

DDAS Accident Report

Accident details

Report date: 19/05/2006	Accident number: 352
Accident time: 12:50	Accident Date: 05/08/1999
Where it occurred: Nr Vidovic village	Country: Bosnia Herzegovina
Primary cause: Management/control inadequacy (?)	Secondary cause: Field control inadequacy (?)
Class: Detection accident	Date of main report: 11/08/1999
ID original source: EB/NH/DG/SD	Name of source: BiH MAC
Organisation: Name removed	
Mine/device: PROM-1 AP Bfrag	Ground condition: agricultural (abandoned) bushes/scrub grass/grazing area
Date record created: 21/02/2004	Date last modified: 21/02/2004
No of victims: 1	No of documents: 1

Map details

Longitude:	Latitude:
Alt. coord. system: GR CQ 20608440	Coordinates fixed by:
Map east:	Map north:
Map scale: 426-1	Map series: M 709
Map edition:	Map sheet:
Map name:	

Accident Notes

vegetation clearance problem (?)
mechanical follow-up (?)
mine/device found in "cleared" area (?)
pressure to work quickly (?)

Accident report

The following is the MAC's Accident report, edited for anonymity.

INTRODUCTION

- 1) As a result of an explosive accident on the morning of 5 August 1999, a Board of Inquiry was convened by the Bosnia and Herzegovina Mine Action Centre to conduct an investigation on behalf of the State and Entity governments, in accordance with the BH MAC National Technical Guidelines. The verbal report of the accident was received at the BHMAC at 1330 hours on 5 August, the official written report had not been submitted at the time of writing this report.
- 2) The accident involved one deminer working as part of the [Demining group] organisation during mine clearance operations at Vidovice, near Orasje. The task was to clear a large area on the side of a river embankment near the River Savo. The police undertook an investigation on the afternoon of the 5 August.
- 3) The Board of Inquiry members were:
 - a Chairman - Technical Advisor to Commission for Demining
 - b Member - Head of the Co-ordination Office BH MAC
 - c Member - Technical Advisor, Co-ordination Office BH MAC
 - d Member – Inspector, RO Tuzla
 - e Observer - Team Leader, [Demining group]
- 4) The team met at 0900 hours on the morning of 6 August at Tuzla and proceeded to the accident area. The writing of this report was delayed in order to include information and photographs from the local police and the [Demining group] and clarification of several aspects of the accident data.

A copy of the Board's Terms of Reference is at Annex A.[Not made available.]

SEQUENCE, DOCUMENTATION AND PROCEDURES OF TASKING

- 6) The [Demining group] was awarded a commercial demining contract by the Federation PIU, utilising donations channelled through the International (Slovenian) Trust Fund. The [Demining group] demining team was on an authorised task assigned to them by PIU. The task Red Folder, MAC ID number of 10,125, was received by the PIU and given to the [Demining group]. Work started on the site on 7 June 1999. The [Demining group] demining team has remained on this site since that time.
- 7) On the morning of 5 August 1999 the complete [Demining group] demining team, consisting of the Team Leader nine deminers, (one deminer was sick), one ambulance driver, one medical orderly and the PIU monitor, had been woken at 0620 hours in their accommodation which was approximately 3 kilometres from the site.
- 8) On arrival at the site at 0700 hours the Team were given a formal Safety Brief and works instructions in accordance with normal works procedures, they then checked equipment, tested their metal detectors and were ready to start work at approximately 0715 hours.

GEOGRAPHY and WEATHER

- 9) The accident occurred some 240 metres from the Control Point (CP) and approximately three (3) Kilometres from the village of Vidovice. The site Reference Point is located at Grid Reference CQ 20608440, Map Sheet 426-1 series M 709. Annex B contains a general map of the site and location of the accident. [Not made available.]
- 10) Access to the site is good with a tarmac road from the village to within a few hundred yards of the site, from there a firm un-surfaced track leads to the CP. The track forks at this location one part is a 'service' road to agricultural areas and the second part leads to the river embankment. At the junction with the embankment the track again forks, acting as a route along the top of the embankment. This track is again firm but un-surfaced.
- 11) The task was to clear one side of the embankment and around 15 to 20 metres of the base area, along a site that stretches for some kilometres. The lower part of the site is flooded during winter, with the embankment preventing inundation of the agricultural areas by

floodwater. The team had previously utilised a vegetation-cutting machine on the lower section and the side of the embankment, enabling the team to conduct clearance in conditions that met the category criteria.

