

DDAS Accident Report

Accident details

Report date: 17/03/2004	Accident number: 341
Accident time: 08:30	Accident Date: 29/08/2000
Where it occurred: Jahorina, Palosevina	Country: Bosnia Herzegovina
Primary cause: Field control inadequacy (?)	Secondary cause: Field control inadequacy (?)
Class: Excavation accident	Date of main report: 01/09/2000
ID original source: AS/AA/BK	Name of source: BiH MAC
Organisation: Name removed	
Mine/device: PMA-3 AP blast	Ground condition: grass/grazing area metal fragments pylons and surrounds rocks/stones
Date record created: 21/02/2004	Date last modified: 17/03/2004
No of victims: 1	No of documents: 2

Map details

Longitude:	Latitude:
Alt. coord. system: y= 44785 x=42473	Coordinates fixed by:
Map east:	Map north:
Map scale: JNA 526-3-1	Map series:
Map edition:	Map sheet:
Map name: 1.25.000	

Accident Notes

visor not worn or worn raised (?)
protective equipment not worn (?)
squatting/kneeling to excavate (?)
metal-detector not used (?)
mechanical follow-up (?)

Accident report

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

INTRODUCTION

Due to demining accident that occurred on August 29th 2000 on Jahorina mountain (location Palosevina), one of the [Demining group] deminers, [the Victim]. Due to this accident, BH MAC Director convened a Board of Inquiry in order to conduct an investigation and stating the circumstances of how the accident occurred.

The Board consisted of:

Chairman – Coordination Department, BH MAC

Member -RO Sarajevo F MAC

Member -RO Pale RS MAC

The [Demining group] organisation provided BH MAC the information on the accident August 29th 2000 by phone, while the Initial report was submitted the same day at 09.00 hrs.

In compliance with the BH Standard, Board of Inquiry gathered at the place of the accident at 11.30 hrs. Upon arrival on the site, the Bol had a short briefing with the director of the organisation, as well as with the team leader, group leader, monitor and deminer No 2. Bol as well gathered all the written statements of the personnel involved.

SEQUENCE, DOCUMENTATION AND THE PROCEDURES OF TASKING

Pale municipality and the Jahorina Olympic centre requested the demining at the mentioned location, in order to conduct the reconstruction of the power lines that are set from the direction of Dvoriste location.

After general survey was conducted by the Entity MAC of RS, it was assigned its ID No Jahorina –Paloševina 1000277. The map where the site is marked is JNA 1:25.000, sheet 526-3-1, grid references of the datum point x=42525 and y=44805. The task was financed through the International Trust Fund. The [Demining group] organisation that was assigned with this task started work on July 18th 2000. Integral demining was used during the conduct of clearance (mechanical preparation of the ground, manual operations and the use of EDDs.) Mechanical preparation of the ground has been conducted at a larger part of mined area, which was marked as mined, and of high risk. Mechanical preparation did reduce the mine threat and enabled the use of EDDs on the area. Since there are steep rocky slopes on the site as well as areas covered with rocks due to NATO bombing of the former radar objects of VRS (former JNA facility), these parts could not have been mechanically prepared. Three demining teams were included in demining within this task.

There is a sketch of the minefield in the Red Folder as well as the interview with the participant of war, [name excised] who was a member of the engineering unit of the VRS. She participated in mining a part of Jahorina Mountain. Relying to her memory, she showed a part of the mined area.

Minefield was laid by the VRS in 1992 in order to protect the radar facility that was treated it JNA documentation as 'facility No 5' (0-5).

General Survey report is given as annex D to this report. [Not made available.]



[The accident area is shown above.]

GEOGRAPHY AND WEATHER

The area where the task is (the peaks of Jahorina mountain), the area is mild slopes without too much high vegetation. The ground is covered with dense and harsh mountain grass, which is not too high, so the use of the vegetation cutting tools was of a minimum. There are not many trees and the existing ones are rather low, due to heavy winds and sharp winters. Stones are protruding the surface of the task area at certain parts, so it was hard to use the prodder at all places. There is a part of the task area (especially the steep part to the West), which is not shown as mined at the sketch and which is full of rocks fallen over from the bombing. This can be easily seen on the photographs provided in Annex E. [The Annex was not made available but some of the pictures were.]

