualty. After stabilisation had been achieved [the Victim] was then carried out of the minefield whereupon he was then transported to Marjayoun Hospital for medical treatment.
9. Following the accident Team Leader [name excised] passed back the initial accident report to [Demining group] base location. The accident scene was then secured and marked as per [Demining group] current SOPs and National TSGs by Team Leader [name excised]. Annex E details a schematic diagram of the accident area / scene.

BOI Post Accident Activities and General Observations

10. On arrival at the accident scene and after an initial reconnaissance by the Investigation Officer, it was ascertained that the BOI could gain safe access up to the accident scene without any additional clearance being conducted.

11. On the initial inspection of the accident scene the following general observations were established:

- There had been an uncontrolled sub-surface detonation of an Israeli No4 mine.
- [The Victim]'s manual demining probe had been in close proximity to the mine at the time of detonation.
- 15 x Israeli No4 mines had been located and excavated in accordance with the current clearance methodology.
- 1 x Israeli No4 mine had been excavated not in accordance with the current clearance methodology as the top of the mine had been excavated, (last mine excavated prior to the uncontrolled detonation).
- The mine, as detailed above had not been marked with a yellow picket in accordance with [Demining group] SOPs nor National TSGs. (It should be noted that the Investigating Officer marked the mine at the start of the accident investigation).
- The mine row direction had altered and shifted to the right approximately 30cms after the fifteenth mine.

VIEW OF THE ACCIDENT SCENE



[The row of yellow topped pickets mark where mines were found. The excavation depth is around 10-15cm and there are many rocks.]

12. As an aid to the investigation, all items of equipment located on-site and specific areas pertaining, or considered to pertain to the accident investigation were numbered, photographed in-situ and all details taken. The breakdown of items and areas are detailed as follows:

- No 1 - Manual demining probe.
- No 2 - Base stick.
- No 3 - Visor.
- No4 - Knee protector.
- No 5 - Mine-Lab detector.
- No 6 - Glove left hand.
- No 7 - Glove right hand.
- No 8 - Position of [the Victim] at the time of accident.
- No 9 – Accident seat of detonation.
- No 10 - Rock location following detonation.

VIEW OF ACCIDENT SCENE SHOWING NUMBERED EQUIPMENT ITEMS



VIEW OF EQUIPMENT ITEM NO 1 (PROBE)



[The probe is a variant of a blast resistant design developed for safer excavation and probing around AP blast mines. It has bent as designed. Not that the Victim's severe hand injury was with his left hand with which he guided the probe – against the designer's advice.]

VIEW OF EQUIPMENT ITEM NO 3 (VISOR)



[The visor shown here has broken around the frame fixing on the left hand side. This is unusual but the fracture is "contained" (not a shatter effect) and is probably due to the visor being twisted sharply as the blast struck. It may have been slightly raised. This visor is designed to withstand AP blast mine detonations at 60cm. If the victim was lying prone in this case, the visor may have been closer to the initiation than its design intent.]

VIEW OF EQUIPMENT ITEM NO 4 (KNEE PROTECTOR)



[The “knee-pads” and gloves worn in this accident are not part of demining PPE. Both are designed to provide comfort and protection while carrying out conventional tasks such as gardening. The researcher designed all of the PPE used in this accident, and added these “knee-pads” as a “comfort” extra. The knee-pads have no measured fragmentation resistance. However, limited testing has shown that they do offer some protection against blast.]

VIEW OF NO 9 (SEAT OF DETONATION)



[The rock in the bottom of the crater is scarred, implying that the blast energy may have been reflected making the blast effects worse than they would otherwise have been.]

Accident Detonation Crater

13. On the inspection of the accident detonation crater the following specific observations were established:

- The crater had formed through a sub-surface detonation of an Israeli No4 mine.
- A true crater had not formed completely due to the seat of detonation being directly above a large rock. This would have not allowed an absolute and complete 360⁰ omni-directional effect of the detonating wave to take place at the time of detonation. Therefore, as opposed to normally having a bulbous shaped crater, the crater sides had broken and were dispersed around the immediate area (spalling effect).
- Immediately at the seat of detonation the rock had fractured and there were 360⁰ “splash marks” immediately around the fractured area.
- There was evidence of heavy blackening to pieces of spoil and Israeli No4 mine primary plastic fragmentation was located.
- The lifting effect of the detonating wave had shifted a large rock to the left hand side of the clearance lane.