- 12) The site was believed to have been mined by the VRS during the war. While cutting vegetation four PROMs were activated, other mines were found during clearance operations.
- 13) The accident site was approximately 17 metres from the embankment track.
- 14) There is no information of any previous clearance tasks being undertaken in the immediate area.
- 15) The weather on the day of the accident was bright and very warm.
- 16) Photographs of the site are at Annex C.

SITE LAYOUT and MARKING

- 17) A detailed plan of the accident site is shown at Annex D. [Not made available.]



[The picture above shows the start of the accident lane and the vegetation being cleared.]

- 18) The marking was adequate and in accordance with SOPs, it clearly identified the cleared and un-cleared areas.

SITE SUPERVISION and DISCIPLINE

19) The [Demining group] demining team had only two levels of supervision, consisting of the Team Leader and Deputy Team Leader. They are supported by a medical orderly and there is a full time PIU monitor on site. The Section all attended the morning briefing on 5 August 1999. Site supervision is the responsibility of the Team Leader. Additional technical and managerial support is provided by the [Demining group] staff, but details of site visits were not recorded by the Board. In addition the Federation MAC inspectors from the RO Tuzla office and the PIU Supervisor visit the sites on a regular basis.

20) The Federation MAC inspectors visited the site on the 10, 21 and 25 June, 5, 21 and 26 July and 2 August 1999. The inspection reports are attached at Annex E. [Not made available.]

21) The spacing of the teams was in accordance with SOPs and the site threat, with all team members separated by a minimum of 50 metres, this created a problem as the site was extended over a distance of more than 500 metres.

22) A static medical area was located at the CP, the medic was at the CP at the time of the accident and was able to move quickly to the accident location.

QUALITY ASSURANCE

- 23) Internal Quality Assurance is undertaken by the Team Leader and the PIU monitors, however neither could supply any documentation to indicate that QC inspections had been undertaken. In addition the Federation MAC inspectors undertook formal inspections of all sites, but records of inspections did not include reference to QA/QC by use of prodder, detector tests, or reference to productivity.
- 24) Several faults had been noted on these inspections, which in the opinion of the Board of Inquiry were the result of management failure at several levels, these include:
- a Lack of sufficient supervisors/managers to supervise the ten deminers over the length of this site, more than 600 metres.
 - b The Team Leader, the senior supervisor, was not on the work site at the time of the accident, having just left to go to the CP. The Deputy Team Leader was believed to be in the middle of the site area.
 - c The PIU monitor allowed productivity that is considered to be excessive to continue.
 - d RO MAC inspectors, knowing that the site may have been dangerously over productive, did not note this on visit reports or write a formal letter to the company and the PIU stressing the possibility of unsafe practices and poor quality. The productivity was so excessive that the RO Inspectors should/could have closed the operation on this factor alone.
 - e The SOPs agreed as part of the accreditation process were not the SOPs in use on the site. The site SOPs did not require the removal of metal contamination. There was no evidence of any excavation anywhere on the site and there were no fragmentation piles. This unusual practice was not identified by the PIU monitor.
- 25) Reports of the RO MAC inspections are attached at Annex E. [Not made available.]

TASKING, REPORTING and COMMUNICATIONS

- 26) The [Demining group] had received instructions from the PIU Director and Supervisor to undertake this task and received the Red Folder in early June 1999. The task was planned and the Section started work on the 7 June 1999.
- 27) The team work to a strict timing system. Start work at 0715 and work for 30 minutes, break for 15 minutes and continue this pattern until around 1000-1015 hours when a 30-minute break is given. The team then continues with 30 minutes work and 15 minutes break until 1300-1315 hours.
- 28) Reporting is undertaken on a daily basis by the PIU Monitor. Weekly reports are prepared by the [Demining group] and sent to the PIU Supervisor. Examples are attached at Annex F. [Not made available.]
- 29) Communications on the site are by hand-held radio, two radios are with the deminers at each end of the 600 metres demining team line, the Team Leader and Deputy Team Leader and the Medic. There is no immediate communications system with any other organisation off site, including the [Demining group] Company. Reports to Sarajevo and the [Demining group] in Croatia are made via the national telephone system.

MEDICAL

- 30) The deminer involved in the accident was killed instantly. He was taken to the morgue and an autopsy undertaken. The autopsy report is at Annex G. [Not made available.]
- 31) The mine is a multi-directional, fragmentation type, on detonation it releases hundreds of metal fragments. The deceased deminer had lost both legs, the left up to the knee and the right up to thigh and the lower left arm from the elbow. In addition there was massive fragmentation damage to the head and lungs with less severe damage to the stomach. The metal detector was also totally destroyed.

