

James Madison University

JMU Scholarly Commons

Global CWD Repository

Center for International Stabilization and
Recovery

6-26-2002

DDASaccident381

HD-AID

Humanitarian Demining Accident and Incident Database

Follow this and additional works at: <https://commons.lib.jmu.edu/cisr-globalcwd>



Part of the [Defense and Security Studies Commons](#), [Peace and Conflict Studies Commons](#), [Public Policy Commons](#), and the [Social Policy Commons](#)

Recommended Citation

HD-AID, "DDASaccident381" (2002). *Global CWD Repository*. 581.
<https://commons.lib.jmu.edu/cisr-globalcwd/581>

This Other is brought to you for free and open access by the Center for International Stabilization and Recovery at JMU Scholarly Commons. It has been accepted for inclusion in Global CWD Repository by an authorized administrator of JMU Scholarly Commons. For more information, please contact dc_admin@jmu.edu.

DDAS Accident Report

Accident details

Report date: 19/05/2006	Accident number: 381
Accident time: 09:38	Accident Date: 26/06/2002
Where it occurred: M/F 178, Bayt Yahun, North of Bint Jubayl	Country: Lebanon
Primary cause: Unavoidable (?)	Secondary cause: Inadequate equipment (?)
Class: Excavation accident	Date of main report: 18/07/2002
ID original source: MF: BOI:No005/2002	Name of source: MACC SL
Organisation: Name removed	
Mine/device: No.4 Israel AP blast / frag	Ground condition: dry/dusty grass/grazing area hard rocks/stones
Date record created: 22/02/2004	Date last modified: 17/03/2004
No of victims: 1	No of documents: 2

Map details

Longitude:	Latitude:
Alt. coord. system: GR 36 725651 671996	Coordinates fixed by:
Map east:	Map north:
Map scale: UNIFIL Genimap	Map series: M/F 178
Map edition:	Map sheet: A (Tibnin)
Map name: 1:50,000	

Accident Notes

inadequate equipment (?)

handtool may have increased injury (?)

mechanical follow-up (?)

Accident report

A summarised MACC BOI report was made available in 2003. It is reproduced below, edited for anonymity. The full BOI accident report is reproduced under *Related papers* at the Other documents tab.

Introduction

1. At the time of the accident [1st commercial demining group] Manual Clearance Team No.1 were operational on M/F 178 clearance site at Bayt Yahun. Manual Clearance Team No 1 had been operational on M/F 178 since the 01st June 2002. A total of 1 x base lane, 4 x cut lanes (through the low wire entanglement), 1 x cut lane to dissect M/F 178 and M/F 177 and 5 x main clearance lanes had been cut into M/F 178 during the previous 19 x days clearance activities, resulting in the location of the minefield mine rows.



The area of the accident.

2. A [1st commercial demining group] Deminer had previously cleared through the low wire entanglement and was operating in the vicinity of the first mine row of M/F 178. Whilst conducting the detector drill, he picked up 2 x readings forward of his base stick (1 x to the right and 1 x to the left). The left hand signal was of a high pitch, whereas the right hand signal was of a weak pitch. The left hand signal was in an area of open ground and the right hand signal was in-between 2 x rocks.

3. The Manual Team No.1 Team Leader was conducting his minefield checks at this time and the Deminer told him of the left hand signal. The Team Leader then told the Deminer to wet the area of the signal prior to excavation and to be careful as the signal were in the vicinity of the first mine row. The Deminer then wetted the area of the left hand signal and on excavation; a piece of metal was located. He then proceeded to wet the second right hand signal putting approximately 6 litres of water in the vicinity of the signal; whilst the water was being absorbed, he filled up his watering can.

4. The Deminer then started to excavate the right hand signal, starting 20cms back from the signal source. He had excavated approximately 12 – 15 cms in distance from the signal, at a depth of 18 cms, with the width of the excavation trench being approximately 20cms wide before the uncontrolled detonation occurred.

