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DDAS Accident Report

Accident details

Report date: 18/05/2006	Accident number: 227
Accident time: 12:30 approx	Accident Date: 19/07/1997
Where it occurred: Sevarlije, Doboј	Country: Bosnia Herzegovina
Primary cause: Management/control inadequacy (?)	Secondary cause: Field control inadequacy (?)
Class: Missed-mine accident	Date of main report: 23/07/1997
ID original source: WL/EB/VT	Name of source: BiH MAC
Organisation: Name removed	
Mine/device: PMA-3 AP blast	Ground condition: agricultural (abandoned) bushes/scrub grass/grazing area trees
Date record created: 17/02/2004	Date last modified: 17/02/2004
No of victims: 1	No of documents: 2

Map details

Longitude:	Latitude:
Alt. coord. system: BQ683499	Coordinates fixed by:
Map east:	Map north:
Map scale: Doboј	Map series: M709
Map edition: WGS 84	Map sheet: 2784 III
Map name:	

Accident Notes

inadequate communications (?)
inappropriate vegetation cutting tool (?)
pressure to work quickly (?)
inadequate area marking (?)
safety distances ignored (?)
inadequate medical provision (?)

Accident report

This was one of two incidents occurring at the same site on the same day.

The demining group involved in the accident deployed two-man teams using a one-man drill, in which one deminer cleared undergrowth, used the detector and excavated finds while the other "controlled" him.

An accident report on both accidents was prepared for the country MAC by an ex-pat Technical advisor, an advisor to the funder and a representative of the company involved. That report was not among the records made available by the country MAC [the UN MAC handed over to local control on 1st July 1998.] A copy was found from other sources and the following summarises its content. The original report is under *Related papers* at the "Other documents" tab.

The area where the accident occurred was a former defensive line that was known to be mined. It was "heavily vegetated" and included several bunkers and defensive positions. The demining team started work at the site on the day of the accident. The demining company had employed one of the soldiers who had laid mines in the area during the conflict, and his information augmented that available from the country MAC's mined area database. The group were engaged in clearing access lanes into the suspect area from the Control Point in preparation for clearing around 1200 square metres of "rolling countryside" mostly around the top of a hill.

The team at the site comprised an ex-pat Team Leader (Gurkha), six deminers, a medic and a translator. An external QA monitor was on site at all times to guarantee that standards were met.

The access lane in which the accident occurred was approximately 350 metres long and followed "a winding course". Two other lanes in other directions had also been started. The group began work at the site at 06:00. They were using Ebinger detectors and clearing foliage with a machete. "Full protective clothing and headgear" was available for all personnel.

Prior to the accident the Team Leader had "used a machete to clear foliage and to inspect uncleared ground" in the accident lane. He did not use a detector or prodder. He advanced ten metres in this way, then handed over to the victim. The ten metres were counted as "cleared". The Team Leader was reported to have "used this system on other occasions to encourage deminers to clear areas faster". He was not wearing any protective equipment when he did this.

The victim [who was wearing protective equipment including leggings] took over clearance at the new end-of-lane and had cleared about five metres when he stepped on a mine that may have been "concealed below a small rock". The Team Leader was close to the victim. Three other deminers hurried along the lane to his assistance and they carried the victim to the Control Point where the medic attended him. The victim suffered "bruising and flesh injuries to his lower leg and fractures to his left foot". He was not expected to require amputation. It took "approximately 15 minutes" to reach hospital in Dobo by road from the site [from which I infer a 30 minute evacuation time].

The investigators found that the site had no easy communications beyond the task site. It was necessary to climb a nearby hill and plug-in to an antennae mast to achieve contact with the demining company's local HQ or other groups.

The ambulance was an unconverted truck without provision for a stretcher.

A one day retraining period had been completed by the time of the investigation [which occurred in the field three days after the incident]. The terms of the clearance contract required the demining group to clear a minimum number of square metres each day, so delaying operations until the investigation had been completed was presumably not possible. They were required to clear 800 square metres in each of the four sites where they operated.

