

DDAS Accident Report

Accident details

Report date: 19/05/2006	Accident number: 350
Accident time: 08:45	Accident Date: 15/07/1999
Where it occurred: Kratine, Gola Kosa village, Near Vitez	Country: Bosnia Herzegovina
Primary cause: Unavoidable (?)	Secondary cause: Inadequate training (?)
Class: Handling accident	Date of main report: 22/07/1999
ID original source: EB/RB/VM	Name of source: BiH MAC
Organisation: Name removed	
Mine/device: Fuze	Ground condition: agricultural (abandoned) bushes/scrub soft trees
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: not recorded	Coordinates fixed by:
Map east:	Map north:
Map scale:	Map series: M 709
Map edition:	Map sheet: 474-4
Map name:	

Accident Notes

inadequate training (?)
inadequate investigation (?)
inadequate medical provision (?)

Accident report

The following is the MAC's Accident report, edited for anonymity. The original contained blanks for names, dates, map reference, etc. It appears that the version made available was not finished.

INTRODUCTION

- 1) As a result of an explosive accident on the morning of 15 July 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 aton the 15 July and the official written report on the July, this is attached at Annex A.
- 2) The accident involved one deminer working as part of the Busovaca [Demining group] demining team, during mine clearance operations at Kratine, Gola Kosa. The task was to clear a route to the village ofin order to conduct house and area clearance for a repatriation task on behalf of [NGOs]. The task started on the 30 June 1999.
- 3) The Board of Inquiry members were:
 - a Chairman - Technical Advisor to Commission for Demining
 - b Member - Co-ordination Office BH MAC
 - c Translator - Co-ordination Office BH MAC
 - d Observer - EOD Advisor to [Demining group]
 - e Observer - Technical Advisor to [Other group engaged in demining]
- 4) [The Demining group advisor] was initially suggested as a Board Member, on arrival at the site the Chairman discussed with [the advisor his organisation's] connection to the project and found that [his group] were in charge of the [partner group's workers] under an agreement between the two organisations. As this compromised his neutrality as a member of the Board the Chairman requested that he participate as an observer. The [other group] Technical Advisor was also invited to participate as an observer.
- 5) A copy of the Board's Terms of Reference at attached at Annex B.

SEQUENCE, DOCUMENTATION AND PROCEDURES OF TASKING

- 5) The Busovaca [Demining group] demining team was on an authorised task assigned to them by UNHCR. The task RED Folder was received on the 25 June with a MAC ID number of 10169 and work on the site was started on the 30 June 1999. The Number One (1) Section has remained on this site since that time and on the morning of the 15 June were involved in widening part of the route from the CP to a field some 200 metres away with the front demining team 'cutting' an advance lane into a field heading in the direction of a number of houses a limited distance away.
- 6) On the morning of the 15 June 1999, the complete Busovaca team (consisting of two Sections of deminers with medics, drivers and Team Leader) had assembled at 0650 hours, at the [Demining partnership] container some 4 kilometres from the site and received the Safety Brief as per [Demining partnership] instructions and in accordance with the BH MAC Standing Operational Procedures (SOP Part Two). Section Leaders have the standard safety brief in a printed form as part of their documentation. On completion of this task the teams departed to their various sites with Section 1 departing for the CP location of task number 10169 at the village of Gola Kosa.
- 7) On arrival at the site the Section checked equipment and tested the metal detectors. This occurred around 0720 hours and the team was ready to start work around 0730 hours.



[The photograph above shows the area being cleared.]

GEOGRAPHY and WEATHER

8) The accident occurred some 250 metres from a number of deserted houses in a rural area of the village which is four (4) Kilometres from Vitez. The site is located at Grid Reference, Map Sheet 474-4 series M 709. Annex A contains a general map of the site and location of the accident. [Not made available.]

9) Access to the site is difficult as the route deteriorates from a narrow tarmac track into a rough un-surfaced track and then as the track proceeds up the hill to the CP into a very rough track that has deteriorated due to lack of maintenance and poor ground conditions.