Tools and Equipment

14. At the time of the accident, a standard [Demining group] probe was being used by [the Victim], on inspection of the probe, the following specific observations were established:

- The probe tip (last third of the probe), had been deformed quite considerably through 90°.
- There was evidence of blackening confined to the probe tip.
- There was considerable damage to the Kevlar hand guard.
- The probe had maintained its structural integrity and had not shattered.

Personal Protective Equipment (PPE)

15. At the time of the accident, [the Victim] was wearing his protective apron and protective visor. On inspection of the protective apron, the following specific observations were established:

- The outer cover was not ripped.
- The blast debris was concentrated at top right hand side.
- There was no part or complete fragmentation penetration of the Kevlar lining.

VIEWS SHOWING DEMINER'S PROTECTIVE JACKET



16. On inspection of the protective visor, the following specific observations were established:

- The vast majority of the blast effects were concentrated on the outer face of the visor.
- There was no part or complete fragmentation penetration of the polycarbonate visor.
- The left hand side visor securing bolt had not maintained its integrity and had broken away.

Work History of the Casualty

17. [The Victim] commenced his employment with [Demining group] early 2002, whereupon he completed the [Demining group] demining course, prior to operational deployment in Mozambique. He deployed to Lebanon in April 2002 where he continued to be employed as a deminer until; August 2002 whereupon he was promoted to 2I/C. He is considered by [Demining group] to be competent, trustworthy and someone who was being observed closely for possible future internal promotion to Team Leader; disciplinary action had never had to be taken against him.

EI Wazzani M/F Belt and M/F 1087 Description

18. The EI Wazzani M/F belt is actually made up of 2 x different M/F belts, the first M/F belt consists of AT mines and runs parallel North to the border road; the second M/F belt consists of AP mines and is situated to the West of the AT M/F, again running parallel North to the border road. There are a total number of 17 x IF laid and recorded M/F's within the EI Wazzani belts which contain approximately 6,000 x mines.

19. The MACC SL designated the M/F No 1087. IDF Northern Command reported the minefield details on the 12th December 2001, the minefield details reported were:

- Reference Point GR 36 744300 685600.
- Quantity of mines x 316 No4 AP mines.
- Quantity of mine rows x 4.
- Minefield map is available.

Sequence, Documentation and Procedure of Tasking

20. Task Dossier (TD) OES 4 #021 was issued to [the Demining group] on the 12th December 2002; the TD contains details of 5 x minefields in and around the El Wazzani belts. Up to the time of the accident a total area of 325 sq.m within the AP M/F belt had been cleared by manual assets, resulting in the disposal of a total number of 961 x Israeli No4 AP mines. (It should be noted that the sq.m for the days clearance activities prior to the accident, are not included in the above total as they were not available at the time of writing this report).

Geography and Weather

21. El Wazzani task site is located in an open area in a valley area to the North East of Rhajjar village. Access to the site is via the main Aarab El Louaizh / El Wazzani road. The mined area was previously arable agriculture land, used for animal grazing; there are no forested areas within the immediate district. The weather at the time of the accident was overcast with a temperature of approximately 08 to 10 degrees Celsius.

Site Layout and Marking

22. The site layout and minefield marking prior to the accident was in accordance with National TSGs and [Demining group] SOPs; as was the post accident marking.

Management Supervision and Discipline

23. [Demining group] clearance operation is supervised by an International Operations Manager and an International Team Leader is in over all charge of the manual clearance team. There are no reports of disciplinary action being taken against [Demining group] personnel on the El Wazzani task site.

Quality Assurance

24. Internal QA is a continuous process with daily QA checks and evaluations being conducted by [Demining group] personnel, there are no reports of any indifferent evaluation results on the El Wazzani task site.

25. External QA is carried out by the MACC SL QA Section [other commercial demining group]; the last External QA Evaluation was conducted on the 17th February 2003 where Manual Clearance, M/F Marking and External QA Inspection were evaluated; all evaluation results were good.

Communications and Reporting

26. Communications in-between the El Wazzani task site and [Demining group] base location is maintained via the use of VHF and HF radio systems. On site communications in-between teams is maintained via VHF handheld radios.