The QA Monitor stated that he thought that clearance was too fast for safety, but had not written or verbally reported this prior to the accident. The clearance rate had been unusually high, but one day in the previous week had been lost because of rain, [so the Team Leader may have felt a pressure to increase clearance rates on the fine days].

Conclusions

The investigators concluded that the standard of marking in the field was inadequate, that the width of the cleared lane was "insufficient", and that the performance of the Team Leader was inadequate because he did not wear protective equipment, did not adhere to SOPs, moved in uncleared areas and failed to seal the site after the accident. They felt that the Team Leader's actions were "probably" influenced by the "clearance rate targets", and said that the QA monitor did not "sufficiently action his concerns" about speed and safety on the site. They added that "the aim of the clearance was unclear" and that the deminers appeared to be "searching for groups of mines shown on the minefield record".

Recommendations

The investigators recommended that constant QA be applied to the marking and width of lanes and should always comply with company SOPs. They stated that protective clothing should always be worn by everyone "in or near" uncleared or suspect areas, and that the purpose of clearance should be checked to avoid "mine tracking" or mine-hunting and the partial area clearance that results.

Other recommendations included that the ambulance vehicle be appropriately converted and that the ambulance should not double as the communications vehicle when it is the only vehicle on site. Also that the QA monitor should report concerns on the day they first arise, and that personnel with prior knowledge of the mined area should "not be allowed to create an environment of false confidence" by giving the impression that the whereabouts of the threat is clearly known - "all areas should be demined systematically".

Victim Report

Victim number: 294	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: no
Compensation: DM60,000	Time to hospital: 30 minutes
Protection issued: Frag jacket	Protection used: Frag jacket, Long visor, Leggings
Long visor	
Trousers/leggings	

Summary of injuries:

INJURIES

minor Arm

minor Leg

severe Foot

COMMENT

See medical report.

Medical report

See also under "Related papers" for victim interview details.

A medical report was located. Signed by a British orthopaedic surgeon and dated 21st April 1999, the following relates its content verbatim [with apologies if the medical handwriting occasionally defeats me]:

S/ S/P Mine injury L foot 97 -

had loss of calcaneus and heel pad. Full thickness flap from lat Dorsi and Split thickness skin graft of DF 5°

PF 25°

φ inver/eversion

Skin graft - medical aspect plantar surface to 9cm Proximal Vs mm

Full thickness plantar aspect and split thickness medical

Good pulses - dorsalis pedis

inc Thompson's test

nl sensation forefoot

Achilles tendon attached to remnant of calcaneus laterally

X Ray, dystrophic calcification posteriorly

absence of 75% calcaneus

+ sub talor joint, no DJD of Tubio-talor joint

Talus dorsiflexed on lateral vicu

Leg lengths are equal -

loss of calcaneus = 4cm deficit L leg. Gait - antalgic due to weakness Achilles tendon and short L extremity and a significant lateral instability causing a rolling of foot on weight bearing.

Strength 5/5 Right side. 3/5 DF left. 3-/5 Platar Flexor

DX. S?P mine injury with residual short L extremity asensate heel and medical plantar foot. Weakness to plantar flexion.

Recommendation

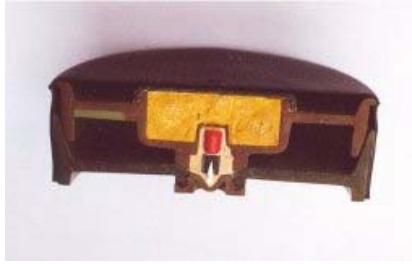
Pt is unable to do demining work due to inability to weight bear for extended periods of time greater than one hour. Will require constant modification of footwear. Will be unable to do winter activities. Early amputation and a well fitting prosthesis may have allowed rehab to a labour type employment.

