

10-14-2006

## DDASaccident489

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# DDAS Accident Report

## Accident details

<b>Report date:</b> 21/01/2008	<b>Accident number:</b> 489
<b>Accident time:</b> 09:15	<b>Accident Date:</b> 14/10/2006
<b>Where it occurred:</b> Task # H/1397, Durani Village, Koh-i-Safi District, Parwan Province	<b>Country:</b> Afghanistan
<b>Primary cause:</b> Field control inadequacy (?)	<b>Secondary cause:</b> Inadequate equipment (?)
<b>Class:</b> Excavation accident	<b>Date of main report:</b> 16/11/2006
<b>ID original source:</b> OPS/27/435-06	<b>Name of source:</b> UNMACA
<b>Organisation:</b> [Name removed]	
<b>Mine/device:</b> PMN-2 AP blast	<b>Ground condition:</b> bushes/scrub soft
<b>Date record created:</b>	<b>Date last modified:</b> 21/01/2008
<b>No of victims:</b> 1	<b>No of documents:</b> 2

## Map details

<b>Longitude:</b>	<b>Latitude:</b>
<b>Alt. coord. system:</b>	<b>Coordinates fixed by:</b> GPS
<b>Map east:</b> 069.37710°E	<b>Map north:</b> 34.86026' N
<b>Map scale:</b>	<b>Map series:</b>
<b>Map edition:</b>	<b>Map sheet:</b>
<b>Map name:</b>	

## Accident Notes

handtool may have increased injury (?)  
inadequate equipment (?)  
inadequate investigation (?)  
inadequate medical provision (?)  
squatting/kneeling to excavate (?)

## **Accident report**

The report of this accident was made available in August 2007 as a PDF file. Its conversion to a text file for editing means that some of the formatting has been lost. The substance of the report is reproduced below, edited for anonymity. The original PDF file is held on record. Text in [ ] is editorial.

## **REVIEW OF BOARD OF INQUIRY**

File: OPS-27/435106

To: Chief of Staff UNMACA, Kabul

From: BOI Review Panel Chairman UNMACA, Kabul

Date: 16 November 2006

Subject: REVIEW OF BOARD OF INQUIRY CA-87

### **Introduction**

On the 13 Nov 06 Chief of Staff of UNMACA appointed a panel to review the BOI into [International demining NGO] demining accident CA-87 that took place at Durani Village, Koh-1-Safi District of Pawan Province on 14 Oct 06.

Members of the panel appointed were [Name removed], Area Technical Advisor UNMACA (Chairman) and [Name removed], Quality Management Senior Associate UNMACA (Member).

The accident was investigated by [International demining NGO] on 14 Oct 06 and a BOI was convened by the UNMACA on 15 Oct 06 consisting of staff members of the Kabul UN Area Mine Action Centre. The reports from both investigations are attached.

### **Accident Details**

At 0915hrs on 14 Oct 06 whilst conducting clearance using the [International demining NGO] standard excavation drill at [International demining NGO] task H/1397, deminer [the Victim] of [International demining NGO] Manual Clearance Team 47 suffered fatal injuries as a result of detonating a PMN-2 AP mine.

[The Victim] had previously excavated 19xPMN-2 AP mines at the site prior to the accident occurring.

### **Site Details**

The demining site consists of undulating ground that contains bunkers, bund lines, trenches and eroded soil. The area is contaminated with pockets of PMN-2 AP mines less than 1m apart. There are also many UXO (Rifle grenades and canon projectiles) scattered throughout the site combined with other battlefield remnants and domestic waste.

Evidence of a detonated UXO (or possibly a booby-trapped munition) was found in and surrounding the blast crater at the base of the explosion. [No evidence of this was shown. The accident site is shown below.]



According to the BOI mines have moved or changed attitudes from that which they were originally laid making excavation riskier than usual.

The excavation depth for the clearance task is 10cm and some mines have been located down as far as of 8cm from the surface.

On 18 Aug 06 a previous demining accident occurred 15m from the site of the latest accident. The deminer in the previous accident suffered minor injuries.

### **Accident Scenario**

According to the information presented in the two investigations [the Victim] was tasked to commence clearance of a lane at a right-angle to an existing excavated lane. He commenced work in the lane at 0710hrs after being briefed by his Section Leader [Name removed]. He was later checked by the Assistant Team Leader [Name removed] at 0800hrs, who stated in his statement to the [International demining NGO] investigation, that he observed that the deminer was not excavating deep enough. He instructed the deminer to excavate deeper prior to advancing the End Lane Marker (ELM).

At 0830hrs the Section Leader checked on [the Victim] and drew the same conclusion as the Assistant TL. He also advised the deminer to excavate deeper prior to advancing the ELM.

During the investigations it was also revealed that the Team Leader was absent from the site on the day that the accident took place. The Assistant TL (Who is usually employed as a section leader during normal operations) took charge but did not assign a stand in section leader. This meant that there were only two section leaders available to supervise three sections. As a result the level of supervision and control over the site was diminished somewhat.

The [International demining NGO] Demining Supervisor did not visit the site even though he was aware that the TL was absent. Had he done so, a stand in section leader may have been appointed.

At the time that the accident occurred, [the Victim] was not under observation from a section leader. This occurred even though he had been corrected in his excavation technique twice since commencing work in the lane that morning.

The left glove of the deminer was damaged during the accident leading to the conclusion that he was using the excavation tool in his left hand at the time of the accident.

The excavation tool used had a triangular shaped blade with two sharp points at either end of the cutting edge. An element of force was necessary for the tool to penetrate the earth and it was stated by both the Assistant TL and the Section Leader that the deminer was excavating from the surface downwards instead of from the down the excavation face upwards.

[International demining NGO] SOP 7.3.3.1 clearly states that excavating should commence on the face of the excavation 2cm to 3cm below the surface and then continue close to the bottom of the excavation.

The accident occurred at 0915hrs and the team ceased operations in accordance with the SOP and conducted the casualty evacuation and accident reporting procedures.

### **Injuries Sustained**

[The Victim] had sustained a severe head injury as a result of the blade of his excavation tool being projected by the explosion into his visor and penetrating through to his skull. He also sustained injuries to his left shoulder and upper left leg. The fingers of his left hand had suffered minor lacerations.

### **Post Accident**

After the accident took place and the casualty was stabilized an attempt was made to deliver him by ambulance to the hospital facility inside Bagram Airfield (Coalition Base). The Bagram Hospital facility refused to treat the casualty and the ambulance was then diverted to Charikar Civilian Hospital in Pawan Province and later to Kabul Emergency Hospital where fifty minutes after arrival [the Victim] succumbed to the severity of his injuries and passed away.