This area is not inhabited, but it has abundance of healthy herbs during the summer period. It is as well very suitable for the stock due to quality grass during spring, summer and autumn. One of the accidents that happened a year ago on Jahorina was due to bringing the stock to be fed.

To the East of these peaks, the most distant poles for the power lines and Jahorina Olympics ski-climbing facilities are located. There is not much possibility of activating a mine in this area during winter and early spring due to great quantities of snow that practically covers the whole mountain.

Since the task site is located very high (1900 m), it is very suitable for demining during summer period.

The safe area for this task was supposed to be the part that fenced around the military facility, being a part of the facility. This is the place where the teams established their Control Points and other designated areas. A part of this fence was broken during the bombing, but the parts of poles and the barbed wire can still be seen. According to the incomplete sketch, the suspect and mined area is the one leading toward the fence, from all the sides except from the East, which leads the access road from Pale. There is a damaged water tower in the very vicinity of the task site where team S-1 worked, which is within the safe area of the 0-5 facilities. At the same location there are two craters as a result of NATO bombing. One is just above the left box marked for the use of EDDs. There is a line of fence leading just above that crater (the part of the fence that is damaged – shown on photographs at Annex E).

THE PRIORITY OF THE TASK

The priority to this task was issued because of the needed reconstruction of the power lines, in order to re-settle the winter sports facilities on Jahorina, that would then enable the need electricity for both the tourism and the refugees from Sarajevo that are located on Jahorina mountain.

The RS MAC upon the request provided by the Pale municipality set the priority to this task and Jahorina Olympics centre. As stated above, it is for the reconstruction of the part of the power lines leading from the direction of Dvoriste, which were damaged during last winter. It

supplies the electricity for the power stations for Jahorina facilities and further on over Jahorina Mountain.

The reality of the priority for the task is the safe power supply for both winter tourism, facilities in which the Serb refugees from Sarajevo are settled (hotels 'ator' and 'Jahorina' and the surrounding weekend houses). It is also for the knowledge of the real mine threat and the surrounding military facilities, since there were two civilian and two mine accidents at this site already.

TASKSITE LAYOUT AND MARKING

The task site layout is done in accordance to BH Standard and the SOP of [the Demining group] organisation. The administrative area is shared for all the three teams. It is within the natural shelter (the peak of a slope with a small valley inside). The administrative area is accessible from the S/E side, leading into the ring of the safe and fenced area of the O-5 military facilities. (Sketch provided in Annex E).

Control point of every team is located within the administrative area. There are also parking lots, medical areas, areas for equipment, rest areas as well as the area for daily EDD check (10x10 box). Explosives storage is located in a bunker 50 m away from the other areas, while the latrines are located to the East, in the part of the facility that was bombed. Access areas are over 50 metres long, which is very satisfactory for the natural shelter of the administrative area. The testing of detectors is conducted prior to commencement of works and after the team leader replaces the batteries. This is documented in the form attached as annex F. While-on-working-check is conducted by the deminer, using the test piece in which the fuse of UPMAH-3 is placed. Every two-men team is placing it for the check in the safe part of their working lane.

Marking of the task site area is conducted correctly. Access lanes are 2 metres wide and marked with 1.2 or 1.5 m high, of a maximum distance of 6 metres, from administrative area to the safe area and area cleared so far. There are clear borders between the safe (cleared) and unsafe areas. Working lane between two boxes where the accident occurred is marked with pickets and attached with the tape at the ground level. Locations of mines found so far at this site are properly marked with yellow tipped pickets, so it is easy to follow the area of the ring that was mined outside of the military radar facility (O-5).

The task site layout is in absolute compliance with the requests set in BH Standard and the [Demining group] SOP.

SUPERVISION AND DISCIPLINE ON THE SITE

The leader of the Sierra team (S-1), was the immediate supervisor to the team, experienced and able organizer of the tasks, included in demining from 1966.

The Group Leader was performing a higher level supervision. He filled the report on his visit and quality control to this team on August 22nd 2000.