27. On the day of the accident, the site had proper and appropriate communications and managed to pass all relevant accident information back to [Demining group] base location, which in turn passed the information to the MACC SL in a timely manner. Annex F details the Initial Casualty Report. [Annex F was not made available.]

Medical Details

28. [the Victim] suffered compound closed fractures to his left first and second metacarpal bones, closed compound fracture to his right second metacarpal bone, deep lacerations to the left hand palm, deep lacerations to the right forearm, a small cut to the upper lip and slight swelling on the forehead.

29. [Demining group] Team No9 Medic [name excised] and Senior Medic [name excised] administered medical treatment and stabilisation on-site to [the Victim]; casualty evacuation by road to Marjayoun Hospital then took place. On arrival at Marjayoun Hospital, [the Victim] was transferred to the Emergency Department for X-rays and subsequent surgery. For reasons of medium term casualty continuation care on the 19th February 2003 [the Victim] was transferred to Hammoud Hospital in Sidon. Annex G details the medical report from Marjayoun Hospital and Annex H details the IMSMA Casualty Report. [Annex H was not made available.]

Personnel

30. A list of all personnel and their duties is detailed at Annex B. Written statements from [Demining group] personnel involved in the accident and [Demining group] internal report form part an Appendix to the Annex.

Details of Mine Involved

31. The Israeli No4 AP blast mine consists of a plastic box with a hinged lid that overlaps the sides. The main charge is 188g of cast TNT, housed in an internal plastic compartment, which occupies just over half of the volume of the box at the hinged end. The wall of this compartment is threaded to accept the fuze assembly; the remainder of the box is empty.

32. The metal fuze assembly, which incorporates a lead-shear arming delay, is fitted through a hole in the end of the mine and screwed into the wall of the charge compartment and sealed with a rubber O-ring. The arming pin protrudes through the end of the mine opposite the hinge. The arming pin is attached to a pull ring, which is looped over the fuze body and retained by a plastic cap during transit for additional safety. The striker is retained and secured by a square shaped slotted plate on which the open end of the box rests.

33. The mine is designed purely for direct pressure operation. To arm the mine, the plastic cap on the end of the fuze is removed to release the pull ring; the arming pin is then removed. The spring-loaded striker is retained until it has sheared through a lead wire, which runs through holes in the end of the fuze. The arming process normally takes several hours. Once armed, the striker is retained only by the slotted plate; pressure on the lid (in excess of 8kgs), simply pushes the slotted plate out which in turn releases the spring loaded central striker. The striker then impacts with the integral fuze detonator, which then passes the detonating wave to the main TNT charge causing the mine to disintegrate. (Paragraphs 31 – 33 inclusive extracted from Reference A)

34. There have been instances reported where foreign bodies have embedded themselves in between the recess in the striker mechanism and the slotted striker retaining plate, therefore allowing the partial downward release of the plate. The spring-loaded striker is now therefore only being held by the foreign body. Accumulated pressure over a period of time (especially in heavy soil conditions), can also slowly release the slotted striker retaining plate. This will therefore reduce the direct pressure required to activate the mine.

Account of Activities

35. The following is a description of the events before and after the accident. The information from the investigation forms the basis of the description of events:

18/02/03

- 1130hrs – Uncontrolled detonation at M/F 1087.
- 1134hrs – Accident information passed to [Demining group] Base Location.
- 1135hrs – On-site stabilisation of casualty.

- 1140hrs – Initial accident information passed to MACC SL.
- 1140hrs – CASEVAC of casualty to Marjayoun Hospital.
- 1143hrs – MACC SL QA Officer informed of accident.
- 1145hrs - MACC SL QA Officer informs MACC SL Programme Manager.
- 1147hrs - MACC SL QA Officer informs MACC SL Planning Officer.
- 1213hrs – Arrival of casualty at Marjayoun Hospital.
- 1230hrs – Initial accident report received at MACC SL.
- 1235hrs – BOI Convened by MACC SL Programme Manager.
- 1240hrs – BOI leaves MACC SL on route to accident site.
- 1400hrs – BOI Arrives at accident site to conduct accident investigation and informs [Demining group] Programme Manager of BOI convening order.
- 1525hrs – BOI Leaves accident site to move to [Demining group] base location to conduct witness interviews.
- 1620hrs – BOI leaves [Demining group] base location to move to MACC SL.
- 1825hrs – BOI arrives at MACC SL and briefs Programme Manager and Planning Officer.