Analysis

The primary cause of this accident is listed as a "*Management/control inadequacy*" because the Team Leader was in breach of basic SOPs and encouraging the deminers to work more quickly that was safe. Management did not control him adequately, and the QA Monitor also failed in this regard. The secondary cause is listed as a "*Field control inadequacy*".

See also the second accident that occurred at this site on the same day, in which the Team Leader was the victim. The failure of the insurance to provide timely compensation for this victim appears to have been partly the responsibility of the funder who dictated some aspects of the insurance requirement. Another deminer injured similarly on 23rd September 1997 received some compensation more quickly because of the demining company's private insurance arrangements.

The injuries resulting from stepping on a PMA-3 vary from traumatic amputation to minor bruising. The picture below shows why this can happen. It shows a cut-away section through a PMA-3. The 35g Tetryl is in the top and centre of the mine. The area of pressure-plate surrounding the HE is actually larger than the area of pressure-plate over it. If a victim is fortunate, they step on the pressure plate but the explosive charge is not beneath their foot.



Related papers

The victim was covered by an insurance that limited disability definitions to the loss of limbs or specified functions. The fact that his foot was saved left him without compensation to November 1999. The demining company was not at fault over this - it having provided the insurance dictated by the funder and pursued the victim's claim long after the accident.

The victim was interviewed on 22nd June 1999. He described the working method at the time but did not mention the actions of the Team Leader prior to the accident. When the mine detonated he "sat down backwards". His ears were ringing for a day or two but they had recovered completely after that. He did not lose consciousness. He was given an infusion of "all purpose fluid replacement" and taken by truck to hospital. He said that the truck was uncomfortable but fast - which he appreciated.

At hospital they took "X" rays of his foot and operated. He had a small hole "finger sized" in his heel and the skin was damaged on one side. He said the bone inside was smashed. His right lower arm was peppered with fragments (he showed the scars). They removed stones from his arm when they cleaned the wounds which healed very quickly. The foot was terribly painful. After they operated he woke up with a splint on his leg holding his foot at a right angle and leaving the wound open.

He was kept in the local hospital for 20 days during which he suffered terrible pains but they had no pain killing injections. Then he was transferred to a clinic in Austria by air. Some doctors there could understand him which was lucky because he was unaccompanied. He was in the clinic for one month, then went home for four or five months. His toes had contracted and did not move. They had taken grafts from his back and his other leg. Then he returned to Austria where they were to fit a new heel bone. They "fixed" his toes but decided that it was better not to fit the heel bone so it was left out. He was there for 16 days on that occasion and returned home in June 1998. Then he was taken to a private health clinic in Montenegro for 30 days.

He needed a prosthetic shoe to walk but it was still painful and his "leg shakes inside". The demining company gave him his first shoe but even with it he could not carry anything when walking and could not walk very far. When interviewed, his original prosthetic shoe had worn out and no longer fitted the wound. He said that his injured leg was shorter [hard to measure with the heel absent] and that it swelled when he used it. He said that he wished they had cut off his foot and given him a lower leg prosthetic and compensation. Then he could have got on with his life.



The victim's foot was photographed during the interview.

The demining company continued to pay him for a full year after the accident but he received no formal compensation in that period. Aged 35 with young children, the national government accepted no responsibility for his continued needs because he was working for a commercial company when the accident occurred.

The victim's cause was taken up by an ex-pat specialist in the country and the demining company. In November 1999 the researcher was informed that the victim had been made an offer by the insurance company. That offer was the equivalent of four years salary.

In an interview with the demining company in December 1999, a Director stressed that the root of the problem was that in three separate medical reports the Victim has been described as only "partly disabled" which explained the insurance company's offer of DM60,000. [The maximum compensation was DM300,000.]

Original Bol report

The following is the original Bol report, edited for anonymity. It covers two accidents that occurred at the same site on the same day.

23 July 1997

REPORT ON MINE ACCIDENT AT SEVARLIJE, NEAR DOBOJ

Reference A: Map, Series M709, Sheet 2784-III, Doboj. (WGS 84)
B: UN Mine Action Centre Technical Guidelines. Dated 12 July 1997.
C: [Demining group] Standing Operating Procedures for Demining.
Dated May 1997.