[Name excised] was the external supervisor for the contractor, from the [name excised] monitoring organization. He was monitoring the two teams working (team S-1 and C-1).

QUALITY ASSURANCE

Apart from the team leader who is constantly in charge for the QA of the team's work, the group leader who is immediate level of supervision to the teams performed the same function on the site. According to his function, he is conducting the internal QC along with the QC officer of the organization. According to the requests from the SOP, QA officer has visited the site once in 7 days (August 18th 2000). This visit is documented on Internal Quality Control Report, and is left for the review of RS MAC inspections and to the team leader for realization.

RO Pale inspectors were visiting this site in compliance to BH Standard. The last visit that is documented was on August 21st 2000.

Since the task is opened on July 18th, total of 10 RO MAC Pale inspections were conducted over three teams (S-1, C-1 and C-2).

Regarding the internal and external quality control as well as monitoring, there were no breaching of the procedures on the site.

The approved copy of [the Demining group] SOP was available on the site.

COMMUNICATIONS

Both HF and VHF communications were used during the conduct of this task. Every team apart from this had a mobile phone. Communication system is in absolute accordance with the requirements of the SOP. The optical distance between the Operational Centre and the site is about 10 km, so the hand-held Motorola VHF radio device was sufficient for maintenance of communications within the team, amongst the team and towards the Operational Centre.

The communication was maintained by the medic, truck driver for shared equipment of all the three teams, as well as team leader if on Control Point.

Operational Centre was informed about the accident by the group leader, using the VHF hand-held GP-300 radio.

MEDICAL COVERAGE

By the very Control Point, within the safe zone, there are three medics with their vehicles and equipment needed for every team. Such medical coverage complies with BH Standard requirements entirely and is justified from the mine threat aspect on this task.

S-1 medic and C-1 medic provided the first emergency aid within the safe area which the injured deminer reached himself. He left the working lane with the help of deminer No 2.

On activating the mine PMA-3 with the prodder, the deminer had no helmet with the visor on his head. Therefore he suffered injuries to his left eye and scratches from the soil and stones moved by the explosion blast. Compress pad was put on his left eye and his head was bandaged too. The injured deminer had no other visible injuries and he was totally aware while going with the medic to the Kasindol hospital immediately after the accident. He reached the hospital within 45 minutes. After the medical aid was provided to him from the specialist doctor, he was forwarded to a higher medical facility in Belgrade (Military Medical Academy) due to further medical treatment of his eye that was injured by the blast.

When we arrived on site for the investigation (11.30 hrs), we were informed that the injured had left for Belgrade with medical vehicle from Pale medical facility.

Operational Centre of the organisation had informed the Kasindol hospital about the accident so that the injured can be treated and further forwarded if needed.

PERSONNEL INVOLVED AND THE TEAM'S IDs

This demining operation at this task consisted of three [Demining group] teams working (S-1, C-1 and C-2). The team where the accident occurred is Sierra 1 (S-1) consisting of the following employees:

the team leader,
deminer and the deputy team leader,
6 x deminer
5 x dog-handler
medic.

As a monitor on behalf of the contractor in order to review the procedures of the contract, there was [Name excised], who was as well monitoring the C-1 team that worked along the S-1 team.

Written statements were taken from all the personnel who were included in this accident. They are attached as Annex C of the report. [Not made available.]

The Board of Inquiry has not talked either to the injured deminer or any of the medic staff except for the team medic, so there were no actual information on the situation and the probable length of medical treatment, since the injured was almost immediately forwarded to Belgrade MMA.

Copy of deminers' insurance is given in Annex G. [Not made available.]



[The Victim's long prod is shown above - in the blast crater.]

TOOLS AND EQUIPMENT

Tools and equipment used by the team consisted of:

EBEX 420 PB metal detector,

Prod

Spade.

Shears,

Helmets with visor and protective jackets.

