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DDAS Accident Report

Accident details

Report date: 17/03/2004	Accident number: 394
Accident time: 15:55	Accident Date: 13/05/2002
Where it occurred: MF: 501, Arid al Mazra'ah, Nr Bra'Shit	Country: Lebanon
Primary cause: Inadequate training (?)	Secondary cause: Inadequate equipment (?)
Class: Handling accident	Date of main report: 23/05/2002
ID original source: Bol: 002/2002 MJF	Name of source: MACC SL
Organisation: Name removed	
Mine/device: Fuze	Ground condition: not applicable
Date record created: 27/02/2004	Date last modified: 27/02/2004
No of victims: 1	No of documents: 1

Map details

Longitude:	Latitude:
Alt. coord. system: GR: 36 7265 6730	Coordinates fixed by:
Map east:	Map north:
Map scale:	Map series:
Map edition:	Map sheet:
Map name:	

Accident Notes

inadequate equipment (?)

inadequate training (?)

Accident report

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

REPORT FOR ACCIDENT INVESTIGATION BOARD OF INQUIRY – No002/2002
MINE Accident that occurred in OES 3 on 13th May 2002 in which [Demining group] Deminer [the Victim] was injured.
Map Reference: UNIFIL Genimap 1:50,000 Sheet A (Tibnin).
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 Monday 13th May 2002, 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 Mine Accident that occurred on the 13th May 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 1555hrs on 13th May 2002, in Minefield (M/F) No 501 at the Arid al Mazra'ah minefield, Bra'shit. Arid al Mazra'ah minefield is located to the West of Bra'shit at GR 36 7265 6730, (M/F No 501 Command Post). Annex D details a map of the general area.

Events leading up to the Accident

4. At the time of the accident, [Demining group] Survey Team had completed the survey operations for the day at M/F 501 clearance site. The Survey Team had been operational on M/F 501 since the 09th May 2002; the Survey Team were conducting a Level 2 Technical Survey by means of a series of penetration cuts into the suspect area, in an attempt to identify the mined area. Annex E details [Demining group] Survey Team Site Clearance Map.
5. On completion of the day's activities, Team Leader [name excised] had ordered his team to start preparing the site for departure. The following concurrent activities were taking place:
 - Mine Incineration of the 3 x previously located Israeli No4 Anti-Personal (AP) mines.
 - The loading of the team demining equipment onto the team vehicle.
 - Movement of the mine fuzes from the explosive storage area to the team vehicle.

Note

[Demining group]'s manual neutralisation technique for the Israeli No4 Anti-Personal (AP) mine fuze, at the time of the accident was to attach the collar and insert the pin in the fuze, only whilst the fuze was being removed from the mine. Once this had been completed, the collar and pin were then again removed. The fuze would then be wrapped in tissue paper.

6. Team Leader handed over the mine fuzes to Deminer [B], and ordered him to take the mine fuzes from the explosive storage area to the team 2i/c Deminer [C], who was loading the stores onto the vehicle. Deminer [B] took the fuzes to the stores area where upon Deminer [C] ordered him to place them on the ground sheet, as he was busy with another task, this Deminer [B] did.
7. Once prepared to load the fuzes, Deminer [C] ordered Deminer [D, the victim] to pass him the fuzes from the ground sheet, to the vehicle where he was going to put them in the team detonator box. Deminer [the victim] picked up all 3 x fuzes and laid them on the palm of his left hand, he then handed the first fuze to Deminer [C] who in turn placed the fuze into the detonator box.

Events following the Accident

8. At approximately 1555hrs, an uncontrolled detonation occurred in the Command Post. Following the uncontrolled detonation, the Survey Team Medic [name excised] immediately assisted [the victim] by applying a shell dressing to his wounded hand. Following full stabilisation, the casualty was then transported to Bint Jubayl Hospital for medical treatment. Annex F details a schematic diagram of the accident area / scene.