PERSONALITIES INVOLVED and EXPERIENCE

- 32) The Team Leader and the PIU Monitor. The other personnel involved in this task are:
- a Deputy Team Leader
 - b Deceased Deminer
 - c nine x Deminers
 - d Medical Orderly
 - e Driver

33) All the deminers were formally trained in 1997 by [another demining group] and undertook demining activities from July to Oct/November 1997. It is not clear where the deminers were employed until the team started work with [Demining group] in June 1999. The [Demining group] conducted pre-contract training with the team prior to starting this contract.

34) In the period 3 June to 5 August (the date of the accident) the Vidovice team of between 10 and 17 deminers had cleared more than 72,000 square metres of land manually, working behind an MV2 vegetation and threat reduction machine. In that time, (12) AP mines and (1) other munitions were located and cleared.

EQUIPMENT and TOOLS

35) The equipment and tools used by the team consist of metal detectors, (this site had Vallon 1620 model metal detectors which it had been using since the start of the contract), prodders, trowels, shears, helmets with visors and protective jackets. The ground preparation machine was an MV2 vegetation cutting machine manufactured in Croatia.

DETAILS OF THE EXPLOSIVE ITEM

36) The item that caused the fatality was a PROM AP mine, designed to be activated by tripwire or by pressure on the prongs of the fuze. The mine was buried and it was the opinion of the Board, based on the hole and depth of the recovered base-plate, that the mine had been laid in accordance with standard JNA policy. This means that the mine was probably buried with the mine body in the ground and only the fuze above ground level. The Board was unable to sweep the surrounding areas therefore it was not able to establish if the mine had a tripwire attached. There are several models of PROM, some have a tether cable which dictates the distance that the bounding mine will travel upwards before activating the main fuze and charge, these can be 0.70 to 0.80 cms long. The later model of PROM has a cable length of 0.20 to 0.30 cms.

37) The Vidovice Police conducted an investigation on the site on the day of the accident, the base plate was recovered for them by a specialist deminer before the arrival of the Board. Formal confirmation of the model of PROM has still not been received.

EVIDENCE of MINING/REMINING

38) There was no evidence to indicate that remining had occurred.

DETAILED ACCOUNT of EVENTS on 5th AUGUST

39) The day's events were

0620 hours. The Vidovice team was woken.

0700 hours A detailed safety brief was conducted on the site and daily instructions given.

0715 hours. The team started work and worked 30 minutes followed by 15 minutes break until 1000 hours when a 30 minute break was taken. After this the team continued to work 30 minutes and break for 15 minutes until the time of the accident at approximately 1250 hours.

1245 hours Team Leader leaves the site and walks towards the CP

1250 hours. The Team Leader was within 80 metres of the CP when, at around 1250 hours, an explosion occurred in the nearest lane to the CP. This was 10 minutes before work was normally stopped.

1330 hours. BHMAC notified of the accident by the PIU Site Monitor.

ADDITIONAL SITE INVESTIGATION INFORMATION

39) The site appears uncomplicated and the basic format is simple. The safety lane is a 5 metres wide firm, un-surfaced path along the top of the river embankment. The site task was to clear the river embankment and an area of land beside the river, this varies in width but at the accident location it was around 15 to 20 metres wide. See site sketch at Annex B. [Not made available.]

40) The MV2 vegetation and threat reduction machine had activated 4 PROMs during the vegetation-cutting phase. During the previous two months the deminers had found a further 8 AP mines. The ground conditions after the machine had been used were such that, in some locations, it was difficult for a mine detector to be used close to ground level because of the height of the residual stubble. Comments made to the Board members by personnel on site gave the impression that deminers believed that the MV2 machine would have detonated any PROMs in the area where it had worked.

41) It is certain that the deminer activated the mine, how this occurred cannot be confirmed because of limited information. The Board considered that one of the possible options was activation of the fuze by the metal detector head pushing the top of the fuze prongs. It is also possible that the deceased deminer set the mine off with his leading foot. However, the pattern of injury seems to indicate that the deminer was crouched over and took the full force of the blast in the face, upper torso and legs, the crouching position and the PPE partially protecting the mid-torso.

42) The autopsy report and the photographs clearly indicate that the mine activated immediately in front of the deminer. These photographs have not been included in this report but have been added to the accident file.

43) The management on this site was poor, there was insufficient managerial staff for this number of deminers on a site which required excessive distances between deminers due to the threat of fragmentation mines. The deminers were relatively inexperienced and this, coupled to the other factors, clearly necessitated additional management staff.