10) The general location of the task site is on the side of a steep hill, with the team clearing a route through a variety of ground and vegetation types. The first part of the task was to clear an old access route up a steep track which had minimal vegetation in the central part but, as the route widened, encompassed thick vegetation. The top part of the site was through an old agricultural field, now containing sparse grasses of approximately 0.6 metres high. The area is surrounded at the top by forestry, tree lines separate some of the fields. The surrounding countryside is undulating pastureland; the accident site has a clear view of the opposite hill, which is cultivated and had recently been harvested. The team has cleared an access track from the CP up the hill, forking left of the track across the field to the site of the accident. The distance from the CP to the accident site is approximately 215 metres. A site sketch is at Annex B. [Not made available.]

11) A defensive line that separated the warring parties of the HVO and BH Army splits the site across the route.

a) The accident site is some 40 metres from the track in a sparsely vegetated field



[The accident site is shown above. It is not obvious how the vegetation was cut so far ahead of the base stick.]

b) The mines and ordnance previously found on the site are also marked on the site map.

- 12) No previous clearance tasks have been undertaken in the immediate area.
- 13) The weather on the day of the accident was bright and warm but there had been some strong rain showers several days previously.
- 14) Photographs of the site are at Annex C. [Not made available.]

SITE LAYOUT and MARKING

- 15) A detailed plan of the site is shown at Annex D. [Not made available.]
- 16) The marking was in accordance with SOPs, it was well maintained and clearly identified the cleared and uncleared areas.
- 17) The route to the eventual task site will be permanently marked as [Demining partnership] are not able to clear the fields surrounding the route at present due to other commitments.

SITE SUPERVISION and DISCIPLINE

- 18) The Busovaca team has several levels of supervision. The team consists of a Supervisor, Team Leaders and Section Leaders and deminers supported by medics. The supervisor is Mr., the Team Leader of the first team is Mr. and the Section Leader is..... . The Section were all at the morning briefing on the 15 July 1999. Site supervision is mainly the responsibility of the Section Leader, with additional supervision by the Team Leader and Supervisor. The international advisor provides additional technical and managerial support. The [Demining group] EOD advisor also undertakes visits. In addition the Federation MAC inspectors visit the sites on a regular basis.
- 19) The Federation MAC inspectors visited the site on two separate occasions. The only adverse comment made on both visits was about the ambulance (see paragraph 23 on QA). The same comment was made on two consecutive visits.
- 20) The spacing of the teams was in accordance with SOPs with all team members separated by a minimum of 25 metres.
- 21) A static medical area was located close to the CP, the medic was at the CP at the time of the accident and able to move quickly to the medical point to receive the casualty.
- 22) The accident investigation team had no adverse comments about the implementation of this clearance task.

QUALITY ASSURANCE

- 23) Internal Quality Assurance is undertaken by the supervisor and the international advisors. In addition the Federation MAC inspectors undertake formal inspections of all sites. The reports of these inspections are attached at Annex E. [Not made available.] There are no relevant faults found on these inspections but comments were made about the ambulance vehicle general condition and the fact that a fault detailed on the 6 June inspection had not been corrected by the 13 June inspections.

TASKING, REPORTING and COMMUNICATIONS

- 24) The Busovaca Supervisor had received instructions to undertake this task and received the Red Folder on 25 June 1999. The task was planned and the Section tasked to start work on the 30 June 1999.
- 25) Reporting is undertaken on a daily basis by the Section Leaders, work related data is entered on a works sheet daily. Weekly reports are prepared by [Demining partnership] and the last three weekly sheets for the period 28 June until 16 July are attached at Annex F. [Not made available.]
- 26) Communications on the site are by hand-held radio. Reports to Sarajevo are made via the national telephone system.

MEDICAL

27) The injured deminer received extensive damage to the left hand. Following CASEVAC procedure to the Nova Bila hospital he underwent an amputation of the left-hand thumb, index and top joint of middle finger. The middle and fourth fingers were fractured and there was destruction of part of the muscle and surface skin of the palm.

28) The accident occurred at approximately 0845 hours and the injured deminer was able to walk from the site with the assistance of his number two. One of the other deminers in the section, met the deminers walking to the CP and applied a bandage to the injured hand. They arrived at the ambulance where the medic looked at the injury, applied additional dressings to the hand and set up an infusion. The medic did not consider that analgesia was necessary as the hospital is an estimated 30 minutes from the site. However it should be noted that the medic has no strong analgesics available in the first aid equipment. – (this could be contained in the infusion). [Original brackets.]