VIEW OF M/F501 - GENERAL AREA



Work History of the Casualty

9. [The victim] has been working for the [Demining group] since October 2001. He has completed the basic Deminers courses and most recently the pre and post, Lebanon deployment courses. The operation in Lebanon was his first operational deployment. He is however 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

10. The Israeli Forces (IF) initially, and later, the South Lebanese Army (SLA) previously occupied areas in and around Bra'shit. The mine-contaminated areas consist of the following:

- 6 x defensive minefields around the former IF / SLA positions situated at Bal'awin GR 36 7279 6724.
- 2 x protective minefields than run along the Arid al Mazra'ah valley, to the West of the Bayt Yahun / Bra'shit main road, one being designated M/F 501 by MACC SL.
- 3 x protective minefields to the South and South East of Bra'shit.

11. IF Northern Command reported the minefield details on the 12th December 2001, the minefield details reported were:

- No IF minefield designator Number
- Reference Point GR 36 7279 6726
- Quantity of 48 Israeli No4 AP mines.
- Minefield map is available.

12. A previous mine incident occurred in the Arid al Mazra'ah minefield 3 x months previously. A local farmer inadvertently drove his tractor over an Israeli No4 AP mine; no injuries were sustained to the farmer.

Sequence, Documentation and Procedure of Tasking

13. Task Dossier (TD) OES 3 #002 was issued to [Demining group] on the 24th April 2002; the TD contains details of 5 x minefields in and around the area. The clearance operation in M/F 501 commenced on the 09th May 2002 and up to the time of the accident a total area of 913 sq.m had been cleared resulting in the disposal of a total number of 3 x Israeli No4 AP mines.

Geography and Weather

14. The task site is located in a natural valley, 3kms South West of the town of Shaqra. Access to the site is via a stone laid track from the main Bayt Yahun / Bra'shit road. The area is surrounded to the East, South and West with high ground, the highest feature being Hajar et Tawil at 768m. The river Burah runs from the South East to the North West through the valley. The mined area was previously arable agriculture land, used for tobacco and wheat cultivation; 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 24 to 26 degrees Celsius.

Site Layout and Marking

15. The site layout marking of the Command Post prior to the accident was in accordance with National TSGs and Mine-tech SOPs; as was the post accident marking.

Management Supervision and Discipline

16. [Demining group] clearance operation is supervised by an International Operations Manager and an International Operation Field Manager was in overall charge of Bra'shit task site. 1 x International Team Leader, commanded the Survey Team. There are no reports of disciplinary action being taken against [Demining group] personnel on the Bra'shit task.

Quality Assurance and Quality Control

17. [Demining group] Internal Quality Assurance is achieved through a system of on-site checks by an International QA Team to ensure adherence to National TSGs and [Demining group] SOPs. External QA is carried out by the MACC SL QA Section. No external QA visit had taken place on the Survey Team Bra'shit task site, but a "Setting Up" evaluation had previously been conducted on the Survey Team previous task site at Bayt Yahun on the 08th May 2002, the evaluation result was good.

Communications and Reporting

18. Communications in-between the Bra'shit task site and [Demining group] base location is maintained via HF vehicle Codan radios and VHF hand-held Motorola radios. On site communications in-between teams is maintained via the VHF system.

19. 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 limited information to the MACC SL via the HF system. Annex G details [Demining group] Radio Log.

Medical Details

20. [The victim] suffered deep fragmentation lacerations to the insides and tip of his left hand middle, ring and index fingers, a minor closed fracture of his left hand middle two fingers and a deep laceration on the inside of his left hand thumb. There was also a small minor fragmentation laceration to [his] right hand palm. [Demining group] Survey Team Medic administered medical treatment and stabilisation on-site to [the victim] (wound dressings and intravenous "Ringer" solution); casualty evacuation by road to Bint Jubayl civilian hospital then took place.

21. On arrival at Bint Jubayl hospital, [the victim] was transferred to the X-Ray Department where x-rays of both hands were taken. He was then given 200ml of painkiller (Trodon), an anti-tetanus injection and an antibiotic injection. The hospital medical report that was submitted to the BOI is detailed at Annex H to this report. [The Annex was not made available.]

22. On the evening of the 13th May 2002, [the victim] was moved to the All-Rassoul All-Aazam hospital at Beirut for plastic surgery on the injuries to his hand.

FRAGMENTATION RECOVERED FROM LEFT HAND THUMB



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.

Details of Fuze Involved

24. The Israeli No4 AP mine fuze assembly incorporates a lead-shear arming delay, it 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.