Events following the Accident

5. At approximately 09:38 hrs an uncontrolled detonation occurred in the clearance lane. Following the uncontrolled detonation, the casualty managed to move back to the base lane where upon he was met by the Team No.1 Medic and initial medical stabilisation took place. Following full stabilisation the casualty was then transported to Bint Jubayl Hospital for medical treatment.

6. On hearing the uncontrolled detonation the Site Supervisor called a stop to all team demining activities, withdrew all the Deminers from the minefield and passed back the initial accident report to [1st commercial demining group] base location. The accident scene was then secured and marked as per [2nd Demining group's] current SOPs and National TSGs by the Team Leader.

Medical details

7. The casualty suffered closed fractures to his second and fourth fingers to his right hand, lacerations and flash burns to his right hand and right arm and a laceration to his forehead. The Team No.1 Medic administered medical treatment and stabilisation on-site to the casualty; casualty evacuation by road to Bint Jubayl civilian hospital then took place.

8. On arrival at Bint Jubayl hospital, the casualty was transferred to the Emergency Department where additional trauma care and medical treatment was administered.

Conclusions

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

- There was a sub-surface detonation of an Israeli No.4 Anti Personnel mine. Evidence shows that the crater had heavy blackening to the sides, was of a bulbous shape with primary fragmentation lining the bottom and sides. Lifting had formed on 2 x sides around the seat of detonation (the other 2 x sides having rocks in the way), and detonation blast splash was seen on the right hand rock. The excavated crater size was 25cm x 15cm x 20cm.
- The mine detonated whilst the Deminer was attempting to excavate it, detonation occurred through excessive indirect pressure application of the trowel tip, the deformation of the trowel tip substantiates this.
- At the time of the uncontrolled detonation, the mine would have been below the location of the trowel, the deformation of the trowel lower side substantiates this.
- The trowel was not in direct contact with the mine when it detonated as there is no melting of the trowel body.
- The BOI is not convinced that the ground was wetted prior to the excavation of the second signal, as all areas in and around the seat of detonation was found to be dry. It is appreciated that a large proportion of the water would evaporate on the detonation of the high explosive fill, but some evidence should remain if 6 x litres of water was used!
- The fracturing of the casualty's fingers was due to the positive blast effects resulting from the disintegration of the Israeli No.4 mine, on the detonation of the high explosives.
- The casualty's other injuries were sustained from both primary and secondary fragmentation, resulting from the disintegration of the Israeli No.4 mine, on the detonation of the high explosives.
- The medical treatment and subsequent evacuation of the casualty by Team No.1 Medic was very good
- The post-accident marking of the accident site was carried out in accordance with current TSGs and [1st commercial demining group] SOPs.
- The passage of information in between the accident site, [1st commercial demining group] base location and MACC SL was good with all information being passed in a timely manner.

- The BOI agrees with and accepts [2nd demining group – unrelated] Accident and IMSMA Reports, it should be noted however that there are some slight discrepancies regarding the reported times!
- The site map is not a true and accurate reflection of the clearance that has been conducted as inaccuracies exist regarding the appearance of the cut lanes.
- The protective jacket maintained its integrity following the uncontrolled detonation of an Israeli No.4 AP mine.
- The protective visor maintained its integrity following the uncontrolled detonation of an Israeli No.4 AP mine.
- The previous flailing of the area (accumulation of pressure), could have had a direct effect on the sensitivity state of the mine fuze, therefore making follow-up clearance by manual or MDD assets more risky.