INTRODUCTION

1. Two mine accidents occurred on 19 July 1997 at the same demining task site, near the Lime Factory at Sevarlije, Doboj. Grid Reference BQ683499. These accidents occurred at the same location and involved members of the same demining team. [Demining group], the company involved, reported the accidents to UN MAC on 19 July 1997.
2. On the day of the accidents UN MAC appointed [name excised] as a member of an investigative board to conduct an investigation and report about the accidents. Mr [name excised], Senior Technical monitor for World Bank demining projects in Republika Srpska was appointed as a member of the board and Mr [name excised], [Demining group] area manager represented the company but was not an investigating member of the board.

CONDUCT OF THE INVESTIGATION

3. [Name excised] and [name excised] deployed to [Demining group] regional HQ (The Lime Factory), from Sarajevo on 21 July 1997. [Name excised] arrived at the Lime Factory at 1500hrs, [name excised] arrived at 1900hrs. The Operations Director of [Demining group], Colonel [name excised] welcomed the team and stated that he was

determined that his organisation would assist the investigation in every aspect. Throughout the entire investigation [Demining group] employees were open and helpful in every respect, this attitude assisted the team considerably.

4. Shortly after arrival of the investigation team at the Lime Factory, written statements were requested from all members of the team involved. Statements had already been written by four of the deminers prior to this time and these were translated into English on request. Photographs of the clothing worn by the injured personnel involved in the accidents were also provided. [Demining group] had prepared a table-top model of the area of the accidents, this model was marked with areas of specific interest and showed the mined and cleared areas and details of the task site. Paperwork and reports relating to the day of the accidents were prepared for the investigation team's inspection.
5. The team involved in the accidents had completed a 24 hours retraining period, as detailed in [Demining group] Standard Operating Procedures and the UN MAC Technical Guidelines.
6. Both members of the investigating board arrived on the task site at 0730hrs on Tue 22 July. At this time the area of the accidents was inspected and an assessment was made of the site layout and conduct of [Demining group] operations.
7. The injured deminer was interviewed in Doboj hospital on 22 July. It was not possible to interview the injured team leader because he had been evacuated to UK on the day of the accident.
8. Investigation lasted one day, this included interviews, writing of statements, visits to the site of the accident, inspection of documents & maps, and of clothing belonging to injured personnel.

GENERAL

9. [Demining group] relations with local people are generally good. This relationship is enhanced by the fact that several [Demining group] employees are from the local area. Deminers involved in clearance of this site also assisted in laying mines in this area during the war. However, this site was over-run several times during the conflict and mines are believed to have been laid here by both sides.
10. Personnel from [Demining group] started this task Saturday 19 July 1997. This task was part of a larger group of tasks and this team had been working in this area since 5 July. Doboj Municipality request for demining tasking in this area were provided to UN MAC Banja Luka on 26 May 1997. This task is number two on the list of Priority One tasks. Minefield records for the site are held by UN MAC and copies were handed to [Demining group] for use by the clearance team as part of the MAC task folder.
11. The minefield record showed that 16 PMA-3 and 6 PMR-2A Anti Personnel mines had been laid in the area in 1995. A copy of this record, in English and in original language is shown at Annex A. Further information about the locations of mines at this site was provided by [Demining group] deminer [name excised], a former VRS soldier, who had helped to lay some of the mines in this area during the war.
12. The task was being worked by a [Demining group] demining Team; this consisted of an international (Gurkha) member of staff as team leader, six deminers, a medic and a translator. This team was structured in accordance with [Demining group] regional structure.
13. The team travelled to work each day in an IVECO two-and-a-half-ton truck. Task site from [Demining group] location at the Lime Factory is approximately 1 kilometre, travelling time is approximately five minutes.