### **Conclusions**

Contributing factors to the cause of the accident were:

That the deminer was not conducting the standard excavation drill in accordance with the [International demining NGO] SOP and though he had been corrected twice within one and one half hours of commencing work by his supervisors, he was not kept under constant observation to ensure that he excavated correctly.

There was a general lack of supervision on the site as a result of the Team Leader being absent on the day.

The style of excavation tool that was being employed had sharp points and required force to penetrate the ground. He was also using the tool with his left hand whilst excavating to the extreme right of the lane and may not have had as much control of the tool as he should.

The deminer was excavating from the surface downwards increasing the chance of applying pressure to the actuating plate of a PMN-2 AP mine.

There is a high probability the mine that detonated may have been at an angle. Extreme care was needed to be taken whilst he was excavating to ensure that the excavation tool did not come into contact with the actuating plate of a mine. It seems that [the Victim] did not exercise the appropriate amount of caution.

The remnants of the munition found at the seat of and around the blast crater suggests the presence of either an anti-disturbance device or a UXO. In either case the firing mechanism may have been very sensitive and susceptible to very minor disturbance.

It is the view of the BOI Reviewing Panel that the death of the deminer [Name removed] was as a result of him not adhering to the correct procedures for standard excavation and possibly not exercising enough caution whilst he was excavating.

Also, that the excavation tool that the deminer was using was inappropriate and dangerous and that it should be withdrawn from issue and replaced immediately.

The [International demining NGO] Demining Supervisor should have ensured that adequate supervision was employed on the site in the absence of the team leader.

Whilst not a contributing factor to the accident the fact that previous arrangements with the hospital at Bagram were not honoured on the day shows the need for better and more frequent liaison with the medical facility.

### **Recommendations**

The BOI Review Panel concurs with the recommendations of the investigation teams and [International demining NGO] has taken several corrective actions since the accident consisting of the following:

Retraining the team emphasizing on excavation drills and adherence to the SOP.

Increased the excavation depth for the site from 10cm to 20cm.

Additional training for the field doctors in treating head injuries.

Dismissal of the section leader.

Disciplinary action against the Supervisor and the Assistant TL.

Placing addition supervision on site.

Meeting with all senior site staff to reinforce the importance of correcting faults properly and to improve command and control measures.

Immediate introduction of a more suitable excavation tool.

The Senior Operations Officer will investigate with the Bagram Hospital Facility as to why the casualty was refused treatment.

The steps taken by [International demining NGO] as stated in their investigation report are deemed appropriate and adequate enough to avoid similar accidents in the future. Also the steps that they have taken to alleviate future delays to the casualty evacuation procedure are considered sufficient. Although an additional measure if Bagram Hospital Facility agrees to accept casualties in future would be to conduct periodical casevac practices through to the hospital doors.

Signed: [Four members of the Review Panel]

## **[International demining NGO] Accident Report — 14/10/06**

### **1. TASK INFORMATION**

Village: Durrani: District:Kohi-Safi: Province: Parwan: Task No.: H11397

Start Point: Grid 3857 586 N, 42 534 493 E

Lat/long: 34.86026' N, 069.37710°E

## 2. CASUALTY DETAILS

Name: [Name removed]: Team: 47: Position: Deminer

## 3. EXECUTIVE SUMMARY

At approximately 0915hrs on 14th October 2006, a [International demining NGO] deminer, [the Victim], suffered a demining accident on [International demining NGO] task number H/1397 in Durrani village, Kohi-Safi district.

The deminer sustained a severe head injury. He survived the initial blast but died approximately 4 hours later in hospital.

[International demining NGO]'s internal accident investigation team concluded that a slight left-to-right slope in the lane in which the deminer was working may have been a factor in causing the accidental detonation of the mine, particularly because the deminer was excavating the far right of the excavation face with his left hand, which would have increased the chance that he was working at a downward angle. However, with no eyewitness account, one can only speculate on the exact cause of the accident; other possible factors such a deep or angled mine, or human error cannot be discounted.

Whatever the cause of the blast, it would appear that the head injury sustained was largely a consequence of particularly bad luck. The physical evidence led to the conclusion that the blade of the excavation tool was propelled at a considerable velocity directly into the deminer's visor. The tool caused a crack in the visor that resulted in a deep wound to the deminer's forehead. Had the tool been projected in any other direction the deminer may well have escaped with relatively minor injuries.

[International demining NGO]'s accident investigation was carried out by [Name removed] (Senior Operations Officer), [Name removed] (Expat Officer, central region) and [Name removed] (Operations Officer, central region).

## 4. MINEFIELD DETAILS

Durrani village is located in Kohi-Safi district, to the southeast of Bagram airbase. During their occupation of Afghanistan in the 1979-89, the Russian army set up a military post in the village and laid protective minefields in defence against attack from Mujaheddin forces.

[International demining NGO] began clearance of this task on 1st August 2006, initially with a technical survey team and more recently with a full manual clearance team.

To date, only PMN2 anti-personnel blast mines have been found on this task. These have been found in concentrated pockets, often less than a metre apart.

Clearance of this task is problematic, for a number of reasons. Firstly, the task is interspersed with bunkers, bund lines, and areas of eroded soil. Secondly, part of the task is located on a hill with a large concentration of graves that need to be demined around and over. Thirdly, the task is heavily contaminated with domestic and battlefield waste and so requires a large amount of excavation. To add, there are many UXO scattered around the area, particularly launched grenades and cannon projectiles.

On 18th August 2006, a demining accident occurred on the same minefield, only about 15m from this accident. This too happened during the excavation of a mine, but on this occasion

the deminer only sustained minor injuries. The probable cause of this accident was careless excavation drills.

## 5. INJURIES SUSTAINED

The deminer sustained a severe injury to the left side of his forehead. The injury resulted in herniation of the brain and significant blood loss. This injury appears to have been caused by the blade of the excavation tool, which was propelled by the blast directly into the visor. The blade was travelling at such a speed that it cracked and penetrated the visor.

The deminer also sustained shrapnel wounds to his left shoulder and left upper leg.

The deminer survived the blast but did not regain consciousness. He died in hospital at approximately 1305hrs, just less than 4 hours after the accident.

