

DDAS Accident Report

Accident details

Report date: 15/05/2006	Accident number: 225
Accident time: 12:45	Accident Date: 03/09/1997
Where it occurred: Cajnice, Nr Gorazde, RS	Country: Bosnia Herzegovina
Primary cause: Management/control inadequacy (?)	Secondary cause: Inadequate equipment (?)
Class: Tripwire accident	Date of main report: 10/09/1997
ID original source: DB/RK	Name of source: BiH MAC
Organisation: Name removed	
Mine/device: PROM-1 AP Bfrag	Ground condition: bushes/scrub route (verge) trees
Date record created: 17/02/2004	Date last modified: 17/02/2004
No of victims: 2	No of documents: 2

Map details

Longitude:	Latitude:
Alt. coord. system: GR: CP 409294	Coordinates fixed by:
Map east:	Map north:
Map scale: GORAZDE	Map series: DMA 5B
Map edition:	Map sheet: 2882 2
Map name:	

Accident Notes

inadequate equipment (?)
inappropriate vegetation cutting tool (?)
partner's failure to "control" (?)
safety distances ignored (?)
vegetation clearance problem (?)
inadequate training (?)

Accident report

The demining group involved in the accident deploys two-man teams using a one-man drill, in which one deminer clears undergrowth, uses the detector and excavates finds while the other "controls" him.

An accident report was prepared for the UN MAC by internal staff. That report was made available and the following summarises its content. The original report is available under *Related papers* at the "Other documents" tab.

The accident occurred in an area described as a wooded embankment at the side of a road. "Bushes and foliage on the ground" were described as "fairly dense". [Photographs of the site showed that the undergrowth was green with new growth but not dense. The site was under the canopy of trees and the leaf litter and individual stems could be seen clearly to a depth in the undergrowth not less than 30cm.] The ground sloped steeply upward to a track three metres to the left of the accident site but two metres above it. The demining group were clearing a safe lane through the area, with spurs off it to allow later dog access.

The site had a permanently stationed independent QA monitor at all times.

The two man team involved in the accident had only been under that Team Leader for one day, having been moved from another site.

At 09:40 the two victims found and disarmed a PROM-1 in their lane. The Team Leader corrected them because he should have been informed and decided what action was to be taken with the mine.

At 12:40 the two victims were at an appropriate place to site a spur, so the Team Leader instructed them to start a lane off to the left. The deminers changed roles, exchanging leggings and marking tape when they did so [only one set of leggings was issued per pair of deminers]. As Victim No.2 was withdrawing his partner asked him to pass the machete. He returned and did so, then walked away again. He was about five metres away when the mine detonated.

Victim No.2 was found cradling Victim No.1 by the Team Leader and others who helped him to a safe area and medical support. Victim No.2 left for Cajnice hospital within five minutes of the accident. He had a cut on the right of his jaw and two wounds in his right leg. Victim No.1 was pronounced dead by the medic. He had wounds on both sides of his chest, the left side of his neck and his right leg. His body was moved to the hospital about 2.5 hours later after all clearance drills in his vicinity had been completed. He had not been wearing the collar of his protective suit at the time. Victim No.2 was moved to Socolac hospital at 19:00 "for observation".

The demining group manager said that "the undergrowth was not very thick and therefore tripwire feeler drills were deemed unnecessary in the area as visual detection forward of the deminer was quite possible". He also mentioned that grapples used to pull tripwires were not approved by the demining company.

At the scene of the accident the investigators noted a machete, a prodder, a bayonet and a mine detector. They saw no sign of a tripwire feeler or shears.

The investigators found that the groin protector on Victim No.1's protective suit had been "perforated in two places" and had no "neck protector attached". They found no fragment marks on his visor. [They do not mention damage to the armour in the chest area where there were severe penetrating injuries so it is assumed that the equipment was damaged.]

The investigators identified the mine from shrapnel found at the site. [They do not appear to have looked for the base plate.]

Conclusion

The investigators found that the team were not equipped with appropriate tools, the victims were not keeping the required safety distance and that the two victims appeared to be either undisciplined or unfamiliar with proper drills.

Recommendations

The investigators recommended that a helmet and visor should be worn in fragmentation mine areas and that "if so equipped, the collar should be worn with the flak jacket". [This is presumably because the helmet visor is shorter than a full-face visor on a head-frame.]

Also that teams should be equipped with a "tripwire feeler, metal detector and prodder". They added that "only horizontal cutting tools" should be allowed, saying that "no vertical cutting tools or striking tools should be allowed in the clearance lane". The changeover of deminers in a team should be done as a "drill" with work not starting until the retiring deminer is at a safe distance. New Team members should be well briefed and should, when necessary, be placed with existing team members so that they know how the team operates.