Recommendations

10. The following are recommendations based on the BOI conclusions:

- Chapter 10 of the National TSGs is to be reviewed by MACC SL Operations with a view to amending the relevant information currently contained therein in relation to mechanical clearance as a primary means in order to provide further clarity on this issue within the context of the working environment of Southern Lebanon and taking note of the circumstances leading up to this accident.
- Some thought and consideration is given by [1st commercial demining group] in using the detector again, once a certain percentage of soil has been removed during the excavation drill, especially when excavating faint signals.
- Some thought and consideration is given by [1st commercial demining group] to re-introduce the use of demining probes, as part of the Deminers toolbox.
- Only accurate and precise accident information is reported (timings).
- Site maps must be a true and accurate reflection of the clearance activities that have been conducted.
- Mechanical assets should only be used in the ground preparation of clearance sites, as opposed to being used as a primary clearance tool.
- The conclusions detailed in this report be distributed and discussed among all [1st commercial demining group] Operational Field Staff.
- A period of refresher / confidence training is conducted with all [1st commercial demining group] Operational Field Staff, to include the following:

Manual excavation drills.

Accident / accident procedures.

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

Victim Report

Victim number: 498

Name: Name removed

Age:

Gender: Male

Status: deminer

Fit for work: not known

Compensation: Not made available

Time to hospital: Not recorded

(insured HMT)

Protection issued: Frag jacket
Long visor

Protection used: Long visor, Frag jacket

Summary of injuries:

INJURIES

minor Arm

minor Face

severe Fingers

severe Hand

COMMENT

No medical report was made available.

Analysis

The primary cause of this accident is listed as “*Unavoidable*” because the deminer may have been working as directed and in accordance with approved working methods when the detonation occurred. The secondary cause is listed as “*Inadequate equipment*” because the deminer was not issued with a probe and did not use a detector to check the position of the detector-reading as he excavated. The latter may have been because the detector could not be used while kneeling.

The failure to use a metal-detector to check the position of a reading during excavation may have been the main cause of this accident.

The investigation may have been flawed by the investigator making several apparent errors while assessing the cause.

The investigator stated that the “detonation occurred through excessive indirect pressure application of the trowel tip, the deformation of the trowel tip substantiates this”. This is not true. A mild steel trowel placed on top of an AP blast mine without pressure will still be deformed in an HE blast. Also, the investigator should be aware that “melting of the trowel body” does not occur when in direct contact with a mine – although mild steel is likely to burn when in direct contact with a high explosive itself. The No.4 mine body is half void, and the HE block does not reach the lid even when the mine is closed (on detonation), so the absence of melting or burning does not imply a lack of contact between the tool and the mine casing.

The investigator did not explain how the Victim suffered a forehead laceration if his visor was being worn correctly.

Several paragraphs in the full Board of Inquiry, the Summary, and in other reports from Lebanon at this time were clearly copied from other reports (by the same investigator) and lightly edited. This is proven by the name of an uninvolved demining group being left accidentally unchanged in several places. This undermines the authority of the report.

Related papers

The full BoI Accident report was made available in 2004. It is reproduced below, edited for anonymity and with excess pictures removed.

REPORT FOR ACCIDENT INVESTIGATION BOARD OF INQUIRY – No005/2002

MINE Accident that occurred in OES 2 on 26th June 2002 in which [Demining group] Deminer [the Victim] was injured.

Map Reference: UNIFIL Genimap 1:50,000 Sheet A (Tibnin).

References: A. Jane's Mines Manual.

Introduction

1. In accordance with the National Technical Standards and Guidelines (TSGs), the MACC SL Programme Manager issued a Convening Order on Wednesday 26th June 2002, for an accident investigation Board of Inquiry. Annex A details the Convening Order [Annexes were not made available].
2. This is a comprehensive report by the Board of Inquiry into the Mine Accident that occurred on the 26th June 2002. 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 as Annex C is confirmed. The accident occurred at approximately 0938 hrs on 26th June 2002, in Minefield (M/F) No 178 at Bayt Yahun. Bayt Yahun is located North of Bint Jubayl at GR 36 725651 671996, (Seat of Detonation). Annex D details a map of the general area.