GEOGRAPHY

14. The task site area is on a former confrontation line, the area includes several bunkers and defensive positions, which were mined as part of the defensive plan. The area is heavily vegetated and is over what is probably pastoral land, no evidence of farming or livestock was observed. The nearest local residents to this site live approximately one kilometre away, in the village of Potocani. Mr [name excised] reports the task as being

related to the clearance of the Lime Factory quarry and the incoming electrical power lines associated with this site. Priority for the task was set by the RS PIU. The area is not a UNHCR priority area.

15. [Demining group] personnel live in and deploy from [Demining group] local Headquarters at the Lime Factory, Grid Reference BQ680509. The Lime Factory is less than one kilometre from the accident site. All local employees live at the Lime Factory. The two International staff, Mr [name excised] and Mr [name excised] also live in the factory. The organisation at the factory is run on disciplinary lines. Local staff are allowed out only on weekends and there is a strict no-alcohol rule.

WORLD BANK/PIU CONTRACTS WITH [Demining group]

16. World Bank put out three bidding contracts, one of which was for clearance and survey work in RS. [Demining group] responded to this, winning the contract. [Demining group] bid stated their performance would be 200,000 square metres of survey per month and a clearance rate of 83,200 square metres per month. In order to achieve this target, [Demining group] is required to clear an average of 800 square metres on each of their four clearance sites daily.
17. Deminers and team leader are aware of this commercial aspect to the contract and some pressure is felt at this level. Statements from team members say that this pressure has caused work to progress more rapidly than they feel safe with.

SITE LAYOUT

18. The area of the task site, including access lanes and the Control Point is marked and taped-off. The area of the car park and the access lane from the car park to the start of the access lane to the Control Point is not marked. Marking in the clearance lanes is inadequate and inexact.
19. The clearance of access lanes into the mined area started directly from the side of a single-track, unsurfaced road.
20. The task was to clear an area of approximately 1200 square metres of rolling countryside. Most of the area is around the top of a hill.
21. The cleared area of the lane in which the accident occurred consists of a lane approximately one metre wide. This lane follows a winding course through the suspect area. Total length of this clearance lane from the Control Point is approximately 350 metres. Two other clearance lanes were also initiated from the control point. These two lanes are towards different directions and are unrelated to the accident lane.

SUPERVISION AND QUALITY ASSURANCE

22. Supervision of clearance and survey teams in this [Demining group] region is provided, in the first instance, by team leaders, in this case the team leader was a former Gurkha engineer Warrant Officer with experience in humanitarian demining in Africa and Kuwait. The next line of supervision is provided by irregular visits to the sites by the Field Operations Officer. These visits are supported by occasional visits from the [Demining group] Operations Director, Col [name excised]. At the time of the accident Mr [name excised] was at [Demining group] HQ Pale. Col [name excised] was mobile towards Pale from Melici, approximately 100 Km away.
23. UN MAC Banja Luka Operations Officer states that on one occasion he was unable to gain access to the site because signing was inadequate and there was no guide or sentry posted at the main access point to the area. On the day of the investigation team's visit a signboard at the main access point directed visitors to sound their horn and wait for a guide.
24. A RS PIU monitor is on the site at all times. Mr [name excised] states that it was his opinion that the clearance was moving too fast for safe clearance of the area to be achieved. He had reported this opinion verbally to the team leader but had been over-ruled. The monitor did not report his concerns on this subject on any of his daily reports; neither did he mention this to the World Bank Senior Monitor.

25. World Bank Senior Monitor, Mr [name excised] visited a related site on 9 July prior to the move of operations to the area of the accident. On 9 July the operation of that related task was normal and no safety points were raised.
26. No site diary or record of visitors is kept to record visits.
27. The system for continuous Quality Assurance at this site is not clear.