[International demining NGO]'s visiting expatriate trauma specialist and senior doctors saw the casualty when he arrived at the hospital and stated that the head injury was so severe that even with immediate hospital treatment of the highest quality, the casualty would have had virtually no chance of survival.

Surprisingly, the deminer sustained negligible injuries to his hands and arms. It would seem that the gloves issued to the deminers provide a degree of protection against blast and fragmentation.

No injuries were sustained to other [International demining NGO] personnel or civilians.

## 6. MEDICAL TREATMENT & PROCEDURES

The casualty was administered first aid at the accident site by the paramedic and Field Doctor prior to being carried to the onsite ambulance. Reports state that the CASEVAC was well managed and properly administered.

The casualty was given plasma substitute due to the significant blood loss caused by the injuries. There is some contention as to whether plasma should be given to a patient with a head injury as it increases blood pressure, but the Field Doctor (with the advice of [International demining NGO] senior doctors who were in communication with the ambulance) deemed it necessary because of the degree of blood loss.

The casualty was first taken to Bagram airbase, which in the past has agreed to treat [International demining NGO] casualties. However, for reasons unbeknown, the staff at the airbase refused to treat the casualty.

The ambulance was redirected to Charikar Civilian Hospital in Parwan province. On arrival, the casualty was given an intubation as he was having trouble breathing. This intubation probably prolonged the survival period of the casualty. This medical facility, however, did not have the capability to treat the head injury and so the casualty (with the approval of Dr [Name removed], [International demining NGO] Afghanistan Programme Manager) was transported to the Kabul Emergency Hospital.

Unfortunately, [the Victim] died about 50 minutes after arriving at the Kabul hospital. (See Annexes D and E for Field Doctor's and Senior Doctor's reports).

## 7. PHYSICAL EVIDENCE

As per the SOPs, the accident site was left undisturbed. Because Saturday is a non-working day for the UN, the UNMACA investigation team did not visit the accident site until the following day (15/10/06). However, having completed their internal investigation, the [International demining NGO] team left the site mostly as they found it until UNMACA had

completed their assessment. (n.b. the detector was not left overnight due to the cost and sensitive nature of this piece of equipment).

(See Annex A for photos of the physical evidence).

The location and condition of the physical evidence were as follows:

**PMN2 MINE:** Fragments of casing and the pressure plate from a PMN2 anti-personnel blast mine were found in and close to the blast pit. This is consistent with all the other mines that have previously been found on this task.

**BLAST PIT:** The blast pit was centred approximately 30cm in front and to the far right of the end of lane marker (ELM).

**VISOR:** The visor and part of the headband were projected approximately 15m to the right of the accident site onto a path in uncleared area. Other parts of the plastic headband were found in the cleared area.

**APRON:** Other than dirt from the blast and blood from the deminer's wounds, the apron was in no way affected, damaged or ripped. The apron was left at the accident site as it was removed from the casualty during the administration of first aid. The deminer's jacket was also removed and left next to the apron.

**EXCAVATION TOOL:** What looked like the wooden handle of a tool was spotted approximately 10m in front of the lane. However, until a safe lane is cleared up to this point it will not be possible to verify if this is indeed a demining tool. The blade of the tool was not found, but judging by the velocity that it must have struck the visor, it is likely that it ricocheted a considerable distance into the uncleared area.

**ISOLATION MARKERS:** Two isolation markers (red wooden triangles) were seen in the uncleared area, 1m to the right and 2m in front of the blast pit respectively.

**HEAD SCARF:** The deminer's head scarf was in the uncleared area approximately 1/2m to the right of the lane.

**OTHER TOOLS:** All the other tools, including the detector, were unmoved in the cleared area and close to the lane in question. At first, there was some confusion as to why there was also an undamaged excavation tool along with all the other tools, but the Section Leader stated that this particular deminer had two such tools in his kit.

**GLOVES:** The deminer's left hand glove was torn around a number of the fingers, while the right hand glove was undamaged. This provided tangible proof that the deminer was excavating with his left hand.

## 8. OBSERVATIONS & VERBAL EVIDENCE

According to [International demining NGO]'s manual demining SOPs, the ELM should be 20cm behind the excavation face at the start of excavation and the deminer should excavate no further than 10cm forward — i.e. at the end of each excavation the ELM should be 30cm from the excavation face. It would seem, therefore, that the deminer was adhering to this SOP and not excavating too far ahead of the ELM. (Excessive excavation causes a deminer to lean too far over towards the uncleared area, which can affect his balance — particularly if on a slight downward slope — which in turn could result in an accidental detonation of a mine by a hand or tool. In this case, however, the evidence would suggest that this was not a factor).

The deminer's lane was on a slight downhill and left-to-right slope. The angle of these slopes were mild — this was not a glaring error in lane deployment, but may have contributed to the accident. (As stated in the Section 3 — Minefield Description, much of the minefield is

undulating and broken up by trenches, band lines, ditches etc. As a result, it would be virtually impossible to manually clear the entire site without deploying some lanes on slight slopes).

The damage to the left glove only shows that the deminer was excavating with his left hand. Due to the left-to-right slope, a left-handed excavation at the far right of the excavation face would have made it more difficult to ensure that the tool was used in a 'bottom to top' technique. This may also have affected the deminer's balance.

The deminer in question had previously located and excavated 19 PMN2s in this minefield. He should, therefore, have been very familiar with the size and magnitude of signal given by a PMN2. However, the presence of 2 isolation markers in the uncleared area suggests that he may have been having problems isolating the mine as a single signal.

The Section Leader claimed to have seen that the deminer was excavating with his left hand on the left-to-right slope. Later, however, his answers became muddled and his account did not come across as very credible.

When questioned why he had deployed a deminer in this lane, the Section Leader said he had planned to deploy the deminer to a different lane, but the deminer had told him that the command had come from the Team Leader the day before to work in the lane in question.

The Section Leader and Supervisor both reported that the deminer was not excavating as deeply as they had instructed him to do. This, however, came up in their written reports but was not mentioned at the time of the investigation, and so could have been an afterthought in an attempt to divert some of the blame away from themselves. (See Annexes H and F for Section Leader's and Supervisor's reports)

There is no evidence to suggest that the deminer was not wearing his apron or visor properly.

According to the Supervisor, the mines previously found on this task had been at varying depths, some as deep as 8cm. A deeply buried mine is more hazardous to the deminer as it increases the chance that during excavation the top of the mine might be struck.

The normal Team Leader was absent on the day of the accident. Therefore, the Assistant Team Leader was standing in as the Team Leader on the day of the accident. However, no one had been assigned to backfill his Section Leader role. As a result, there were only two Section Leaders onsite for three sections, and the stand-in Team Leader had a dual role.