Victim Report

Victim number: 290	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: DECEASED
Compensation: not made available	Time to hospital: not recorded
Protection issued: Frag jacket Long visor Trousers/leggings	Protection used: Frag jacket, Long visor, Leggings

Summary of injuries:

INJURIES

severe Abdomen

severe Chest

severe Genitals

FATAL

COMMENT

See medical report.

Medical report

A brief field medic's report described Victim No.1's injuries as "hard injury of artery and genitals...I tried to put drip but it did not work out because the veins failed".

Another deminer arrived before the medic. He stated that Victim No.1 "was bleeding in the genital area and top part of his chest. I cut off the jacket and shirt to find more holes bleeding. I applied my bomb-bandage to one of the bleeding holes I then started to apply CPR only to see when I done my first heart massage blood coming out several holes. I then stopped CPR."

A statement from a demining group manager who visited the site on the day listed the victim's injuries as: "perforated corratol artery, perforated femoral artery, large right chest wound, small left chest wound, wounds to genital area. Dead 3-5 minutes after arrival of medic."

The statement reported that "the full blast was absorbed by [Victim No.1] in the genitals". Apparently Victim No.1 said, "I'm dead" and lost consciousness.

Victim Report

Victim number: 291	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: not known
Compensation: not made available	Time to hospital: not recorded
Protection issued: Frag jacket Long visor	Protection used: not recorded

Summary of injuries:

INJURIES

severe Face

severe Leg

COMMENT

See medical report.

Medical report

A statement from a demining group manager who visited the site on the day listed Victim No.2's injuries as: "shrapnel wound to right leg above and below the knee. One piece shrapnel to right side of jaw. Jaw believed to be fractured".

Analysis

This accident is classed as a "*Management/control inadequacy*" because the victim was not provided with a suitable tool to cut the undergrowth cautiously. The secondary cause is listed as "*Inadequate equipment*" because a machete is the wrong tool to use in an area where trip-wires are suspected.

The field management were applying the SOPs as correctly as they could, but they were not provided with adequate tools. It is possible that, given the tools available, the victim was working as properly as possible - apart from not waiting for his partner to withdraw.

The investigators recommend the use of a helmet and visor. The victim was not wearing a helmet, but was wearing a visor. The accident did not involve head injuries and the only recorded head injuries in that country at the time had occurred to deminers wearing helmets that failed. The potential fragment speed from the PROM-1 is far higher than the protection offered by the helmets used. The helmet is disliked by the deminers for reasons of comfort. It gives differential protection (with the visor providing half the fragment protection of the helmet). It is peculiar to insist that the top of the head should have more protection than the forehead.

Related papers

The file included statements from those who attended the victim and the Team Leader, a detailed map, a crude sketch map, photographs of the accident site and another mine, and poorly detailed photographs of the victim's armour which appeared to have separated front to

back into the separate panels it was made up of [possibly explaining how the chest injuries occurred without damaging the armour enough for the investigators to notice].

Original Bol report

The following is the original Bol report, edited for anonymity.

REPORT ON MINE ACCIDENT AT CP 409294 IN CAJNICE

Supporting Documentation

- A: [Demining group] mine incident report.
- B: Statement of [name excised] (Operations Manager for [Demining group]).
- C: Statement of [name excised] (Team Leader).
- D: Statement of [name excised] (Medic).
- E: Statement by [name excised] (Interpreter).
- F: Statement by [name excised] (Gurkha deminer).
- G: Statement by [name excised] (Dog Handler).
- H: Map series DMA 5B GORAZDE map sheet 2882-2.
- I: Photos of site
- J: Site sketch

INTRODUCTION

1. A mine accident occurred 03 September 1997 at 12h45. The accident resulted in one fatality. A second deminer sustained minor injuries.
2. On the same day a board of inquiry was appointed with [name excised] and Captain [name excised] representing the UNMAC.

The accident was reported to the local authorities and they are also conducting an investigation.