COMMUNICATIONS

28. The accident occurred in Republika Srpska. The nearest large town is Doboj. The local Danish SFOR base has a military V-Sat telephone. It was not possible to gain communications with UN MAC Sarajevo on PTT or V-Sat using this telephone on 21 July 97. This link is not continuous or reliable.
29. [Demining group] communications to anywhere outside the region is generally by HF radio. No radio communication outside the task site exists. For communication beyond the task site it is necessary to drive to the top of the nearest hill in order to plug-in to an antenna mast. This set-up allows HF communications to [Demining group] HQ Pale and elsewhere.
30. [Demining group] Standing Operating Procedures state that under no circumstances will demining operations commence until radio communications have been established.
31. There is no operations room at [Demining group] regional HQ at the Lime Factory. Operations are commanded and controlled from a field level. Coordination is from HQ Pale. Field workers generally resolve their own problems.
32. No radio log was kept at this site.

MEDICAL

33. A comprehensive medical kit was on site at the time of the first accident. Medic was stationed at the Control Point, approximately 350 metres behind the scene of both accidents. Ambulance on the site is the Iveco two-and-a-half-ton truck. This vehicle is not fitted for use as an ambulance, in particular there is no provision for a stretcher to be fitted securely in the vehicle. This vehicle is also the team's HF radio vehicle and was the only vehicle on site on the day of the accidents. When the first accident occurred the injured deminer was carried to the medic at the control point. When the second accident occurred the medic and the only vehicle was at the hospital in Doboj with the first casualty.
34. Both Casevac operations were successful, in each case the injured person was stabilised and despatched to the hospital without further problems.
35. The nearest hospital to the accident site is at Doboj, approximately 10 Kilometres, travelling time is approximately 15 minutes.
36. The injured deminer has bruising and flesh injuries to his lower left leg and fractures to his left foot. The injured team leader has similar injuries. Medical reports were not available at the time of the investigation. It is expected that neither deminer will suffer amputation or loss of a limb.
37. No Medevac or Casevac practice exercises had been carried out at this site to the date of the accident.

PERSONALITIES

38. Personnel directly involved are as follows.
 - a. Team leader – Injured in blast from second mine.
 - b. Deminer no. 1 – Injured in blast from first mine.
 - c. Deminer no. 2 – laid mines in area.
 - d. Team Medic.
 - e. World Bank Monitor at the site.

DOGS

39. No dogs were involved for mine or explosive detection or to assist Quality Assurance at this site at any time.

EQUIPMENT

40. The metal detectors used by [Demining group] on this site were Ebinger. Team members state that Ebinger works well in the Dobo area and results have been good. There have been no problems detecting PMA-2 or PMA-3 Anti-Personnel mines.
41. Prodders were used as a standard part of the demining team's equipment in the manner approved by the UN MAC Technical Guidelines. Team members state that the Team Leader used a machete to clear foliage and to inspect uncleared ground in the accident lane before the accidents but did not use a prodder or metal detector. The Team Leader had used this system on other occasions to encourage deminers to clear areas faster.

DRESS

42. Full protective clothing and headgear is available for all vulnerable personnel in [Demining group] demining operations. Industrial working boots are issued to all demining personnel. Boots worn by both personnel injured in the accidents were damaged during the blasts. cursory inspection indicates that wearing boots possibly mitigated injuries to feet.
43. All protective clothing provided by [Demining group] to demining teams is designed to provide a minimum protection to the wearer against 1.1g fragments travelling at a velocity of 450 metres per second.
44. Every deminer in every team is issued with a visor.
45. Deminer [Victim 1st accident] states that at the time of his accident he was wearing his visor and body armour.
46. Team Leader [Victim 2nd accident] was not wearing body armour or visor at the time of his accident. Statements from other team members indicate that he also did not wear protective equipment when he was working in the clearance lane.

DETAILED ACCOUNT OF ACTIVITIES ON 19 JULY 1997.