The Supervisor was not onsite at the time of the accident — he was visiting another of his tasks in Bagram. He had not visited the task in question during the day.

## 9. COMMUNICATIONS

A few minutes after the accident, the onsite team informed [Name removed], the Central Region Operations Officer, via radio, who in turn informed the other relevant members of the senior management.

Dr [Name removed], [International demining NGO] Afghanistan Programme Manager, was not in the central region on the day of the accident but was kept updated of developments.

[Name removed], Head of Kabul AMAC, was phoned shortly after the accident, but could not be reached. An email was sent informing him of the key accident details.

[International demining NGO] Scotland Headquarters were kept updated by email as the information was gathered.

## 10. CONCLUSIONS

Because we do not have a statement from the deceased or an eyewitness account at the moment of the accident, it is only possible to speculate as to the exact reason why the deminer inadvertently detonated the mine. The slight left-to-right and downhill slope of the lane may have been a factor, and certainly the left-handed excavation would have exacerbated the difficulties of excavating a mine at the right-hand edge of the excavation face. This seems the mostly likely cause. However, other factors cannot be discounted, such as a deeply buried or angled mine; or human error such as a loss of concentration, the application of excessive force during excavation, or a loss of balance.

It would appear that the head injury sustained was largely a consequence of particularly bad luck. The physical evidence led to the conclusion that the blade of the excavation tool was propelled at a considerable velocity directly into the deminer's visor. The tool caused a crack in the visor that resulted in a deep wound and heavy impact to the deminer's forehead. Had the tool been projected in any other direction it may have either missed the deminer altogether or glanced off the curvature of the visor, and the deminer may well have escaped with relatively minor injuries. It is unclear whether it was the blade itself or the sharp crack in the visor (or a combination of both) that caused the deep open wound.

Whatever the cause, however, a series of 'end of lane' accidents draws the conclusion from [International demining NGO]'s senior management that greater focus needs to be placed on the command and control of minefields to ensure that demining drills are tightened up, lane placement is better thought through, mistakes are noticed sooner rather than later, and minefield managers are made more accountable for the actions of the deminers.

The assessment by [International demining NGO]'s senior doctors that the casualty's injuries were incompatible with survival takes some focus off the fact the casualty was refused at Bagram airbase. However, it is imperative that a formal agreement (with relevant emergency contacts, if possible) is made with this facility as to whether they will or will not accept a [International demining NGO] casualty. The time wasted in detouring to a facility that cannot/will not accept a casualty could be extremely costly.

Two similar accidents in as many months have called into question the excavation tool being used in [International demining NGO]'s central area of operations. The trowel shaped tool that is currently employed is used to chip as opposed to scrape the soil. An alternative tool with a curved head and angled blade — used on some [International demining NGO] minefields in the north of Afghanistan — may reduce the force being applied during excavations and will be trialled. (See Annex B for photos of excavation tools).

## 11. ACTIONS & RECOMMENDATIONS

The day after the accident, the entire team underwent a day of retraining with a focus on excavation drills. The retraining was managed by the Manual Demining Manager. The deminers were not permitted to return to work until the abovementioned was confident that every deminer displayed good excavation drills.

As some of the mines have been located at depths of up to 8cm, the excavation depth for the all excavations on the task in question has been increased from the standard 10cm to 20cm, particularly because the undulating lie of the minefield makes some excavations more difficult than usual.

[International demining NGO] senior doctors will discuss the rules and procedures for administration of fluids following a head injury and ensure that all medics and paramedics are informed accordingly.

The Senior Operations Officer will investigate why the casualty was not admitted by the Bagram airbase medical facility. He will also investigate and communicate future policy regarding the use of the Bagram facility.

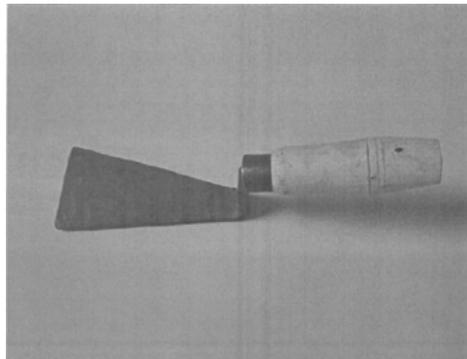
The Section Leader in question will be dismissed. Although it is impossible to say whether the slight slope of the lane was the main cause the accident, the Section Leader failed to act on the fact that the deminer was excavating with his left-hand on this left-to-right slope. In an area that was particularly densely mined and where there had already been an accident, this shows either negligence or a lack of common sense. Tragically, on this occasion, the mistake resulted in a fatality and so a firm reprimand is called for. To add, the Section Leader's dismissal will hopefully act as a message to other Section Leaders that they will be held accountable when deminers break SOPS or have accidents.

The Supervisor and Assistant Team Leader must also shoulder some responsibility for poor management. The Supervisor will be fined 5 day's salary and the Assistant Team Leader will be demoted. It was poor judgement by the Supervisor to opt not to be at the task in the morning when the regular Team Leader was absent. The stand-in Team Leader also has a responsibility for checking the lane placement and demining drills of each deminer.

A supervisor will be assigned to solely oversee this and its neighbouring task once the tasks in the Salang district are closed for the winter (probably at the beginning of December).

A meeting will be held with all manual demining Section Leaders, Team Leaders and Assistant Team Leaders to discuss the common faults that senior management and QA are finding on the minefields; the need to improve the overall level of command and control; and the fact that the Section Leaders and Assistant Team Leaders will be held accountable if demining drills are not adhered to.

An alternative excavation tool will be sourced and trialled in the central region to assess whether its design would be more suitable for excavation than the current 'chipping' trowel. [Shown below.]



The tool to be trialled in the Central Region is shown below.



On two separate occasions when deminers have detonated PMN2s during excavation the damage to their hands has been surprisingly negligible. This would suggest that the issued gloves are providing a degree of protection against both blast and fragmentation. Deminers should therefore be encouraged to wear their gloves during working hours, unless they have a good reason as to why the gloves would hinder their ability to safely carry out their drills.

Signed: Expat Officer, Central Region, [International demining NGO] Afghanistan

#### ANNEXES:

- A. Photos of accident site
- B. Photos of excavation tools
- C. Timeline of events
- D. Field Doctor's report
- E. Senior Doctor's report
- F. Supervisor's report
- G. Assistant Team Leader's report
- H. Section Leader's report

### **Annex C: Timeline of Events**

0710hrs — Demining commenced on task no. [International demining NGO]/1397.