19/02/03

- 0745hrs – BOI departs MACC SL to move to [Other demining group] base location to conduct witness interviews.
- 0915 hrs – BOI arrives at [Demining group] base location.
- 1110hrs – BOI leaves [Demining group] base location to move to Marjayoun Hospital to question casualty.
- 1245hrs – BOI leaves Marjayoun Hospital on route to MACC SL.
- 1415hrs – BOI arrives at MACC SL and briefs MACC SL Programme Manager and Planning Officer.

Insurance Details

36. [The Victim] is covered by the standard [Demining group] insurance for all International personnel conducting mine/UXO clearance activities in Lebanon. All insurance policies for [Demining group] are through HMT Insurers of London. A copy of the scale of entitlements is held at the MACC SL QA Section.

Conclusions

37. Based on the investigation, the statements and visits to the site, the BOI concludes the following:

- A. An Israeli No4 Anti Personnel mine detonated whilst [the Victim] was probing a previously detected signal.
- B. The mine functioned when the probe tip pressed down on the plastic lid of the mine. This in turn would have released the slotted striker retaining plate and subsequently released the cocked striker mechanism. Evidence to substantiate this conclusion are:
 - The probe tip had deformed quite considerably because this is the part of the probe that would have been closest to the mine main explosive fill when it detonated.
 - The heavy blackening confined to the probe tip is a residual effect of detonating high explosives.
 - The damage sustained to the Kevlar hand guard was due to the blast and fragmentation effects of the mine detonating.
- C. [The Victim] was carrying out incorrect drills by trying to identify the mine body perimeter with his probe. The correct drill should have been to move directly into the excavation phase once the mine had been located with the probe.
- D. [The Victim] carried out the incorrect excavation drill on the sixteenth mine as he had excavated directly on top of the pressure plate.

- E. As there had been a minor change in direction of the mine row at the location after the fifteenth mine, this should have resulted in a minor change in direction of the clearance lane. This may have ensured the correct excavation drill of the sixteenth mine.
- F. Prior to the accident actually happening there were numerous non-conformities to SOPs, which should have been identified by Team Leader [name excised].
- G. [The Victim] failed to stop work on the signal given by Team Leader, Deminer No2 should have stopped [the Victim] when he failed to act on the Team Leader's signal.
- H. The compound fracturing of [the Victim]'s fingers were due to the positive blast effects resulting from the disintegration of the Israeli No4 mine, on the detonation of the high explosives.
- I. Deminer Bernard's other injuries to his arms was sustained from secondary fragmentation, resulting from the disintegration of the Israeli No4 mine, on the detonation of the high explosives.
- J. The prone position adopted by [the Victim] reduced the injuries sustained.
- K. The on-site stabilisation and treatment of the casualty was conducted in a professional and expedient manner.
- L. The post-accident marking of the accident site was carried out in accordance with current TSGs and [Demining group] SOPs.
- M. The passage of information in between the accident site and [Demining group] base location was good with all information being passed in a timely manner.
- N. The BOI disagrees with [Demining group] Accident Report, in particular the following:
 - [The Victim] had exposed 16 x mines but had only marked 15 x mines, the Investigating Officer marked the sixteenth mine. Para 3 "**Events Leading Up To The Accident**" refers.
 - Only 15 x mines had been excavated correctly, the sixteenth mine had been excavated incorrectly. Para 4 "**The Accident**" refers.
 - The injuries sustained to [the Victim] were far graver and serious than those listed. Para 5 "**Accident details and Timings**" refers.
 - The time of the accident to the time of the CASEVAC was 10 minutes and not 5 minutes as stated. Para 6 "**Post Accident Actions**" refers.
 - [the Victim] was not following the correct drills and the accident was not a genuine prodding / excavating accident as stated. Para 8 "**Conclusions**" refers.
- O. The BOI agrees and accepts [Demining group] IMSMA Accident and Casualty Reports.
- P. The protective jacket maintained its integrity following the uncontrolled detonation of the mine.
- Q. The protective visor did not maintain its full integrity, but maintained sufficient integrity as to ensure that no serious facial injuries were sustained to [the Victim].