25. The fuze is designed purely for direct pressure operation. To arm the fuze, 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 24 – 25 inclusive extracted from Reference A).

ISRAELI NO4 AP MINE FUZE – SIDE VIEW



[The fuze shown was pictured in the original report and does not include the detonator – only the initiation cap. As a result it is not clear whether the complete detonator was present.]

Account of Activities

26. 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:

13/05/02

- 1555hrs – Uncontrolled detonation at M/F 501.
- 1615hrs – Casualty evacuation of casualty to Bint Jubayl hospital.
- 1621hrs – Casualty arrives at the hospital.
- 1755 hrs - Notification of accident to MACC SL.
- 1800hrs – Casualty leaves hospital to move to Beirut hospital.
- 1830hrs – BOI Convened.
- 1900hrs - Notification of accident to NDO.
- 2045hrs – Casualty arrives at Beirut hospital.
- 2300hrs – Casualty moves into theatre for operation on left hand to remove metal fragments and receive plastic surgery.

14/05/02

- 0130hrs – Casualty leaves theatre.
- 1000hrs – Casualty discharged from Beirut hospital.
- 1300hrs - BOI Arrives at [Demining group] base location.
- 1335hrs – BOI Leaves [demining group] base location to move to accident site.
- 1350hrs – BOI Arrives at accident site to conduct accident investigation.
- 1515hrs – BOI Leaves accident site to move to [Demining group] base location.
- 1530hrs – BOI Arrives at [Demining group] base location to conduct witness interviews and collate the task information.
- 1700hrs – BOI Leaves [Demining group] base location to move to MACC SL.
- 1800hrs – BOI Arrives at MACC SL.

15/05/02

- 0715hrs – BOI Leaves MACC SL to move to [Demining group] base location.
- 0815hrs – BOI Arrives at [Demining group] base location to conduct interviews with [the victim] and the Medical Supervisor.
- 1000hrs – BOI Leaves [Demining group] base location to move to MACC SL.
- 1100hrs – BOI Arrives at MACC SL.

Insurance Details

27. [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

28. Based on the investigation, the statements and visits to the site, the Board of Inquiry conclude the

following:

- There was an uncontrolled detonation of an Israeli No4 Anti Personnel mine fuze.
- At the time of the uncontrolled detonation, no cylindrical collar was attached or safety pin inserted into the Israeli No4 Anti-Personal (AP) mine fuze, the fuze was however had been wrapped in tissue paper
- [The victim] injuries were sustained from the primary fragmentation, resulting in the part disintegration of the Israeli No4 mine fuze, on the detonation of the primary high explosives fill.
- There is no evidence to ascertain that prior to the accident, [Demining group] on-site manual neutralisation techniques for the Israeli No4 AP mine were being infringed.
- The detonator box as used by [Demining group] teams is inappropriate and requires replacing.
- An inexperienced Deminer was allowed to handle fuzes / detonators.
- The medical treatment and subsequent evacuation of the casualty by the on-site medic was very good
- The post-accident marking of the accident site was carried out in accordance with current SOPs.
- The passage of information in between the accident site and [Demining group] base location was good, with all relevant information being passed in a timely manner.
- The passage of the accident information to the MACC SL via HF means was incomplete and not as per Annex A to [Demining group] SOP No 26.
- The passage of the accident information to the MACC SL was not within the 30 minute notification time, as detailed in TSGs Chapter 16, Para 16.1.
- The accident information passed to the MACC SL via the HF means was not recorded in the [Demining group] radio operator's log.
- The BOI agrees with and accepts [Demining group] Accident Report and IMSMA Report. It should be noted however that there are inaccuracies with regards to the BOI schematic diagram of the area as detailed at Annex F to this report, and the site layout diagram as presented in [Demining group]'s Accident Report, Annex B Appendix 1. The information for the BOI schematic diagram, was obtained from the Survey Team Leader at the actual accident site.

29. The BOI concludes that the most likely explanation why there was an uncontrolled detonation, is that the slotted striker retaining plate was either moved or disturbed by [the victim]. This would have allowed the spring-loaded striker to move forward and impinge on the detonator.

30. The BOI has not been able to conclude in any certainty, whether this action was a deliberate foolhardy action, or a genuine innocent mistake.