Events leading up to the Accident

4. At the time of the accident [Demining group] Manual Clearance Team No1 were operational on M/F 178 clearance site at Bayt Yahun. Manual Clearance Team No 1 had been operational on M/F 178 since the 01st June 2002; a total of 1 x base lane, 4 x cut lanes (through the low wire entanglement), 1 x cut lane to dissect M/F 178 and M/F 177 and 5 x main clearance lanes had been cut into M/F 178 during the previous 19 x days clearance activities, resulting in the location of the minefield mine rows. Annex E details [Demining group] Team No1 Site Clearance Map (Briefing Board Map).
5. [Demining group] Deminer [the Victim] had previously cleared through the low wire entanglement and was operating in the vicinity of the first mine row of M/F 178. Whilst conducting the detector drill, he picked up 2 x readings forward of his base stick (1 x to the right and 1 x to the left). The left hand signal was of a high pitch, whereas the right hand signal was of a weak pitch. The left hand signal was in an area of open ground and the right hand signal was in-between 2 x rocks.
6. Manual Team No1 Team Leader [TL] was conducting his minefield checks at this time and Deminer [the Victim] told him of the left hand signal. Team Leader [TL] then told Deminer [the Victim] to wet the area of the signal prior to excavation and to be careful as the signal were in the vicinity of the first mine row. Deminer [the Victim] then wetted the area of the left hand signal and on excavation; a piece of metal was located. He then proceeded to wet the second right hand signal putting approximately 6 litres of water in the vicinity of the signal; whilst the water was being absorbed, he filled up his watering can.
7. Deminer [the Victim] then started to excavate the right hand signal, starting 20cms back from the signal source. He had excavated approximately 12 – 15 cms in distance from the signal, at a depth of 18 cms, with the width of the excavation trench being approximately 20cms wide before the uncontrolled detonation occurred.

Events following the Accident

8. At approximately 0938 hrs an uncontrolled detonation occurred in the clearance lane. Following the uncontrolled detonation, Deminer [the Victim] managed to move back to the base lane where upon he was met by Team No1 Medic [name excised] and initial medical stabilisation took place. Following full stabilisation the casualty was then transported to Bint Jubayl Hospital for medical treatment.

9. On hearing, the uncontrolled detonation Site Supervisor [name excised] called a stop to all team demining activities, withdrew all Deminers from the minefield, passed back the initial accident report to [Demining group] base location. The accident scene was then secured and marked as per [name of wrong Demining group removed] current SOPs and National TSG' by Team Leader [name excised]. Annex F details schematic diagrams of the general working area and accident area / scene.

VIEW OF THE ACCIDENT SCENE



Work History of the Casualty

10. Deminer [the Victim] commenced his employment with [Demining group] on the 11th May 2002, whereupon he completed the [Demining group] Southern Lebanon in-country 2 x week demining course, prior to operational deployment at Bayt Yahun. He has previously worked on a demining operation in the Zimbabwean border minefields for 2 years, from 1998 through to 2000. He is considered by [Demining group] to be a competent and trustworthy employee; disciplinary action had never had to be taken against him.

Past History of the Area

11. The Israeli Force (IF) initially, and later, the South Lebanese Army (SLA) previously occupied Bayt Yahun. The mine-contaminated areas consist of the following:

- Defensive minefields around 2 x former IF / SLA positions situated at GR 36 7258 6718 (W138) and GR 36 7265 6726 (W139).
- 2 x defensive / protective minefields than run along the South West side of the main road linking the above 2 x positions.
- A protective minefield that runs from former position W129, on the North East side of the village down to and across the access road leading to former UN position 6-20 (M/F 147).

12. The MACC SL designated the minefield above as M/F 178. MACC SL Operations Officer reported the minefield details on the 16th June 2001, the minefield details reported were:

- Reference Point GR 36 725709 672040.
- Quantity of mines not known.
- Quantity of mine rows not known.

- Date mines were laid not known.
- No minefield map is available.