Recommendations

38. The following are recommendations based on the BOI conclusions:
- a. Team Leaders and Demining No2s are to more closely supervise manual clearance drills and procedures whilst demining is being carried out.
 - b. All personnel within an operational task sites are to adhere to all signals and instructions given by Supervisory Staff.

- c. A period of leadership training is conducted with all [Demining group] Supervisory Staff; the suggested training programme is to be passed to MACC SL QA Officer for approval and accreditation prior to the training commencing.
- d. A period of refresher / confidence training is conducted with all [Demining group] Manual Teams, the training is to include the following:
 - Manual prodding and excavation drills.
 - Marking systems.
 - Lane placement.
- e. Any future [Demining group] Accident Reports are only to be a true and accurate reflection of the accident investigation findings, anything less will not be accepted and a request will be made to re-submit the Accident Report.
- f. The conclusions detailed in this report be distributed and discussed among all [Demining group] Operational Field Staff.

Signed: QA Officer, MACC Southern Lebanon

Annexes: [Most not made available.]

- A. MACC SL convening order for accident investigation Board of Inquiry.
- B. List of personnel involved with attached statements as Appendices.
- C. IMSMA Mine/UCO accident report.
- D. Map of the general area.
- E. Schematic diagram of the accident area / scene.
- F. Initial Casualty Report
- G. Marjayoun Hospital Medical Report.
- H. IMSMA Casualty Report.

Copies to:

MACC SL Operations Department.
 NDO.
 [Demining group]

Comments by the MACC SL UN Planning Officer

The Quality Assurance Officer's Demining Accident Report 001/2003 is fully concurred with.

To date [Demining group] have located and destroyed one thousand eight hundred and twenty five (1,825) No. 4 AP mines on the Wazzani belt. Unfortunately one of the major hazards when locating and destroying a large number of mines daily is complacency.

It is noted that the team leader and the injured deminer were both very experienced in the demining industry. The accident report has identified basic errors from both the above, errors that both personnel would normally not be expected to make.

[The Victim] had correctly located and excavated 15 No.4 AP mines that morning with no accident occurring. Why he then chose to incorrectly excavate the 16th is unknown.

The accident report also identifies that the line of mines had changed direction slightly, but that the bearing of the clearance lane had not.

Team Leader [name excised] if making regular visits to [the Victim]'s clearance lane would be expected to recognize this change of direction and to modify the clearance lane bearing accordingly. This did not occur.

The balance of No. 4 AP mines remaining in the Wazzani minefield belt is still high with approximately three thousand (3,000) yet to clear. It is assumed that the lines they are laid in will continue to alter direction as the ground dictates.

[Demining group] Headquarters are asked to address the problem of complacency, which this type of minefield target exposes.

Paragraph 38 "Recommendations", sub-para a and c are strongly endorsed.

Signed: Planning Officer, MACC Southern Lebanon

Comments by the MACC SL Operations Officer/Acting Programme Manager

I concur with the conclusions and recommendations of this report.

As stated by the Plans Officer complacency has probably creped it amongst some deminers and it is now time to re emphasize the importance of adhering to SOPs and commands given by Team Leaders.

[Demining group] is to ensure that the recommendations of this report are addressed.

Signed: Operations Officer, Mine Action Co-ordination Centre Southern Lebanon

Victim Report

Victim number: 511	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: not known
Compensation: not made available (insured HMT)	Time to hospital: 43 minutes
Protection issued: Frontal apron Long visor	Protection used: Frontal apron, Long visor

Summary of injuries:

INJURIES

severe Arm

severe Face

severe Hands

COMMENT

See medical report.

Medical report

[The Victim] suffered compound closed fractures to his left first and second metacarpal bones, closed compound fracture to his right second metacarpal bone, deep lacerations to the left hand palm, deep lacerations to the right forearm, a small cut to the upper lip and slight swelling on the forehead.

[Demining group] Team No9 Medic [name excised] and Senior Medic [name excised] administered medical treatment and stabilisation on-site to [the Victim]; casualty evacuation by road to Marjayoun Hospital then took place. On arrival at Marjayoun Hospital, [the Victim] was transferred to the Emergency Department for X-rays and subsequent surgery. For reasons of medium term casualty continuation care on the 19th February 2003 [the Victim] was transferred to Hammoud Hospital in Sidon.