Prior to the commencement of the task, each two men team along with the team leader conducted the detector check while the results of possibility of locating UPMAH-3 fuse were imported into file required by their SOP. Detector was found in the lane and was tested by the Board of Inquiry. It has been proved absolutely operational. While checking the stated working lane, it has been confirmed that the lane was metal-contaminated (probably the bombs shrapnel). The detector could have checked only 20% of the ground. Upon arrival of the Board, the C-2 team was required to once again clear the critical lane with their team leader in order to investigate the actual place of the accident, check the crater, type and possible position of the activated mine.

Prodders used by the members of the team are in compliance with the requirements of BH Standard. On the day of the accident it was possible to prod with this prod to the depth of 10 cm.

DETAILS ON EXPLOSIVE DEVICE INVOLVED

Explosive device that caused the accident was a PMA-3 mine. The plastic parts of its bottom were found in the explosion crater. The ring-shaped rubber that connects the halves as well as the parts of the plastic ring of the handle with a spring were found to the right side, backwards for about one metre from the crater with the very edge of the left side of the box, which is clearly seen on photos No 7 and 8, Annex E.

According to the parts of the mine found, especially the rubber part, it is clear that the branch of the explosion blast was directed to the face and upper right part of the body towards the shoulder. This is clearly seen on the protective jacket, which was taken off by the medic during providing the first emergency aid. Regarding the very location of the crater, where the soil is in a mild slope, it is possible that the mine in the soil was placed leaned backwards and slightly to the right. From what is stated above, it is probable that the angle of the prod was more than 30° related to the position of the mine. Due to relatively hard surface, the prod was probably harder, with no sense of touching the rubber. That activated the mine. It can be stated that even less force was needed for the activation of the mine since it was laid in the ground and remained there from 1992. According to the data provided on this mine (JNA manuals), it is reliable regarding its primary characteristics for since months if in the ground. Since the mine's top part gets older and stains, the mine is losing its stability. Therefore, less force is needed for the activation of these mines, which was also proved by the mechanical preparation of the ground, when almost 90% of those mines were not activated.

According to the data gathered by the Board of Inquiry that lead the investigation, from the August 23rd to the moment of the investigation (there were no works in this period) i.e. to the August 29th 2000, there were 219 mines found, the following numbers of items:

PMA-1=43;
PMA-3=171 (two of these activated, one in the previous and one in this accident);
PMR-2A=2;
PMA-2=2;
MRUD=1 and
One piece of UXO

EVIDENCE ON REMINING

There is no evidence of remining at the stated location regarding the fact that there were 5 days off, given to the teams because of the accident that happened on the same site August 23rd 2000.

CLOTHES AND PERSONNAL PROTECTIVE EQUIPMENT

The injured deminer was not wearing the minim set, which is the visor, i.e. the helmet with the visor, which he had as a part of his equipment.



The photos of the protective jacket with the traces of the explosion blast are given in Annex E. [The Annex was not made available but some of the pictures were. The Victim's frag-jacket is shown above.]

THE USE OF DOGS

There were five EDD teams within the demining team S-1. The EDD teams were used for the search of the area previously prepared by the machines for mechanical preparation of the

ground. EDD teams were also used for location the first rows of the mines at the task areas that were supposed to be technically surveyed, since the slopes or the contamination with huge rocks prevented the use of the machines for mechanical preparation of the ground. Two EDD teams were deployed to search boxes, while the third EDD team was used as internal quality control or as a substitute for one of the two EDD teams, if shown that some of the EDDs have no sufficient interest for work at a certain day.

On the day of the accident, the EDDs were still not deployed on the task site since the team leader decided that the area around two rock in the lane between boxes need to be checked. (EDDs that were searching the box to the right were working with C-1 team right before the accident that happened on August 23rd – they have been disturbed but haven't located the mine). According to the dog-handlers' statements, the dogs were disturbed when searched the right box from the lane cleared. However, they have only indicated one mine that was later on located in the lower left half of the box.

The place where this mine was found in the box is marked with yellow tipped picket, which is shown on photograph No 4, Annex E. [Not made available.]