47. This account is taken from formal and informal interviews and statements from all personnel involved. Most interviews took place through interpreters.
48. Demining team departed [Demining group] local headquarters at Lime Factory as normal at around 0545hrs. They started work on the site at around 0600hrs, as normal. A daily briefing from the team commander is normally given to the team. According to statements from other team members, there is no formal structure to this daily briefing and it is unclear whether it occurred at all on the day of the accidents.
49. Lunch was taken for approximately half-an-hour, by all the team together, in the Control Point, at around 1100hrs, as normal.
50. Progress on the day before the accidents had been faster than on previous days. [Demining group] daily reports, completed by the World Bank monitor on the site, show that on the day before the accident (Friday), the team had cleared 1250 square metres of ground. On the Thursday they had cleared 850 square metres. On the Wednesday, 810 square metres. On the Tuesday rain had stopped work. On the Monday 620 square metres of ground were cleared. These clearance results were reported on a daily basis, both on the World Bank monitor's report and on the Company Team Leader's daily report. Team Leader's reports were unsigned by any other member of staff and information on these reports was unclear.
51. Some time after lunch, at approximately 1200hrs, the Team Leader moved deminers [name excised] and [Victim 1st accident] from one clearance area to another part of the minefield, approximately one hundred metres from where they had been working. The new clearance area was a continuation of a clearance lane that had already been started. This clearance lane was following or moving towards the line of suspected mines laid during the war by deminer [name excised]. The clearance lane did not follow any recognisable pattern or route, suggesting that the team were following the route of

mines shown on the minefield record. This was probably because the original area for clearance was not defined with certainty and a considerable area of mined and suspect ground had to be cleared in order for the demining team to access their clearance area.

52. Deminers state that at this time, team leader [Victim 2nd accident] took the place of deminer number one. [Victim 2nd accident] led the way along the uncleared part of the clearance lane, using a machete as a clearance tool. He did not use a metal detector or a prodder. He led for approximately ten metres and at this point handed over the number one position to deminer [Victim 1st accident].
53. A PMA mine had been missed by the team and was now inside the “cleared” area.
54. At this stage [Victim 1st accident], with [name excised] as number two continued the clearance of this lane. Although they had approximately ten metres of ground behind them which had not been properly cleared, the clearance became normal again and continued in accordance with SOPs.
55. After this the clearance continued normally for approximately five metres, with [Victim 1st accident] leading and [name excised] behind, as deminer number two.
56. While he was clearing the forward edge of the lane, [Victim 1st accident] either disturbed or stepped on an Anti Personnel mine – Probably a PMA-3. It is possible that this mine was concealed below a small rock.
57. Team Leader [Victim 2nd accident], who was already very close to the injured deminer, and three other team members moved forward to the site of the accident and carried the injured deminer back to the Control Point.
58. When the other deminers moved forward to assist the injured man, they had to move over the part of the clearance lane that had not been properly cleared. This was the ground that [Victim 2nd accident] had led over earlier, using only his machete as a clearance tool. The team obviously did not know that there was another PMA in the ground they were moving over to reach their colleague.
59. Once the injured deminer arrived at the Control Point, the medic administered first aid and then accompanied the injured deminer in the truck to Dobo hospital.
60. The task site was now without a vehicle, medic or HF radio.
61. After [Victim 1st accident] had been despatched to hospital, [Victim 2nd accident] decided to go to the point of detonation of the mine. He also instructed three of the other deminers to go into their clearance lanes to collect tools and equipment. They all took the same route into the clearance lanes and the accident site as the team had taken earlier, when they evacuated [Victim 1st accident]. As he was walking over the ground he had earlier not cleared properly, [Victim 2nd accident] stepped on the “missed” PMA. This mine was in the centre of the clearance lane, less than ten metres back from the first explosion.
62. After the explosion [Victim 2nd accident] was removed to the Control Point. Coincidentally, the team’s truck returned from Dobo hospital shortly after this time and was therefore available to carry [Victim 2nd accident] to the hospital.