29) The CASEVAC appears to have been conducted in a professional manner. The doctor was interviewed by the investigation team on two occasions. The explosion appeared to have happened when the explosive item had been held in the thumb and index finger, cupped over the palm of the hand. A second operation is scheduled in two weeks time to conduct plastic surgery, tidy up the amputation sites and facilitate any residual mobility of the remaining digits.

PERSONALITIES INVOLVED and EXPERIENCE

30) The Supervisor is Mr..... and the Team Leader Mr..... The other personnel involved in this task are:

- a Section Leader
- b Injured Deminer
- c Number Two to the injured deminer
- d 4 x Deminers
- e Medical Orderly

31) All deminers were formally trained in 1998 by the MAC RO Mostar and have undertaken demining activities in the Vitez region over the last twelve months. In the period 3 May to the 15 July (the date of the accident) the Busovaca team of 18 deminers has cleared 25,181 square metres of land manually, an additional 10,859 square metres were cleared in one week using Explosives Detecting Dogs. One (1) Anti Tank mine, two (2) AP mines and eleven (11) other munitions were located and cleared. A breakdown of the numbers of metres cleared and munitions destroyed by the No 1 Section was not available at the time of writing the report.

EQUIPMENT and TOOLS

32) The equipment and tools used by the team are standard for all [Demining group] demining sites, and consist of a metal detector, (this site had MINE LAB detectors which it had been using for the last twelve months), prod, trowel, shears, helmet and visor and protective jacket.

DETAILS OF THE EXPLOSIVE ITEM

33) The item that caused the injury was thefuze, a very common grenade fuze that can fit most types of Yugoslavian grenades. It is activated by removal of a safety pin and release of the arming lever (known locally as a spoon) which allows the indent lever under pressure of a strong spring to rotate around a pivot pin and strike the percussion cap. This ignites the delay material which burns slowly, causing a delay period of between 3 and 5 seconds, followed by the detonator activation.

34) The remains of the fuze, found in a hole at the scene of the accident, were examined and it was established that the fuze percussion cap had been fired, the delay mechanism had burned and the detonator activated. The fuze was inspected by several specialists who all agreed that the fuze was comparatively new, but there is no reliable way of ascertaining how long it had been in situ.

35) Neither the fuze arming lever, retaining pin or any other restraining mechanism was found. The team are therefore not able to confirm how the percussion cap was indented. An extended clearance area was requested when the team resumed work on the site on Wednesday 21 July in an attempt to locate the arming or indenting mechanism. No mechanism was found.

EVIDENCE of MINING/REMINING

36) This subject is discussed in detail in the conclusions section.

DETAILED ACCOUNT of EVENTS on 15th JULY

37) 0650 hours. The Busovaca team were assembled at the [Demining group] container in the village of Gola Kosa outside Vitez, a detailed safety brief was conducted and daily taskings issued.

0720 hours. The Number One (1) Section arrived at the task site and deminers tested equipment

0730 hours. Section starts work. The Section utilised a two man demining drill, changing over every 30 minutes, the Section Leader confirms that this occurred.

0830 hours. The deminers changed for the second time. Shortly after resuming work [the Victim] was using his metal detector and received a signal. He placed the metal detector down behind him on his right side and began prodding using his right hand in the area of the signal. He saw a small black object that moved, prodded it more and it came to the surface. With his prodder still in his right hand he started to pick up the plastic object in his left hand in order to remove it so that he could use his detector again. His visor was down and he was looking at the plastic item, as he was removing it the item exploded.

Note: The deminer states that he did not dig in the lane.

0845 hours. Dull explosion from the farthest away demining team. [The Victim] began walking to the CP and Medical Point with the No 2. CASEVAC starts.

0845	Sarajevo informed of the accident
1045	BH MAC informed of the accident departs Sarajevo
1215	[Two ex-pat managers] arrive at the site
1315	Team cannot get to site due to track repair
1430	Board of Inquiry arrives on site and begins investigation
1600 app	Local police arrive to investigate.

ADDITIONAL SITE INVESTIGATION INFORMATION

38) The general layout of the site was good.