DETAILED ACCOUNT OF THE ACTIVITIES ON THE DAY OF THE ACCIDENT

Based on the statements taken from the personnel from the team as well as the details from the team leader's Diary (consisting the activities up to the moment when the accident occurred), the Bol had reviewed the account of activities that went as follows:

07.00 hrs – the team left their base in Brus where they were accommodated. They arrived at the Control Point slightly before 08,00 hrs which is 24 km away. Upon arrival on site, deminers prepared themselves for work as a routine, the team leader is going over the operational part of the site and controls its status in comparison with the previous five days, which is how long the works were stopped due to the previous accident.

Around 08.00 hrs the team leader is conducting a briefing having his focus on the missed mine that caused the previous accident. He briefs about paying lots of attention to the conduct of proper procedures and safety measures, stating that mines that were not activated can even be underneath the big rocks that were covering the pieces of the site, all due to NATO bombing. The team leader was aware all the time about the dogs being disturbed prior to the first accident in the upper part of the right box. Dog handlers notified him that the EDDs were leaving the left middle part to the right part of the working lane, where two big rocks have been located and never moved during this clearance. For this particular reason, a two-men team was assigned with checking the area around these two suspect rocks.

Around 08.10 hrs the communication with the Operational Centre was checked. After the detectors' check, the deminers in two-men teams left for their task. [The Victim] was the first one to work in the critical working lane, while supported by deminer No 2.

At 08.30 explosion was heard and all the works stopped within all the three teams. Emergency first aid was provided immediately and the injured was transferred to Kasindol hospital. Operational Centre of the organisation was notified of the accident immediately. The teams remained on their rest areas near Control Point, waiting for the Bol to appear. The Board of Inquiry arrived at 11.30 hrs.

SUMMARY

The team where the accident happened (Sierra-1) has been working at this site since August 17th 2000. The place where demining accident occurred is of a hard soil, which diminishes the possibilities of proper prodding, while the area itself is contaminated with shrapnel that came as a result of the bombing. It is possible to use detectors on just a few places on the entire area. Mechanical preparation of the ground was conducted the previous working day, i.e. the day when the previous accident happened in team C-1 (August 23rd 2000) – shown on photographs in Annex E, photos 1, 4 and 5. The diminishing of the use of the mechanical preparation of the ground is the direct result of the rocks scattered around the area since the bombing. Both the photographs and the survey of the area clearly show that the machine had partially searched, i.e. cut the right box that has not been treated with EDDs.

It also cut through the working lane at two places and entered the left box (for about 0.5 metres) at a location underneath the very place of the accident. The left box was checked on the day of the previous accident. This is clearly shown on photographs where the chains have touched the rocks and broke some of them into smaller pieces. Machine went as well into the right box up to half (if looked from W/E direction towards the peak). The entrance and the work of the machine were partial due to scattered rocks. It has been shown that the machine did not catch the first mined area that were not even mined, if looked at the sketch. The EDDs had indicated the first PMA-3 mine in the left box that was not prepared by the machine.

The first rock that was moved by [the Victim]. He conducted this move in order to search the location underneath the stone. The previous disturbance of EDDs on that area was confirmed by him activating the mine. The rock that covered the location of the mine involved was probably thrown at that place due to bombing explosion, but had not activated the mine due to its big and flat surface. The rock was removed to approximately 1 m under the crater, at the very edge of the box (photograph 5, Annex E). The traces of its previous position on the ground above the crater of the activated mine are shown in photographs 6 and 9.

The location of new mines that were not marked in the sketch by the task itself, prove the fact that the entire ring about the facility was mined totally. Those were the first irregularly laid mines that actually connect the mined area from the West side leading towards the C-1 team.

Within seven days of the team's work on the site (mostly mechanical preparation of the ground), its productivity was real[istic] in comparison with the local conditions and the usage of integral demining methods (5 EDD teams, eight deminers).

ADDITIONAL INFORMATION

Pale police was notified about the accident and conducted their own investigation the same day, after the Board of Inquiry had finished theirs. At approximately a kilometre from the location of the accident the Bol had met the police vehicle heading for their investigation.

Two mine accidents had happened at the wider Jahorina area as documented so far. There was one [civilian] mine accident and a demining accident in C-1 team on this site that happened August 23rd 2000. The location of that demining accident is on the west side of the mined ring, leading towards North, at about 100 distance from the accident this report is referring to.