Recommendations

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

- An amendment be made to the National TSGs for Mine/UXO Clearance, Chapter 4, Page 4-3, Para 4.13 (Action on Locating a Mine).
- Cylindrical collars must remain attached, and safety pins must remain inserted into the Israeli No4 Anti-Personal (AP) mine fuze, from the time that they are neutralised

in the minefield up to and including the time that they are destroyed by demolition. This is to be amended in [Demining group] SOPs.

- A more appropriate packing material (foam), is used to secure loose fuzes and detonators, rather than paper tissues.
- Fuzes and detonators should always be stored and transported in closed metal containers, from the time that they are recovered on-site until immediately prior to destruction by demolition. [The box used was shown in a photograph and was a plastic "lunch-box".]
- Suitably approved metal detonator boxes are to be used by all [Demining group] Clearance Teams. (MACC SL to issue as soon as practically possible).
- Detonators and explosives are only to be handled by experienced and trained personnel (Team Leaders).
- The passage of the accident information to the MACC SL must be complete and as per Annex A to [Demining group] SOP No 26.
- MACC SL must be informed of all Accidents / Incidents as soon as practically possible (30 minutes), as per TSGs Chapter 16, Para 16.1.
- All radio messages should be logged in the radio log.
- Only accurate information is presented to any BOI investigation.
- The conclusions detailed in this report be distributed and discussed among all [Demining group] Operational Field Staff.

32. It is acknowledged by the BOI, that the second recommendation has already been actioned by [Demining group].

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

Annexes: (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] Survey Team site map.
- F. Schematic diagram of the accident area/scene.
- G. [Demining group] Radio Log.
- H. Bint Jubail Hospital Report

Comments by the MACC SL Operations Officer

I concur with the recommendations of this report.

My main concerns are:

1. The initial accident report was slow and incomplete, this information should go directly to MACC SL Operations via the communications room within 30 minutes and not directly to the QA Officer.
2. The No4 AP mine fuze once neutralised and removed from the mine was handled and moved without the cylindrical collar and safety pin in place. These 2 x safety features must remain in place until destruction by detonation.
3. This accident was preventable and the BOI recommendations shall be implemented when dealing with this fuze, if manual neutralisation is to continue.

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

Comments by the MACC SL Programme Manager

I have reviewed the Report of the Board of Inquiry and I concur with the Board's findings and recommendations. I recommend that the relevant National TSGs be amended accordingly.

I support the Operations Officer's comments.

The final Report of the Board was delayed as a result of a third accident occurring. The third accident is currently under investigation.

Signed: Programme Manager, Mine Action Co-ordination Centre South Lebanon

Victim Report

Victim number: 509	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: not known
Compensation: not made available	Time to hospital: 26 minutes
Protection issued: Frontal apron Long visor	Protection used: frontal apron, long visor

Summary of injuries:

INJURIES

severe Hands

COMMENT

See medical report.

Medical report

No formal accident report was made available. In the Board of Inquiry report it was stated that:

The victim "suffered deep fragmentation lacerations to the insides and tip of his left hand middle, ring and index fingers, a minor closed fracture of his left hand middle two fingers and a deep laceration on the inside of his left hand thumb. There was also a small minor fragmentation laceration to [his] right hand palm".

The Victim was moved to the All-Rassoul All-Aazam hospital at Beirut for plastic surgery on the injuries to his hands.

The photograph of a fragment removed from his hand is further evidence that the injuries were serious.

Analysis

The primary cause of this accident is listed as "inadequate training" because the victim and his supervisors were handling fuzes that had not been rendered safe, although it appears that were working in ways approved by their managers and allowed within their SOPs. The investigators described him as "inexperienced", which implies a lack of suitable preparation for the work. The secondary cause is listed as "inadequate equipment" because the group

were not using approved means of packing or transporting fuzes. It is likely that they did not have a suitable supply of fuze collars and pins with which to render them safe to transport.

The investigators declare uncertainty (paragraph 30) over whether “the incident was a deliberate foolhardy action or a genuine innocent mistake”. No evidence to support the former possibility is included in the report, but clearly the investigators did harbour the suspicion that there was some “horseplay” involved.