Sequence, Documentation and Procedure of Tasking

13. Task Dossier (TD) OES 2 #011 was issued to [Demining group] on the 08th June 2002; the TD contains details of the 11 x minefields in and around Bayt Yahun. The clearance operation commenced on the 01st June 2002 and up to the time of the accident a total area of 220 sq.m had been cleared resulting in the disposal of a total number of 55 x Israeli No4 AP mines from M/F 178 (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).

14. [Demining group] Mechanical BOZENA assets have also conducted clearance work in M/F 178, on the 08th June and 10th June 2002. Approximately 260 sq.m of ground was prepared, resulting in the detonation of 58 x Israeli No4 AP mines.

Geography and Weather

15. The task site is located in an open area to the North West of the village of Bayt Yahun. Access to the site is via a tarmac road from the main Tibnin / Bint Jubayl road, which dissects the village of Bayt Yahun. The area is on a natural incline, sloping downwards in a North - North Easterly direction from the high point of 864m, located to the South East of the village. 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 fine and sunny with a temperature of approximately 26 to 28 degrees Celsius.

Site Layout and Marking

16. 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

17. [Demining group] clearance operation is supervised by an International Operations Manager and an International Site Supervisor was in overall charge of Bayt Yahun task site. 1 x International Team Leader commands Manual Clearance Team No1. There are no reports of disciplinary action being taken against [Demining group] personnel on the Bayt Yahun task.

Quality Assurance and Quality Control

18. [Demining group] Internal Quality Assurance (QA) is achieved through a system of on-site checks by an International QA Team to ensure adherence to National TSGs and [wrong Demining group name excised] SOPs. The last Internal QA Evaluation was conducted on the 24th June 2002, with no major problems being identified. External QA is carried out by the MACC SL QA Section [name excised]. The last External QA Evaluation was conducted on the 25th June 2002 where "Minefield Marking" and "Command & Control" were evaluated; the evaluation results were both good.

Communications and Reporting

19. Communications in-between the Bayt Yahun task site and [Demining group] base location is maintained via the use of the Cell phone system. On site communications in-between teams is maintained via VHF handheld radios.

20. 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, the passage of information to the MACC SL was however not relayed in a timely or accurate manner. Annex G details the Initial Casualty Report. [Not made available.]

Medical Details

21. Deminer [the Victim] suffered closed fractures to his second and fourth fingers to his right hand, lacerations and flash burns to his right hand and right arm and a laceration to his forehead. [Demining group] Team No1 Medic Dambuza administered medical treatment and stabilisation on-site to Deminer [the Victim]; casualty evacuation by road to Bint Jubayl civilian hospital then took place.

22. On arrival at Bint Jubayl hospital, Deminer [the Victim] was transferred to the Emergency Department where additional trauma care and medical treatment was administered. Annex H details the medical report from Bint Jubayl Hospital. [Not made available.]

Personnel

23. 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 of the Appendices to the Annex.

Dress and Personal Protective Equipment (PPE)

24. At the time of the accident, Deminer [the Victim] was wearing his protective apron and protective visor. On inspection of the protective apron, the following points were noted:

- The outer cover was ripped several places.
- The blast debris and damage was concentrated at top right hand side.
- There was part fragmentation penetration of the Kevlar lining.
- There was not full penetration of the Kevlar lining.

[The apron is not made of Kevlar, but ballistic aramid.]

[The Victim's] apron

[The cotton cover was torn and fragments trapped between it and the aramid behind. There are 16 layers of aramid material in this apron. The picture does not show a full penetration of even one layer.]



25. On inspection of the protective visor, the following points were noted:

- A large proportion of the blast effects were concentrated on the outer face of the visor.
- The visor had maintained its integrity.
- The visor securing bolts had maintained their integrity.

[The Victim's visor showed no obvious damage but was translucent over its entire area, implying age or inadequate protection against surface scratching.]