Analysis

The primary cause of this accident is listed as "*Unavoidable*" because it is possible that the victim was working as directed when the accident occurred. The exposed top of the previous mine implies that he may not have been, but this is entirely unproven. The secondary cause is listed as a "*Field control inadequacy*" because the investigators seemed to think it likely that the Team Leader did not provide the guidance and correction that he should have.

The accident investigation is listed under "Notes" as "inadequate" because the report has been constructed by editing a previous document and large parts have been left unchanged. The name of the wrong demining group was left in one place.

The investigators and senior MACC staff also allowed a prejudice to affect their conclusions. They clearly believed that it would be safer to lie prone when excavating, and so concluded that the victim's injuries were lighter than they would have been if he were kneeling. There is absolutely no evidence that this is true. The blast pattern on chest area of the apron shows that the victim was not fully prone, but may have been partly so. The position of the mine may have made it impossible to lie down anyway, because he would have been lying over the trench marking previously cleared mines. More important, there is no evidence to support the contention that a deminer would be safer to excavate in a prone position. This prejudice is a hangover from a military requirement to work in a position that makes the deminer a smaller target for a sniper. It is very important to note that the PPE is use by the demining group was not designed to be worn in a prone position and offers inadequate protection if used when genuinely lying down. [The researcher was the equipment designer.]

The investigators did not consider the fact that the demining probe was intended to protect the lead hand, but that an error in its use (possibly approved in SOPs) left the guide-hand entirely exposed and far too close to the blast. However, the victim did suffer a broken finger on the right hand – presumably as the probe twisted out of his hand. (The Victim states that he is right-handed in his "statement".)

Related papers

The demining group's initial accident report was made available. It is reproduced below, edited for anonymity and with excess pictures removed.

PRELIMINARY ACCIDENT REPORT

1. Introduction:

[Demining group] deminer, [the Victim] was involved in an accident at approximately 11:40 hrs on the 18th February 2003, whilst working in the Wazzani AP mine belt in MF 1087. [The Victim] was working in M9's callsign, under Team leader [Name excised].

2. Background to Target:

The area in which the accident took place is known as the Wazzani belt, which is an extremely densely mined area along the Israeli/Lebanese border, west of the village of El Merei and South of the village Wazzani.

There are numerous minefields within the belt containing predominantly Israeli No. 4 anti-personnel mines and several AT minefields, which contain NR25, M15s and M6A2s.

The targets, referred to hereinafter as 'the target,' run from East to West across a valley and therefore incorporate both a depression as well as a slope.

The minefields follow the same pattern that has been encountered throughout Southern Lebanon, in that the vast majority of the mines are laid in rows and the beginnings of each

row are marked with pickets. As such locating the mines has not proved onerous, but extreme caution is exercised in view of the density of the minefields.

3. Events Leading Up to the Accident:

Minefield 1087 had been approached from the eastern side, with cut lines extended into the lines of mines midway through the minefield.

The team leader had deployed his deminers onto the rows to move in a westerly direction, from where they would move up the rows of mines until reaching the end of row pickets. This is a typical method used by [Demining group] Team Leaders and it has proved extremely successful throughout the contract.

[The Victim] was working in the third line in an easterly direction, after he had cleared the area between the rows of mines. He had experienced no problem in identifying the lines of mines and had already identified exposed and marked 16 mines in his lane before the accident. The accident occurred with the 17th mine. A detailed illustration is included at Annexure A.

The team leader [name excised] had instructed the team to stop work as he was going to lay his cables and prepare for demolitions, when he heard the detonation.

4. The Accident:

It would appear at the outset from the nature of the injuries suffered and the state of the equipment that this was a prodding accident.

[The victim] had exposed 16 mines prior to the one, which detonated. Each mine had been approached from the rear that is from the side opposite to the detonator.

Fortunately [the Victim] was following [Demining group] SOPs and had been completely prone. As a result the main blast wave passed over him. In addition to this he was wearing his protective clothing, which included his visor, which took the brunt of the blast wave that did move in his direction.

5. Accident Details and Timings:

TYPE OF ACCIDENT: - Mine Accident

NUMBER OF CASUALTIES:- One

NAME OF CASUALTY:- [Name excised]

TIME OF ACCIDENT:- 11:30 hrs

DATE OF ACCIDENT:- 18th February 2003

LOCATION OF ACCIDENT: El Wazzani mine belt

GRID REFERENCE: - 744892 - 688475

TYPE OF INJURY: - Lacerations to both right and left hands. Bruising to forehead. Cut to top lip. Lacerations to underside of right arm.