PROCESS OF THE INVESTIGATION

3. The board of investigation:
 - a. [Name excised], Operations Officer, UN MAC HQ Sarajevo.
 - b. Capt. [name excised], Contracts Officer, UN MAC HQ Sarajevo.
4. The investigation board arrived at the [Demining group] facility at Luke at approximately 10h45 04 September 1997. Persons who had been present on the demining site at the time of the accident were made available for interview at this time. [Victim no.2], the deminer who was injured in the accident was interviewed in hospital later.
5. The board collected prepared written statements and conducted separate interviews with several of the individuals who had been involved in the accident. A model of the accident site was used to aid the interviews.
6. Following the interviews, the board visited the local hospital to view the body of the deceased, [Victim No.1], to note the extent and details of his injuries.
7. The board visited the site of the accident and was given a detailed briefing by the team Leader, [name excised]. Photographs of the task site and the scene of the accident were taken. The board concluded this preliminary investigation at approximately 15h00.
8. [Name excised] and Capt. [name excised] interviewed the injured deminer, [Victim no.2] 09 September 1997 at the military hospital at Sokolac.

SITE

9. The accident occurred at Grid Reference CP 409294, in the Cajnice municipality in Republika Srpska. The site is approximately nine kilometres south east of Gorazde. The area is a former confrontation line. The task site is on a wooded embankment along the side of a road. Refer to attachments H and I.

10. UN MAC does not hold minefield records for this site. Local intelligence gave most of the mine indications during survey of this area and when work began PROM Anti Personnel mines were discovered.
11. The location where the accident occurred is approximately 120 metres west of the task site Control Point. A safe lane was being established parallel with the main roadway. At the point where the accident occurred, the safe lane was following a narrow track. A discernible pathway was about three metres to the left of the safe lane and about two metres higher than the safe lane at the point of the accident. Bushes and foliage on the ground are fairly dense and this makes the task of looking for mines difficult.
12. Despite the difficulty of demining operations in this area, the layout of the site was good, marking was clear and the site was well maintained.

GEOGRAPHY

13. The area is mountainous. The task site is on the West side of the Janjina brook valley. Toward the brook is meadow with trees and scrub. To the west of the valley is a steep wooded hillside, along which winds the main roadway between Cajnice and Gorazde. The hillside is wooded with trees and bushes. The slope is very steep and varies between open and thickly bushed area. This area is difficult for demining operations.

TASKING

14. The Republika Srpska PIU, on a project funded by the World Bank, contracts [Demining group] for demining operations in this area. The objective of this task was to clear a track that leads through the forest. The conduct of the task was to establish a safe lane, and at regular intervals, establish lanes to the left, up the embankment, to allow access for further survey by dog teams.

SUPERVISION

15. The Team Leader, [name excised] was supervising the team at the time of the accident. The PIU monitor was also on the site at the time of the accident.
16. The two-man team involved in this accident had been working as part of [name excised]'s team for one day only. They had been drafted in from another [Demining group] team.

COMMUNICATIONS

17. The [Demining group] team had radio communication from the site to the [Demining group] regional office in Luke and [Demining group] head office in Brus. These communications were used to inform the office in Brus of the accident.

MEDICAL

18. The Team's medical officer, Ms [name excised] was approximately 120 metres from the accident and administered first aid immediately after the explosion.

THE MINE

19. The mine in this accident was a PROM-1PK. Identification was determined after excavation of the crater. The mine is a variant of PROM 1 with the following characteristics.
 - a. Weight: 3kg
 - b. Type: Bounding Fragmentation
 - c. Explosive: 421g TNT/TETRYL
 - d. Bounding height: 70cm
 - e. Fuse: Tripwire and Pressure
 - f. Killing Radius: 40m
 - g. Bounding charge: 3g Black Powder

KIT AND EQUIPMENT

20. During the interview in hospital, [Victim No.2] stated that each member of the team was wearing protective clothing. The deminers were wearing protective visors but not helmets. During the changeover drill between the two deminers just prior to the accident, the team

had exchanged leg protection. At the time of detonation (the deceased) was wearing the leg protectors.

21. On examination of the protective suit of the deceased, it was noted that the groin protector was perforated in two places and there was no neck protector attached. There were no shrapnel markings on the visor.
22. A machete, a prodger, a bayonet and a mine detector were observed by the investigation board at the accident site. No tripwire feeler or shears were used by the demining team immediately prior to or at the time of the accident.
23. Medical equipment and an ambulance were available on the site at the time of the accident.

ACCOUNT OF ACCIDENT

24. This account is assembled from statements and interviews taken from witnesses.

On 03 September 1997 at approximately 09h40, a two-man demining team, consisting of [Victim no.1] and [Victim no.2] were working in a clearance lane when they discovered and disarmed a PROM 1PK Anti Personnel mine. This was not reported to the team leader until afterwards. The team leader, [name excised], states that when he learned of this, he was concerned and had corrected the men and advised them of proper procedures; that the team leader had to be notified on discovery of a mine as he was the only one who could direct action to be taken. The team leader had warned all members on the site be vigilant and to be especially aware of PROM type mines in the area.