0915hrs — Uncontrolled explosion causing severe head injury to [the Victim] 0930hrs — First Aid completed.

0935hrs — Ambulance and casualty departed from task, en route to hospital 1030hrs — Ambulance and casualty arrived at Charikar Civilian Hospital 1215hrs — Ambulance and casualty arrived at Kabul Emergency Hospital 1300-1305hrs — [the Victim] died.

### **Annex D — Field Doctor's Report**

On the above mentioned date at Kohi-Safi (Durrani) village at 0915hrs, an explosion occurred to Team [International demining NGO]-47. After being contacted by radio and receiving information from the Team Leader, I immediately drove towards the accident site with my ambulance. [The Victim], insurance number 3362, was injured and already moved from the

unsafe area to a safe area by 2 deminers. The paramedic and I started administering first aid. The casualty was in a deep coma and there was a large injury to the left frontal temporal site, covering the left eye and cranial bone. The brain tissue was herniated and exposed. His face was covered in dust and the airway was open. The wound was cleaned up and quickly dressed. The left shoulder, fingers and knee had small injuries. Immediately, a vein was opened and plasma fluid was intravenously administered. After dressing the small injuries, the casualty was ready to evacuate. He was in a deep coma and massive nasal bleeding had started. After inserting a nasal tampon at 0935hrs, the casualty was evacuated to Bagram (American hospital), but unfortunately this hospital didn't accept the patient. The nearby Arab Hospital didn't accept him either. By this time his breathing had become worse and we decided to take him to Charikar Hospital for intubation. After intubation in Charikar Hospital, the casualty was evacuated to Kabul Emergency Hospital. When he arrived at 1215hrs he was still alive; 50 minutes later he died.

Medication:

Serum of Ringer Lactate for washing Serum of Plasma x1000m1

Vial Benzyl Penicillin

Signed: Field Doctor.

## **Annex E - Senior Doctor's Report**

Details of injury:

Deminer [the Victim], whilst working at the above [International demining NGO] task in Durrani village accidentally detonated an AP mine. As a result of this explosion he sustained a severe head trauma with laceration of the left frontal and orbital bones and a big defect causing brain tissue herniation with complete loss of the left eye.

He also sustained small injuries to the left shoulder, left hand and upper part of the left leg. He was found unconscious at the scene of the accident. He was in a deep coma — Glasgow coma scale grade 2. He had difficulty breathing and a weak pulse.

Treatment given:

The deminer was in an unconscious state. He received immediate First Aid by the team paramedics. His vein was opened and he received 5,000,000 units of Benzyl penicillin by I.V. and normal saline injection. His injuries were irrigated with normal saline.

After initial First Aid, the victim received the following treatment before reaching hospital:

1. Normal Saline 0.9% - 1000m1
2. Benzyl penicillin — 5,000,000 units

The casualty was initially evacuated to the Parwan Provincial Hospital for intubation because of the difficulty in his breathing and for advanced trauma care. He was later transferred to the Emergency Hospital in Kabul. He passed away at the Emergency Hospital due to the severity of his injuries.

Dr [Name removed], [International demining NGO] Senior Doctor.

## **Annex F — Supervisor's report**

I, Supervisor [Name removed], visited Team 47 at 1000hrs on 13/10/06 at Task 1397 in Kohi-Safi location. The day before, a mine was found in the working lane of [the Victim]. I instructed him, in the presence of the Team Leader, as follows:

To start with he must excavate deeply where he was working. When he had excavated down to the original level of the land on the right side of his lane he should continue excavating forwards as normal. After supervising the other lanes, I left at 1140hrs for Bagram.

The next day, on 14/10/06, I visited Khlazai and Qalai Noor Khan tasks. While I was on the way to Kohi-Safi, near to Bagram Dosaraka and Khalazai, [Name removed] the radio operator called me and told me about the accident. I rushed to Kohi-Safi. On the way, near to Dorrani village, I met the ambulance (233). I saw the patient, who was bleeding. The ambulance continued towards the hospital. I continued to the minefield as the Operations Officer had instructed me to do so.

When I arrived at the minefield I found that unfortunately the deminer had not been working as I had instructed him. He was working in the wrong direction.

### **Annex G - Assistant Team Leader's report**

We started work at 0710hrs. Having checked the lanes of the other deminers and instructed them according to the SOPs, I went to the lane of the deceased deminer at 0800hrs and instructed him about excavating, about which the Supervisor and Team Leader had also instructed him. For example, I instructed that he excavate deeply to the original level of the land before he moved his lane marking forward. I also ensured he was wearing his safety equipment. Afterwards, I was busy controlling the other lanes.

At 0910hrs, after a break, I went to check the detector of deminer [Name removed] because he was complaining about his detector. At 0915hrs, there was an uncontrolled explosion in [the Victim]'s lane. The distance between [where he was] and [the Victim]'s lanes was 75m.

First Aid: It took 15 minutes to administer the first aid to the casualty, and after 17 minutes he was taken to hospital.

Reason for the explosion: As the deminer was working with his left hand, he was excavating from the top of his lane which put pressure on the mine and caused the explosion.

Use of the safety equipment: When the deminer was checked, he was wearing his safety equipment properly.

Signed: Assistant Team Leader.

### **Annex H - Section Leader's report**

We started work at 0710hrs. The deminer in question was deployed in Section 2, and I instructed him to start work from a cleared area and excavate deeply to the original level of the land before going forward, and to continue the work according to the SOPs and the Supervisor's instruction.

At 0830, I went to his lane again and found that he wasn't working according to my instruction. I instructed him again to excavate deeply which he accepted, and so I went from his lane to control other lanes. At 0915hrs the explosion occurred and I was 50m from the incident.

Jacket and visor: The deminer in question was using the safety equipment properly.

First Aid: It took 15 minutes to administer the first aid to the casualty, and after 17 minutes he was taken to hospital.

Reason for the explosion: As the deminer was working with his left hand, he was excavating from the top of his lane which put pressure on the mine and caused the explosion.

Signed: Section Leader.

## **From IMSA report**

[Extracts that add to the information above. IMSMA forms have tick-box entries that are often too limited to be of much use, and are frequently left blank.]

During excavation the deminer apply more pressure which caused mine to be exploded.

While the deminer was excavating the scraper has touched the mine and caused the accident.