TIME OF EVACUATION: - 11:40

RECEIVING HOSPITAL: - Marjeyoun Government Hospital.

6. Post Accident Actions:

On hearing the detonation the team immediately ceased work, as did other teams working in the area.

The deminers closest to [the Victim] immediately made their way up his access lane and picked him up to move him towards the ambulance. At the same time the team medic [name excised] reacted by bringing the stretcher up to the patient, where he gave primary medical care stabilised the patient.

He was removed shortly thereafter to the ambulance and began the trip to Marjeyoun Government hospital, the closest medical facility available capable of dealing with his nature of trauma.

[The Victim] was in the ambulance within 5 minutes of the detonation and on his way to the hospital. He arrived at the hospital at approximately 12:10hrs where he was immediately wheeled into the Emergency Room.

Shortly after the accident a casualty report was radioed through to HQ and the PM and Field Operations Manager was informed of the accident. The UNMACC was informed of the accident at the same time.

The site was immediately closed down and all items of equipment were left in the position they were found in pending the arrival of the Management and the MACC's investigating officer.

7. State of Equipment

Damage was occasioned to two items of equipment namely the prodder and the protective visor. The prodder tip was bent by the blast, and the Kevlar hand protector was damaged, it had also been thrown approximately 15m away from where the accident took place.

The visor, which took the brunt of the explosion, was broken on the left side. But the front had maintained its integrity thus saving [the Victim] from serious facial injuries.

The flak jacket was not damaged, and having penetrated the outer cover. [Sic]

8. Conclusions

We conclude that [the Victim] was following the correct drills and that this was a genuine prodding/excavating accident.

He was working after an instruction to stop work had been issued by his team leader.

From the damage to the prodder it is assumed that [the Victim] prodded onto the top of the mine, causing the lid to close and remove the retaining collar thereby initiating the mine, and resulting in the ensuing detonation.

The PPE was worn correctly and as such prevented [the Victim] from sustaining further injuries.

9. Recommendations and Follow up actions.

The team will undergo 1 full days retraining with the emphasis being on prodding and excavation drills.

Whenever team leaders have given an instruction to stop work they are to ensure that this has been complied with before moving out of the area.

All deminers are to ensure that they stop work when the instruction is passed, if they feel that there is a need to complete an activity they are to check this with the Team Leader.

APPENDIXES

1. DIAGRAM OF ACCIDENT SITE.

Statements

The following statement from the Victim was made available.

The following witness statement from [the Victim] was conducted at 1130 hrs on the 19.02.03 at Maryayoun Hospital. Due to the seriousness of [the Victim]'s hand injuries, the statement was taken verbally by the BOI Investigating Officer.

Q1. Explain what you remember happened before the accident occurred?

A1. I had got a signal with my detector and was in the prone position prodding the signal when there was a loud bang, that is all I remember.

Q2. How long had you been prodding for before the bang?

A2. I had confirmed the location of the mine by prodding and was attempting to locate all the mine body when there was the explosion, I cannot remember the exact time but it was not a long time.

Q3. What strength was the signal?

A3. Same as the previous mines.

Q4. Describe the signal indicator?

A4. It was a single pulse therefore I knew that the mine was at a right angle to my position.

Q5. At what distance did you start prodding?

A5. 200mm back from the signal.

Q6. Are you right or left handed?

A6. Right handed.

Q7. Did you hear the signal to stop work?

A7. Yes.

Q8. Why did you carry on working after you had heard the signal?

A8. I just wanted to finish off that mine.

Q9. What do you remember about the previous mine that you cleared?

A9. I remember that the mine's position was closer to me than before.

Q10. Do you remember how you excavated the mine?

A10. Same as normal.

Q11. On excavation was the mine body or mine back exposed?

A11. Both.

Q12. Had you noticed that there had been a slight change in the mine row direction ?

A12. Yes.

Q13. Why did you not change the lane direction?

A13. I wanted to keep my lane straight.

Q14. At what time did you take your last break?

A14. Approximately 25 minutes before the accident.

Q15. Anything else that you think will be useful for the investigation.

A15. No.

Signed: QA Officer, MACC Southern Lebanon.