SUMMARY

63. This Demining team was demining with minimum supervision in an area of difficult terrain. A minefield record and advice from personnel who laid some of the mines was used. Standard Operating Procedures were varied without reference to company management or headquarters. The Team Leader acted irresponsibly and the site was marked inadequately. Progress of clearance was probably too quick along the lane. Deminers missed a mine and, before this was realised one of them was injured by another mine. After the first accident, other deminers moved over the missed mine at least five times. The Team Leader and others entered the suspect area after the first accident had been dealt with and the Team Leader detonated the missed mine, by accidentally stepping on it. Reporting, supervision procedures, communications and

transport were not adequate. From reports received from other sources, this site does not seem to be typical of [Demining group]'s operation in Bosnia-Herzegovina.

CONCLUSIONS

64. Standard of marking between safe and unsafe areas was not adequate.
65. Width of clearance lanes were not consistent
66. Standard of clearance in the accident lane was insufficient.
67. Performance of the Team Leader was inadequate. In particular the Team Leader;
Did not wear protective equipment when moving in and near uncleared areas.
Did not adhere to company Standard Operating Procedures.
Moved in uncleared areas.
Did not seal the site after the accident, in preparation for a subsequent investigation.
68. The following SOPs were varied during this task without any reference to higher authority.
 - Clearance lanes were not restricted to 1 metre width.
 - Clearance lanes and other areas were not adequately marked.
 - Clearance drills were not carried out in accordance with SOPs.
 - Protective clothing was not worn where it should have been worn.
 - Personnel were moving in a suspect area without ambulance or medical cover on the site.
 - Personnel were moving in a suspect area without radio communications at the site.
 - Clearance rate targets probably influenced the Team Leader.
 - The team's two-and-a-half ton vehicle was not prepared for use as an ambulance.
 - Reports and Returns were not completed sufficiently or scrutinised properly after completion.
 - The aim of the clearance was unclear. The team was searching for groups of mines shown on the minefield record.
 - The World Bank Monitor did not sufficiently action his concerns about accident indicators such as speed and safety on the site.

RECOMMENDATIONS

69. The following recommendations are made.
 - Marking and width of clearance lanes should be subject to a process of constant Quality Assurance. Standards of clearance should always be in line with company Standing Operating Procedures.
 - All personnel working in or near suspect areas should wear protective clothing and equipment.
 - Standing Operating Procedures of any demining organisation must not be varied in the field in any way without prior approval from a higher office.
 - No movement should be allowed in any uncleared or suspect areas.
 - Areas where a mine accident has occurred should be closed until a formal investigation team arrives to inspect the site.
 - If parameters of a mine-clearance task are unclear, advice should be sought from the client, in order that mine tracking or partial clearance of a suspect area does not occur.

- Safety and Quality Assurance should take a greater priority than clearance-rate targets.
- Vehicles used as ambulances should be prepared and fitted for the task.
- If the ambulance/personnel and stores carrying vehicle is also to be utilised as the HF communications vehicle, additional radio communications or transport is required.
- When the site vehicle departs the site for any reason, including for a radio-check to Headquarters or to transport anyone anywhere, all demining work on the site is to cease.
- Supervision of teams at task sites should be subjected to a continuous regime of regular visits by managers or supervisors more senior than the team leader. These visits should be structured to check on safety, Quality Assurance and all other relevant aspects of the task.
- Reporting procedures and documentation should be reviewed generally. Daily reports should be scrutinised by management and actioned as required. Such activities as supervisory visits to sites and Casevac practices carried out should be recorded daily. These records should be checked and confirmed daily by headquarters staff. Every clearance site should maintain a site diary to record activities and visitors at the site.
- Team leader should have regular or constant access at the task site to a higher level of management, who can give immediate advice or supervision.
- If suitable solutions are not found to alleviate concerns about demining activities from World Bank monitors immediately, these concerns should be referred by monitors to the World Bank Senior Monitor on the day that they are first raised.
- Personnel with prior knowledge of a mined or suspect area must not be allowed or encouraged to create an environment of false confidence at a clearance site. All areas of minefields or suspect areas that have been mined or re-mined by Former Warring Factions should be treated equally. No assumptions should be made and all areas should be demined systematically.

Signed: World Bank rep., UN Mine Action Centre

Distribution

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