39) The injured deminer states that he detected the item first by metal detector, and then, using the prodder in his right hand, located a plastic item that he picked up with his left hand. It was initially assumed that the deminer had attempted to excavate the area on finding a suspicious item, as there was a large excavation, but this is not what the deminer stated. After completing the initial investigation the investigation team was concerned, as it appeared that the accident site may have been interfered with. The site, as shown in the photographs, had a crater measuring 20cm by 10cm by 4 cm deep (see Annex G) [not made available]. As the deminer and No 2 had both stated that no excavation work was conducted there should not have been a crater of this size.

40) Based on the report of the doctor the team were aware that the wound had a considerable amount of soil and grass embedded in the flesh, as well as slivers of aluminium, which indicated that the detonator had exploded while in the ground or at ground level and while held by the deminer in his left hand. This would confirm the deminer's statement.

41) The detonator has the equivalent power of a Number Eight detonator and therefore if the detonator exploded in the ground or at ground level the impact would be limited. If the fuse had detonated in the ground the resulting hole would be small, no larger than a few centimetres in radius. The investigation team took five (5) electric detonators to the site on the 20 July and in similar weather conditions and at the same time of day as the accident detonated them in various positions to simulate the fuze explosion (see details at Annex H). The results clearly illustrate that the accident site crater was considerably larger than the trial detonator holes. As considerable explosive force would have been absorbed by the hand of the deminer it is reasonable to expect that the crater would be the same size or smaller than the trial detonations.

42) A verbal report given to a Board Member states that the accident site was photographed and that [the Demining group's advisor] dug a channel at the left of the area in an attempt to find the 'spoon' (arming handle). This statement has not been confirmed and both [Demining group advisors] state that the investigation site has not been interfered with by them. Photographs taken by [one advisor] before the Investigation Board members arrived on site clearly illustrate the excavation at the point of the accident.

43) Further investigation of the site provided no additional information and the mechanism for activation of the fuze has still not been identified.

SUMMARY

44) The accident occurred due to the activation of a grenade fuze by indentation of the percussion cap. The fuze was disturbed or activated by the deminer. The fuze is comparatively new. The accident site had been interfered with and evidence that may be removed or destroyed.

CONCLUSIONS

45) In view of the fact that the investigation team are unable to ascertain how the fuze activated it is impossible to draw firm conclusions. Possible interference with the site may or may not have removed evidence which could provide clarification.

46) Due to the fact that critical evidence can not be found the investigation board can only assume that one of three possibilities occurred:

- a) The fuze was deliberately placed by an unknown person in order to be activated by members of a clearance team
- b) The fuze could have been accidentally left on the site some time before in such a manner that disturbance could have caused activation
- c) The deminer deliberately activated the fuze

47) In view of the injured deminer's statement and his attitude during subsequent interviews the investigation team consider it highly unlikely that the deminer deliberately activated the fuze.

48) Due to the reasons stated above the investigation team cannot state that this fuze was relaid.

RECOMMENDATIONS

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

a After an accident the site should immediately be closed and no person should approach the accident site until requested to do so by the investigation team or until the site has been cleared by the accident investigation team.

b It is recommended that [Demining partnership] review the medical equipment with particular reference to the provision of analgesics.

c Based on the fact that the Busovaca team have not over the last few months been on sites that contain more than a few explosives items, refresher training or operational tasking on a more contaminated area should be undertaken in order to improve munitions recognition and operational awareness.

Signed: all BOI members

Victim Report

Victim number: 445	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: not known
Compensation: not made available	Time to hospital: 30 minutes?
Protection issued: Frag jacket Helmet Short visor	Protection used: Frag jacket, Helmet, Short visor

Summary of injuries:

INJURIES

severe Hand

AMPUTATION/LOSS

Fingers

COMMENT

No medical report was made available.

Analysis

The primary cause of this accident is listed as "*Unavoidable*" because the deminer was investigation a detector reading and lifting an apparently innocent item from the area when it detonated. It is possible that the grenade fuze was recognisable (it was new) and the Victim did not recognise it because his training was inadequate, so the secondary cause is listed as "*Inadequate training*".

The Investigators went to some pains to prove that the site had been disturbed prior to their arrival. By implication, the ex-pat advisors had disturbed the area to look for other parts and did not admit it. If so, their dishonesty would be a significant failure of senior management.

The investigation is considered "inadequate" only because the version made available was incomplete.