**History of the Minefield:** Russian has planted mine at the top areas to secure their post from possible Mujahideen attached. And also during the internal fighting between Islamic parties and government. Local people and local authority requested clearance of the area.

Technical survey is started on 01-08-06 and clearance started on 01-09-06.

**Description of the incident/accident:** On 14-10-06 at around 9:15 his suddenly an explosion occurred on lane, which [the Victim] was excavating, to uncover a mine while he was working with left hand at the front right side of the stake. As he brought more pressure on the trowel and it hit top of the mine and accident happened.

We stopped the operation and informed site supervisor and field doctor to start first aid on injured person. With 18 minutes first aid was applied and patient shifted to the hospital.

“Visor – Deminer accidentally detonated mine while excavating. Excavation tool was propelled directly at visor, causing a crack and penetrating visor. The blade of the tool and/or the crack of visor impacted the deminer’s head causing a deep wound to the forehead that proved fatal.”

**Description of equipment damage:** The scraper, Visor, and the left hand glove had got damaged.

**Site conditions:** The terrain was described as uneven hillside. The soil was “soft”. The weather was “clear” and the vegetation was “bush”.

**Team and task details:** For the period of two months [since the team arrived at the site] no QA inspection has taken place. Working hours are from 06:30 until 12:00. There is a rest of ten minutes every thirty minutes. The tool used was the “Normal type scraper that the masons are using”. Last leave was from 21-09-06 to 30-09-06. The deminers were requesting the clearance depth to be increased from 10 Cm to 15 Cm.

**Medical reaction time:** It took two minutes for the paramedic to reach the accident site. The paramedic treated the casualty for 18 minutes before he was placed in the ambulance for transportation. It took 40 minutes to drive 22 Km to the hospital. [It took three and a half hours for the Victim to reach a hospital with appropriate medical facilities.]

## **Conclusion**

Following are the points which we found:

1. As we observed the area which accident had happened is mine belt area. Much supervision is to be done by command group, as experiences are shown in such area it obvious occurring of accident. From the statements of command group it shows that no one was controlling the deminer during operations.
2. As much soil is being immigrated from the top to the lower spot of the area. To identify the original ground level, it needs to work from bottom to top, which is safest method. This method would rid of any confusion about disposition of the mine and facilitate for identifying the level of the ground.
3. Clearance was conducting from side way lane, which causing some confusion in demining the actual ground surface. The best method is to clear a lane at the bottom of the sloppy area then work should start upward, which is safest way. We observed the area lane which accident occurred had worked as a side way.

Based on above points we reach the following facts:

- As much soil finding covered area the original ground surface of the ground is very important to be recognized. Unfortunately the victim deminer has not taken care of this point.
- He was excavating 10 cm and was thinking of a normal surface, which caused the accident by touching the trowel on top of the mine.

### **Recommendations**

Following points are recommended:

1. Close monitoring by command group.
2. Command group should explain main points for deminer prior to the commencement of operations on such area.
3. In sloppy [sloping] area experience shows that mines position are being changed, so, it deems necessary that to be more cautious conducting operations from bottom to top.
4. A cross lane should be cleared at the bottom part of the sloppy area then work should conduct from bottom to top as per procedure and obtaining full safety.

Attachments: [Held on file]

### **Follow up letter**

File: OPS103101-20

From: Acting Chief of Operations UNMACA

13 December 2006

Subject: Follow up action on BOI C-87 (Demining Fatality)

[International demining NGO], MCT-47 at Task # H11397 Durani Village, Koh-e-Safi District of Parwan Province

Reference: Demining Investigation Report File: OPS/27/435-06: Report of Board of Inquiry, Dated: 16 November 2006.

## **Introduction**

All addressees should review the recommendations below and initiate appropriate action within your organizations where you deem necessary.

A fatal demining accident occurred on October 14, 2006, at Task # H/1397, Durani Village, Koh-i-Safi District, Parwan Province. A PMN-2 AP mine exploded causing the subsequent death of [the Victim], a deminer from MCT-47 of [International demining NGO].

Contributing factors to this accident are described below and are the conclusions of Board of Inquiry assigned to the investigation of the accident.

## **Conclusions of the BOI**

1. That the deminer was not conducting the standard excavation drill in accordance with the [International demining NGO] SOP and though he had been corrected twice within one and one half hours of commencing work by his supervisors, he was not kept under constant observation to ensure that he excavated correctly.
2. There was a general lack of supervision on the site as a result of the Team Leader being absent on the day.
3. The style of excavation tool that was being employed had sharp points and required force to penetrate the ground. He was also using the tool with his left hand whilst excavating to the extreme right of the lane and may not have had as much control of the tool as he should.
4. The deminer was excavating from the surface downwards increasing the chance of applying pressure to the actuating plate of a PMN-2 AP mine.
5. There is a high probability the mine that detonated may have been at an angle. Extreme care was needed to be taken whilst he was excavating to ensure that the excavation tool did not come into contact with the actuating plate of a mine. It seems that [the Victim] did not exercise the appropriate amount of caution.
6. The remnants of the munition found at the seat of and around the blast crater suggests the presence of either an anti-disturbance device or a UXO. In either case the firing mechanism may have been very sensitive and susceptible to very minor disturbance.
7. It is the view of the BOI Reviewing Panel that the death of the deminer [Name removed] was as a result of him not adhering to the correct procedures for standard excavation and possibly not exercising enough caution whilst he was excavating.
8. Also, that the excavation tool that the deminer was using was inappropriate and dangerous and that it should be withdrawn from issue and replaced immediately.
9. The [International demining NGO] Demining Supervisor should have ensured that adequate supervision was employed on the site in the absence of the team leader.
10. Whilst not a contributing factor to the accident the fact that previous arrangements with the hospital at Bagram were not honoured on the day shows the need for better and more frequent liaison with the medical facility is required.

## **Recommendations of the BOI**

1. The BOI Review Panel concurs with the recommendations of investigation teams and [International demining NGO] has taken several corrective actions since the accident consisting of the following:
2. Retraining the team emphasizing on excavation drills and adherence to the SOP.
3. Increased the excavation depth for the site from 10cm to 20cm.
4. Additional training for the field doctors in treating head injuries.
5. Dismissal of the section leader.
6. Disciplinary action against the Supervisor and the Assistant TL.
7. Placing additional supervision on site.
8. Meeting with all senior site staff to reinforce the importance of correcting faults properly and to improve command and control measures.
9. Immediate introduction of a more suitable excavation tool.
10. The Senior Operations Officer will investigate with the Bagram Hospital Facility as to why the casualty was refused treatment.
11. The steps taken by [International demining NGO] as stated in their investigation report are deemed appropriate and adequate enough to avoid similar accidents in the future. Also the steps that they have taken to alleviate future delays to the casualty evacuation procedure are considered sufficient. Although an additional measure if Bagram Hospital Facility agrees to accept casualties in future would be to conduct periodical CASEVAC practices through to the hospital doors.