25. At approximately 12h40, the same two-man team was working at the end of the safe lane. The Team Leader decided that this was an appropriate place to establish a clearance lane up the bank to their left side. The Team Leader met with the team at the end of the safe lane and discussed the approach and exact location of the new lane. The new lane would be up a steep bank, crossing a small pathway about three metres from the safe lane. The new lane would take them past a small, dense bush. The team leader states that he told the deminers to be careful when working in the area of this bush.
26. After the Team Leader had moved away the demining team carried out a changeover drill prior to starting the new clearance lane. [Victim no.1] (deceased) was now in the number one position and [Victim no.2] moved to the number two position. [Victim no.2] passed lane marking material and leg protection on to [Victim no.1].
27. As [Victim no.2] was moving away from the uncleared area [Victim no.1] asked him for the machete. [Victim no.2] returned and gave [Victim no.1] the machete. After handing over the machete [Victim no.2] turned to move away again. [Victim no.2] was approximately five metres away from [Victim no.1] when the explosion occurred.
28. The team leader was about 30 metres away at this time and rushed to the site where he found [Victim no.2] crouched on the ground, cradling [Victim no.1]. The dog handler, [name excised], arrived to give assistance and the Team Leader went to assist the medic to the scene. The Team Leader then went to the Control Point to coordinate CASEVAC.
29. The injured [Victim no.2] was assisted from the scene and evacuated to Cajnice hospital. Approximately two-and-a-half hours later, the body of the deceased was moved to the hospital.
30. [Name excised] sealed the site; all was left in place for the investigation team.

INJURIES

31. The deceased was ascertained to be dead by the medic on site after checking for a pulse, breathing and listening for a heart beat. From the viewing of the body, it was noted that the deceased had a wound in the left and right hand side of the chest, the left side of the neck, and the right leg.
32. The injured person had a cut to his jaw on the right side and two wounds in the right leg.

CONCLUSIONS

33. The team was working in a minefield known to contain bounding fragmentation mines (PROM). This information was known from local intelligence and the fact that at least two PROM had already been found. Photographs of these mines are in the photo file attached.
34. According to shrapnel found on the accident site, the detonated mine was a PROM bounding fragmentation mine.
35. It is probable that [Victim no.1] was using the machete at the time of the accident. The mine may have been activated by the deminer taking hold of the vegetation to cut it or by a striking action of the machete.
36. The deceased was wearing his issued fragmentation jacket at the time of the accident. This type of fragmentation jacket is normally issued with a removable collar, which is designed to protect the wearer's neck. [Victim no.1] was not wearing this removable collar; therefore his jacket was incomplete. Shrapnel perforated the protective suit in at least two places.
37. The injured team member was not outside the required safety distance from the working deminer.
38. The team was not using a tripwire feeler. They were relying on visual inspection and mine detector to find trip wires prior to advancing or clearing brush. A machete was being used to cut brush.
39. Incorrect changeover drills were being used when number one started to work before the number two was out of the danger area.
40. The two-man team involved in this accident had recently been moved to the group and had worked under the supervision of [name excised] for one day only. The disarming of the PROM earlier in the day without following proper procedures and the improper procedures noted above indicates that this two-man team were either undisciplined or unfamiliar with proper drills.

RECOMMENDATIONS

41. When working in areas where there are fragmentation mines, it is recommended that a helmet with visor be worn. If so equipped, the collar should be worn with the flak jacket.
42. Demining teams should be equipped with the correct tools to carry out demining tasks. This should include tripwire feeler, metal detector, and prodder.
43. Only horizontal cutting tools should be used to clear undergrowth or foliage. No vertical cutting tools or striking tools should be allowed into clearance lanes.
44. Team Leaders are responsible for ensuring that teams are properly equipped for the task.
45. The changeover procedure between deminer number one and deminer number two should be carried out as a drill. Number one should brief number two on exactly what he has done and to which point the working lane has been cleared. Deminer number two is to be outside the danger area before deminer number one commences work in the clearance lane.
46. When a new clearance lane is started, the Team Leader should fully brief the two-man demining team to ensure that they know precisely what is expected of them.
47. New members to a team should be briefed by the Team Leader about procedures and safety issues with particular attention to detail. The team leader must not assume that new members to a team will work in the same way as existing team members. If necessary, new members should work with other members of the team until they are familiar with and follow all standard procedures.

Signed: UNMAC, UNMAC Contracts Officer