44) The PIU monitor allowed excessive productivity to continue unchecked. There are no records to indicate that QA/QC checks were undertaken by the Team Leader or Deputy Team Leader, PIU monitor or the RO Inspectors from Tuzla. All of these levels of management and QA have a responsibility to address QA/QC and any issues impacting on safety. See Annex F. [Not made available.]

45) The SOPs shown to the Board at Vidovice stated that the team did not have to remove metal fragments found on the site. The SOPs presented and approved for accreditation clearly state that all fragmentation must be removed

ADDITIONAL OBSERVATION

46) The inspectors do not seem to have the authority to stop work where breaches of safety procedures have occurred, either due to a lack of technical ability or lack of a legal statute. It is recognised that inspectors should not be able to stop work for minor infringements, but major breaches of SOPs must be stopped immediately. If it is advisable to endorse the power of the inspectors to close a site, the Regional and EMAC HQ must be prepared to respond immediately to any unfavourable reports in order to ensure full compliance with safety and quality issues.

SUMMARY

47) This accident occurred because the deminer activated a PROM mine, it is not possible to prove how the fuse was activated. Contributing factors which could have created the environment for this accident were poor management on the site at several levels, excessive productivity, lack of authority of the MAC inspectors, no removal of metal contamination and a possible over-confidence in the performance of the machine.

CONCLUSIONS

48) In view of the fact that the deminers on the site were consistently exceeding established productivity rates by an excessively large amount, it is the view of the Board that the excessive operating speed was the major contributing factor.

49) The responsible elements of the team, company and PIU Monitor all failed to conduct proper QC functions. This would have clearly identified that this team was not only conducting operations too quickly but the faults found also indicted a lack of site management control which would eventually lead to an accident.

50) The PIU Monitor did not address issues of quality and safety in a professional manner and due to his lack of control allowed the team to continue to function in a manner that was unsafe.

51) The RO MAC inspectors, although clearly concerned about the management of this site, did not write formal complaints or take firm action to ensure that the company corrected the manner of operations.

52) That the company has allowed SOPs to be used on the site that are not in conformance with those utilised and agreed as part of the accreditation process, illustrates another lack of a firm quality assurance and quality control policy in the company.

RECOMMENDATIONS

53) Based on the investigation the following recommendations are made:

a The SOPs used on site must be the SOPs which have been presented and approved for accreditation, any amendments to SOPs must be authorised and distributed to all sites promptly.

b Additional site management is required. In addition the Team Leader with site control responsibilities should be relieved of the management of issues that are non-operational in order to concentrate on operational matters.

c Based on the fact that the Vidovice team have had little experience since undertaking training in 1997 and over the last few months have only been on one site that contained only a few explosive items, it is recommended that refresher training and operational tasking with personnel who have extensive experience would considerably improve operational, quality and safety awareness.

d This team should undergo retraining, only after this re-training period should they be allowed to recommence clearance operations.

e The PIU must ensure that all monitors are capable of implementing the BHMACH standards for safety and quality. Issues such as productivity must be checked daily as part of the QC functions of the monitor and the PIU Supervisor.

f EMAC inspectors must formally address any safety issues, especially productivity, with the company undertaking the work and the contracting organisation. In the event that unsafe practices are being undertaken the inspectors must be capable of stopping work until their Regional Office or the EMAC HQ resolves the issue.

g This report should be handed over to the local police to support the police investigation.

Signed: all BOI members and one [Demining group] observer

Victim Report

Victim number: 449	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	Protection used: frag jacket
Helmet	
Short visor	

Summary of injuries:

INJURIES

severe Chest

severe Face

severe Head

severe Legs

FATAL

COMMENT

The victim died immediately. No medical report was made available

Analysis

The accident is classed as a "*detection accident*" because it seems that the Victim had his detector in his hand at the time [although he may have activated the mine with his foot].

The primary cause of this accident is listed as a "*Management/control inadequacy*" because it seems that the QA monitors should have stopped work because it was being carried out improperly prior to the accident. The secondary cause is listed as a "*Field control inadequacy*" because there were not enough field supervisors and the decision they made NOT to cut back the stubble further may well have caused the accident.

The accident report did not record the protection used at the time of the accident, or detail the injuries suffered by the Victim. This is unusual for the MAC in this theatre, but the information may have been in the missing annexes.

The demining group did not react to the recommendations of the report and left the site with mines on it when they moved on. An accident involving a civilian and a PROM-1 occurred at this site on 10/10/99 [after "clearance" was completed]. This implies that the MAC's management systems were not working adequately.