Distribution List

AMACs (5), Sub AMAC Gardez, Sub AMAC Kunduz and Director [International demining NGO]

Attachment Not Included: [A;; other demining NGOs working in-country.]

### Victim Report

<b>Victim number:</b> 652	<b>Name:</b> [Name removed]
<b>Age:</b> 23	<b>Gender:</b> Male
<b>Status:</b> deminer	<b>Fit for work:</b> DECEASED
<b>Compensation:</b> Not made available	<b>Time to hospital:</b> Three hours and 15 minutes.
<b>Protection issued:</b> Short frontal vest Long visor	<b>Protection used:</b> Short frontal vest, Long visor

**Summary of injuries:**

minor Hand  
 minor Leg  
 minor Shoulder

severe Face

severe Head

AMPUTATION/LOSS: Eye

FATAL

COMMENT: See Medical report.

## Medical report

Victim's DoB: 1983

Field doctor's statement "...we checked the breath system it was open. Then we checked the injury of the left side of the fore head. We washed the injuries and then dressed it then we start to give the serum to the patient. At the moment bleeding started from his nose because his nose was broken. To provide better breathing system we changed the position of the body of the mentioned deminer. Then the deminer was ready to be transferred to the ambulance. It was 09:30 that the ambulance left the area. On the way to the hospital we give the patient some antibiotics and one bag of the serum was finished and we give the second one. At 10:30 in the morning we reached to Bagram Hospital. The American and Arab doctors reject to accept the patient to admit him for the treatment. Then I shared the problem with the medical officer in the main office and asked guidance. The camp manager Dr. [Name removed] was also, had come to the hospital in Bagram. Dr. [Name removed] called on Dr. [Name removed] and finally we decided that first we will take the patient to Charikar hospital and then to the Emergency hospital in Kabul, It took about two hrs till we reached to Kabul. At 1230 in the afternoon the patient was admitted the hospital. Unfortunately they could not do any thing and at 1310 they handed the patient body back to us."

Senior Doctor's statement: "...he sustained a severe head trauma with laceration of the left frontal and orbital bones and a big defect causing brain tissue herniation with complete loss of the left eye.

"He also sustained small injuries to the left shoulder, left hand and upper part of the left leg. He was found unconscious at the scene of the accident. He was in a deep coma — Glasgow coma scale grade 2. He had difficulty breathing and a weak pulse.

"Treatment given:

"The deminer was in an unconscious state. He received immediate First Aid by the team paramedics. His vein was opened and he received 5,000,000 units of Benzyl penicillin by I.V. and normal saline injection. His injuries were irrigated with normal saline.

"After initial First Aid, the victim received the following treatment before reaching hospital:

"1. Normal Saline 0.9% - 1000ml

"2. Benzyl penicillin — 5,000,000 units

"The casualty was initially evacuated to the Parwan Provincial Hospital for intubation because of the difficulty in his breathing and for advanced trauma care. He was later transferred to the Emergency Hospital in Kabul. He passed away at the Emergency Hospital due to the severity of his injuries."

## STATEMENTS

### **Statement and Witness Report 1: Field doctor**

Q.No.01: Would you please explain how the accident occurred and what did you do after the accident?

A.to Q.No 01: While the accident was occurring I was near to the Ambulance. It was 09:15 in the morning after the break time that suddenly the mine exploded. I could not keep contact with the team Leader of team No 47. As the work area of team No S-5 was in an area a little bit higher then this area so, and the team leader of team no. S-5 asked me to start and go to the area of team No. 47. Very soon and on time I reached to the area with the consultation of one of the deminers through a clear path I get next to the injured deminer then I arranged to transfer the injured deminer by the strature [stretcher] and asked the nurses to start the First Aid

Q.No. 02: When the accident happened and how long does it take that you helped the injured deminer with the First Aid help.

A. Q. No 02: After the patient reached to the nurses, the nurses start to help the patient as per [International demining NGO] SOP. We start the help and first we checked the breath system it was open. Then we checked the injury of the left side of the fore head. We washed the injuries and then dressed it then we start to give the serum to the patient. At the moment bleeding started from his nose because his nose was broken. To provide better breathing system we changed the position of the body of the mentioned deminer. Then the deminer was ready to be transferred to the ambulance. It was 09:30 that the ambulance left the area. On the way to the hospital we give the patient some antibiotics and one bag of the serum was finished and we give the second one. At 10:30 in the morning we reached to Bagram Hospital. The American and Arab doctors reject to accept the patient to admit him for the treatment. Then I shared the problem with the medical officer in the main office and asked guidance. The camp manager Dr. [Name removed] was also, had come to the hospital in Bagram. Dr. [Name removed] called on Dr. [Name removed] and finally we decided that first we will take the patient to Charikar hospital and then to the Emergency hospital in Kabul, It took about two hrs till we reached to Kabul. At 1230 in the afternoon the patient was admitted the hospital. Unfortunately they could not do any thing and at 1310 they handed the patient body back to us.

### **Statement and Witness Report 2: deminer**

Question:

1. Please introduce yourself?
2. How the accident happened?
3. Please declare that what was the cause of the accident and what points should be taken into considerations, in order to avoid further accidents at the future?
4. What do you think about the depth of the exploded mine and also tell us how deep you investigating the mark?

Answer:

1. I am [Name removed] deminer of Team # 47 resident of Khwaja Boghra Kabul. Since 2004 I am working with [International demining NGO].

2. I heard a sudden voice of explosion, my neighbour party [the Victim] blown by mine. Without delay I reached my self to help him [and] pull him out from the accident spot. I with the help of section leader brought him in safe area for applying first aid to him.
3. As per my past experiences in demining, many years has passed on this minefield and much soil has been lain on top of the cultivated mines, it increased depth of the mines. The danger point is that mostly mine positions have been changed, this causing deminer to be confused. So, in such situation deminer should investigate mines in deeper depth and should be very careful about disposition of mine.
4. I think depth of the exploded mine was more then 10 Cm and deminer should search for deeper depth, in order to make sure himself that finding original ground surface.
5. Recommendation is to increase the depth of the excavation from the current depth which is 30 Cm.