Tools and Equipment

26. At the time of the accident, a standard [Demining group] excavation trowel was being used by Deminer [the Victim]. On inspection of the trowel the following points were noted:

- The tip of the trowel had misshapen at an angle of 80 degrees from the norm.
- Deformation of the trowel was also present on the trowel body.
- The rubber handle bung had come away from the trowel.
- There were no signs of melting on the trowel.



[The use of this trowel for excavating and prodding is criticised in other accidents involving this demining group in this database. The trowel itself is not appropriately designed (not in line with IMAS guidelines) and has killed at least one deminer.]

Details of Mine Involved

27. 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.

28. 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.

29. 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 27 – 29 inclusive extracted from Reference A)

30. 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 therefore reduces the direct pressure required to activate the mine.

Account of Activities

31. 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:

26/06/02

- 0938hrs – Uncontrolled detonation at M/F 178.
- 0945hrs – Accident Information passed to [Demining group] Base Location and Operations Officer. [Demining group] Operations Officer informs MACC SL Operations Officer who informs MACC SL QA Officer.
- 0950hrs – Casualty evacuation of casualty to Bint Jubayl hospital.
- 0955hrs – Accident site secured.
- 1000hrs – Casualty arrives at Bint Jubayl hospital.
- 1025hrs – BOI Convened.
- 1030hrs – BOI Arrives at accident site and informs [Demining group] Operations Officer of BOI convening order.
- 1330hrs – BOI Leaves accident site to move to M/F 499 for Armoured Bulldozer accreditation.
- 1415hrs – BOI leaves M/F 499 to move to Bint Jubayl Hospital.
- 1425hrs – BOI arrives at Bint Jubayl Hospital.
- 1455hrs – BOI leaves Bint Jubayl Hospital to move to [Demining group] base location.
- 1600hrs – BOI arrives at [Demining group] base location to conduct witness interviews and collate task information.
- 1735hrs – BOI leaves [Demining group] base location to move to MACC SL.
- 1745hrs – BOI arrives at MACC SL and briefs Programme Manager, Operations Officer and Planning Officer.

27/06/02

- 1330hrs – BOI departs MACC SL to move to Bint Jubayl Hospital.
- 1430 hrs – BOI arrives at Bint Jubayl Hospital to question Deminer [the Victim].
- 1515hrs – BOI leaves Bint Jubayl Hospital to move to MACC SL.
- 1615hrs – BOI arrives at MACC SL and briefs Programme Manager and Operations Officer.

28/05/02

- 1115hrs – BOI leaves MACC SL to move to [Demining group] accommodation.
- 1130hrs - BOI arrives at [Demining group] accommodation to question Deminer [the Victim] and pick [Demining group] Accident Report
- 1230hrs – BOI leaves [Demining group] accommodation to move to MACC SL.
- 1245hrs – BOI arrives at MACC SL and briefs Programme Manager and Operations Officer.

Insurance Details

32. Deminer [the Victim] is covered by the standard [Demining group] insurance for all International personnel in mine/UXO clearance activities in Lebanon. All insurance policies for [Demining group] are through HMT Insurers of London.