CONCLUSIONS

Based on what is stated above, the Bol can make the following conclusions:

The critical mine activated by [the Victim] WAS underneath the big rock thrown on the ground during the bombing. The rock mentioned did not activate the mine due to its large leaning surface.

It is possible to activate a PMA-3 in the hard surface since it is hard to make a difference when touching the rubber part with the prodder. It is what the demining work consists of. In this particular case, it was easier to activate the mine due to the slope of the ground, the position of the mine as well as the length of time it actually was in the ground. This means that it did not require the same force of prodding in comparison to the period of 6 months when it is laid and reliable regarding its activation characteristics.

If the deminer had used entire set of equipment he was issued (the minimum) containing the visor, i.e. helmet with the visor, which is more than the minimum prescribed by BH MAC, his eye and face probably would have not been hurt. Regardless of mine having been activated, the injuries could have been avoided in this particular case, while the demining accident could have ended up a demining accident. This accident would then be a lesson learned about how much a visor can protect when a PMA-3 mine is activated.

RECOMMENDATIONS

Based on what is stated above and in order to prevent further accidents from happening, the Board of Inquiry issued the following recommendations:

The works in the teams should be stopped for 5 more days in order to stabilise the psychical conditions of the personnel engaged on this task, all in order for them to re-gain their self-confidence and reject the fear of a new accident. A one-day training is to be performed on the procedures in the working lanes where there are rocks or other debris are scattered all over the area. The need and the requirements for the BH Standard issued usage of the protective equipment are to be analysed with the personnel.

The [Demining group] organisation with their Ops officer, group leader and the team leaders is to analyse the sketch of the mined area provided in the Red Folder. All the knowledge about existence of mines within the entire ring around the radar facility is to be input into the sketch since this facility is of great importance. The knowledge gained so far is very clear, proving that the area which is (according to the sketch) not mined, contains the layer of PMA-3 mines, which is to connect existing PMA-1 mines on the South and PMA-2 mines drawn on the N/W side. The first mines located within the first box as well as the mine activated with the prodder clearly shows the irregular layer within the minefield. Since there is a great probability of the density of mines in the areas, the usage of EDDs should be replaced with manual methods.

[The Demining group] organisation is to reconsider the possibility for all the available areas to be mechanically prepared, which would diminish the mine threat for deminers.

When using manual methods in areas with rock scattered over, rocks are to be gently removed (taken up or pulled if bigger) to the safe areas, which would totally remove the mine threat regarding the possibility of a mine left under a stone / rock scattered during bombing over mined areas.

The organisation is to take disciplinary measures against the team leader of the S-1 team, since he took no measures against the deminers who do not use their protective equipment. In future, organisation will take disciplinary measures against such deminers even if it comes up to getting fired and the breach of the contract.

ANNEXES: [Not made available.]

- A Initial report
- B Board of Inquiry
- C Written statements of personnel – witnesses
- D General survey reports
- E Site sketch and the sketch of the accident location
- E Photographs of the site and of the location of the accident
- F Documentation of the team leader from the site, along with MAC inspectors' reports
- G Copy of the deminers' insurance

Signed: all BOI members

Distribution: [Demining group], RS MAC

Victim Report

Victim number: 429	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: not known
Compensation: not made available (insured)	Time to hospital: 45 minutes
Protection issued: Frag jacket	Protection used: Frag-jacket

Helmet

Short visor

Summary of injuries:

INJURIES

minor Face

severe Eye

COMMENT

No medical report was made available.

Analysis

The primary cause of this accident is listed as a *“Field control inadequacy”* because the Victim was not wearing his visor and his error was not corrected.

No one actually witnessed the deminer prodding carelessly, so it is possible that he was excavating properly according to SOPs when the accident occurred. His injuries were limited to his eye and face, and it is likely that he would have escaped any serious injury if he had been wearing his visor.

The demining group in question had an impressive range of demining techniques to call on and appear to have been working in the difficult area with responsiveness and ingenuity. However, metal-detectors were only used on 20% of the ground which raises questions about the suitability of the drills and the metal-detector in use by the group. It seems that the victim was not using a metal-detector, and if he had done so the accident might have been avoided.