### **Statement and Witness Report 3: Section Leader**

Would you please answer the following questions? Questions:

1. Please describe how the accident happened?
2. How many days you have worked in this task?
3. Please give me a short examination about this task?
4. When was the last QA and also last MEDIVA exercise dates?
5. What was the deminer fault caused the accident?
6. Salary is on time?
7. As the accident point was observed much soil is existed that increased depth of the ground what do you think?
8. How deep do you investigate for mine and also tell me in which depth the deseeded deminer was working?

Answers:

1. On 14-10-06 at 7:10 we have started our daily operation Deminer [the Victim] deminer start his work as normal. As the deminer was a good deminer and were doing demining operations with full discipline and his work was according to the [International demining NGO] SOP. While he was working with his left hand his excavation tool touched with top of the mine which caused accident. I was controlling him from a 50 m distances.
2. About 35 working days from 01-09-06 till 14-10-06. We have found about 33 PMN2 mines.
3. In year 1985 Russian has planted mine to protect their posts form any possible enemy attack.
4. At the beginning of each [work] cycle. It means last MEDIVAC has been done on 1 Oct. No QA has been done in this task.
5. I think his working with left hand side and working with both hands may have caused the accident.
6. Yes.
7. We are doing our work according to the SOP and also instruction from Supervisor.

8. We have been working as depth of 15 Cm as per supervisor order. Deminer was obtaining the same order it means he was excavating the area with the depth of 15 Cm.

#### **Statement and Witness Report 4: Assistant Team Leader**

Q.No.01: Would you please explain how the accident occurred?

A.to Q.No 01: It was 14.10.06 about 0915 that suddenly an accident happened in the working lane of [the Victim]. While the mentioned deminer was scraping the spot at right front hand of the wooden stick. It seems the accident cause was the pressure that was brought to the mine by the scraper during excavation. We stopped the operation suddenly and informed the supervisor and the doctor. Within 18 minutes the first Aid operation finished and the patient transferred to hospital.

Q.No. 02: If you please write something about the MF history and what have done in this MF yet?

A.Q. No 02: In the year 1985 the MF has been planted with mine by the Russian soldiers to maintain the security of the Government posts and MCT No. 47 within two cycles are busy in mine field No. 1397. We have observed all Demining procedures as normal according to [International demining group] SOP.

Q. No. 03: When the last QA was done in and when was the last Medical Evacuation drill?

A. Q. No. 03: Within two months there were no QA inspections.

Q. No. 04: What do you think which fault of the deminer cause the accident?

A. Q. No. 04: There was no problem with the deminer line and string but the working on left side of the stick cause the pressure to be brought on the mine.

#### **Analysis**

The primary cause of this accident is listed as a “Field control inadequacy” because the investigators determined that the appropriate field-controls were not in place.

The Secondary cause of this accident is listed as “inadequate equipment” because the hand-tool in use was not designed for purpose, was not made using appropriate materials, and was recognised by the investigators and the International demining NGO as having contributed to injury.

Both causes are ultimately “Management control inadequacies” because the demining group’s managers only recognised them after the event. Their proposed replacement hand-tool has all the inappropriate design features of the tool it will replace, and represents a significant failure to learn from experience.

The extent of injury inflicted by a relatively small AP blast mine is unprecedented if the visor was worn in the down position.

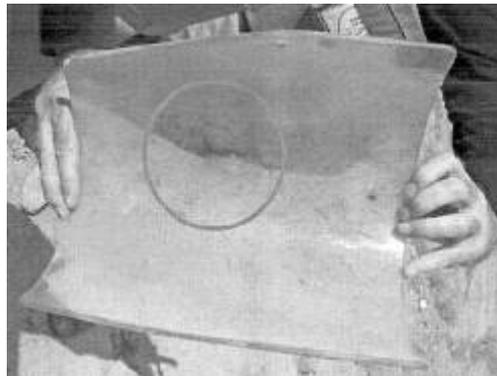
The “inadequate investigation” listed under notes refers to the fact that the authorities accepted the International demining NGO’s explanation of events, including the claims that the Victim’s injuries resulted from a single fragment of hand-tool penetrating the visor, and that the delay in reaching an appropriate medical facility did not affect the Victim’s chance of

survival. The body was returned to the demining NGO almost immediately, so implying that no investigative autopsy was performed. Both of the above claims are questionable.

The visor is shown below, pictures reproduced from the International Demining NGO's internal report.



Deminer's visor — reverse ("crack" from tool circled below)



The damage is below the middle of the visor. The forehead of anyone wearing the visor correctly would have been at least 5cm higher. The Visor head-frame was shattered in the event. The brittle plastic head-frame of this design of visor frequently breaks in a blast event but rarely shatters. Its destruction may imply that it was being worn with the visor raised so the visor's position at the time of the accident cannot be known with certainty.



The visor had "cracked" away from a 3cm (approx.) penetration. Polycarbonate in good condition does not crack readily. A sharp object had penetrated the visor. Given the shape and the tool believed to have been in use, it was probably a part of the tool's blade. The tool is not designed using ductile blast resistant materials, so may have shattered, but it is mild steel and the entire blade may have struck the visor in one distorted piece. The crack propagating from the hole may imply that the whole piece could not pass through, and so the

blade was intact. The blade (or part thereof) would have been hot, and the visor was penetrated by a combination of speed and heat. It may have fallen out afterwards or passed right through. If a fragment passed right through, it could have gone on into the Victim's head. Because no x-rays of the head were taken, it is not possible to know whether a fragment was lodged inside.

A forehead wound caused by a fragment that passed through that hole implies that the visor was either raised, or not present when the projectile struck. Injuries suffered were the complete loss of one eye, a forehead injury that resulted in "brain tissue herniation", and a broken nose that bled profusely. This combination of injury is unlikely to have been made by a single fragment (approximately 3cm long) entering lower in the visor. Perhaps the visor was not in place in front of the Victim's face. It may have been in a raised position.

The "Inadequate medical provision" listed under "Notes" is recorded because, with no post-mortem cranial investigation, it is not possible for the International demining NGO's internal staff to reliably determine whether the lengthy delay in hospitalisation contributed to the Victim's death. The three and a half hour delay may very well have been significant.

The Victim's shoulder injury is another example of this demining group's failure to provide appropriate PPE. Shoulder injury would have been avoided if the Victim had been wearing IMAS compatible body protection.