Conclusions

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

- There was a sub-surface detonation of an Israeli No4 Anti Personnel mine. Evidence shows that the crater had heavy blackening to the sides, was of a bulbous shape with primary fragmentation lining the bottom and sides. Lifting had formed on 2 x sides around the seat of detonation (the other 2 x sides having rocks in the way), and detonation blast splash was seen on the right hand rock. The excavated crater size was 25cm x 15cm x 20cm.
- The mine detonated whilst Deminer [the Victim] was attempting to excavate it, detonation occurred through excessive indirect pressure application of the trowel tip, the deformation of the trowel tip substantiates this.
- At the time of the uncontrolled detonation, the mine would have been below the location of the trowel, the deformation of the trowel lower side substantiates this.
- The trowel was not in direct contact with the mine when it detonated as there is no melting of the trowel body.
- The BOI is not convinced that the ground was wetted prior to the excavation of the second signal, as all areas in and around the seat of detonation was found to be dry. It is appreciated that a large proportion of the water would evaporate on the detonation of the high explosive fill, but some evidence should remain if 6 x litres of water was used!
- The fracturing of Deminer [the Victim]'s fingers was due to the positive blast effects resulting from the disintegration of the Israeli No4 mine, on the detonation of the high explosives.
- Deminer [the Victim]'s other injuries were sustained from both primary and secondary fragmentation, resulting from the disintegration of the Israeli No4 mine, on the detonation of the high explosives.
- The medical treatment and subsequent evacuation of the casualty by Team No 1 Medic was very good
- The post-accident marking of the accident site was carried out in accordance with current TSGs and [Demining group] SOPs.
- 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. The passage of information however between [Demining group] base location and the MACC SL (Initial Accident Report) was poor, with the information being passed not within the notification time, as detailed in TSGs.
- The BOI agrees with and accepts [name of wrong demining group excised] Accident and IMSMA Reports, it should be noted however that there are some slight discrepancies regarding the reported times!
- The site map is not a true and accurate reflection of the clearance that has been conducted as inaccuracies exist regarding the appearance of the cut lanes.
- The protective jacket maintained its integrity following the uncontrolled detonation of an Israeli No4 AP mine.
- The protective visor maintained its integrity following the uncontrolled detonation of an Israeli No4 AP mine.

- The previous flailing of the area (accumulation of pressure), could have had a direct effect on the sensitivity state of the mine fuze (Para 30 to this report refers).

Recommendations

34. The following are recommendations based on the BOI conclusions:

- No amendments are necessary to the National TSGs for Mine/UXO Clearance.
- Some thought and consideration is given by [Demining group] in using the detector again, once a certain percentage of soil has been removed during the excavation drill, especially when excavating faint signals.
- Some thought and consideration is given by [Demining group] to re-introduce the use of demining probes.
- MACC SL must be informed of all Accidents / Incidents as per Initial Accident Report format, as soon as practically possible (30 minutes), as per TSG's Chapter 16, Para 16.1.
- Only accurate and precise accident information is reported (timings).
- Site maps must be a true and accurate reflection of the clearance activities that have been conducted.
- Mechanical assets should only be used in the ground preparation of clearance sites, as opposed to being used as a primary clearance tool.
- The conclusions detailed in this report be distributed and discussed among all [Demining group] Operational Field Staff.
- A period of refresher / confidence training is conducted with all [Demining group] Operational Field Staff, to include the following:
 - Manual excavation drills.
 - Accident / Incident procedures.

Signed: QA Officer, Mine Action Co-ordination Centre 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. [Demining group] Team No 1 current site map.
- F. Schematic diagrams of the general working area and accident area/scene.
- G. Initial Casualty Report
- H. Medical reports from Bayt Yahun Hospital.

Comments by the MACC SL Operations Officer

I concur with the Conclusions and Recommendations of the report.

I also concur with the recommendation of the re-introduction of the probe as a valuable manual demining tool aid, as part of the Deminers toolbox.

As indicated in paras 20 and 34 of this report the "Initial Accident Report" from the [Demining group] HQ was not received in the required time frame (30 mins) and the relevant details were not received at the MACC HQ as required in TSGs. In future Initial Accident Reports are to be Phoned or Faxed to the MACC SL Ops Comms Room in the first instances. I also

feel that the details on the "Initial Accident Report" were very light i.e. Type of accident "excavation" (a very brief description of what happened).

Clearance Organisations must remember that these details are required by the MACC Ops to initiate accident notifications to other interested parties.

The fact that the accident site had been flailed by a mechanical asset (BOZENA 3) previously raises concerns that mines not detonated during the flailing process may be made more sensitive as a result of this process, therefore making follow-up clearance by manual or MDD assets more risky. This accident is a wake up call to the viability of putting mechanical assets into a known mined area as the primary clearance tool very questionable. I therefore strongly recommend that mechanical assets should be used for ground preparation and area reduction purposes only.

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