

# DDAS Accident Report

## Accident details

<b>Report date:</b> 31/07/2006	<b>Accident number:</b> 427
<b>Accident time:</b> 07:50	<b>Accident Date:</b> 26/06/2003
<b>Where it occurred:</b> Talaimannar Pier, Mannar district	<b>Country:</b> Sri Lanka
<b>Primary cause:</b> Unavoidable (?)	<b>Secondary cause:</b> Inadequate equipment (?)
<b>Class:</b> Missed-mine accident	<b>Date of main report:</b> 12/08/2003
<b>ID original source:</b> MAN/03/001	<b>Name of source:</b> [Name removed]
<b>Organisation:</b> [Name removed]	
<b>Mine/device:</b> Type 72 AP blast	<b>Ground condition:</b> dry/dusty metal fragments sandy
<b>Date record created:</b> 29/07/2006	<b>Date last modified:</b> 31/07/2006
<b>No of victims:</b> 1	<b>No of documents:</b> 4

## Map details

<b>Longitude:</b>	<b>Latitude:</b>
<b>Alt. coord. system:</b>	<b>Coordinates fixed by:</b>
<b>Map east:</b> E79 43' 52"	<b>Map north:</b> N09 06' 24"
<b>Map scale:</b>	<b>Map series:</b>
<b>Map edition:</b>	<b>Map sheet:</b>
<b>Map name:</b>	

## Accident Notes

inadequate metal-detector (?)

inadequate equipment (?)

mine/device found in "cleared" area (?)

## Accident report

A preliminary investigation report was made available in 2005. The UNDP Inquiry report was made available in 2006, and is held on record. It duplicates the following, which has been edited for anonymity.

## Preliminary Investigation Report

1.

a) This accident report has been written in accordance with the terms of reference supplied by the [Demining group] SOP in the absence of Program manager who is on leave . A copy of the terms of reference is attached at Annex A.

2.

a) The accident occurred at approximately 7.50 am on Thursday 26th June 2003 . [Demining group] demining site at Thalaimannar Pier, in the Mannar District of Northern Province of Sri Lanka (Long /Lat N09° 06' 24", E79° 43' 52"). The casualty was taken place whilst demining . No witnesses to the accident. [In an IMSMA style form, the level of vegetation was selected as "light" and "grass".]

According to the deminer statement He has cleared the line about 1 m to 1,5 meter and made search for signal in one location he got more signals and have made a deep hole to try to located the signals when he was satisfy with the investigation of the hole he has moved his base stick and got up from his knee position to take the gardening shear in order to cut side vegetation at that time his left leg twisted skid towards in the previous excavation hole . Immediately he heard some noise and sand and dust all over his body the smoke also coming from the direction and he fell down. Prior to the explosion, the casualty had been getting multiple signals from the large amount of disintegrating barbed wire in the area. He was confused by the large number of signals and failed to investigate all of them, believing then to be barbed wire fragments.



[A picture of the accident site is shown above.]

The deminer failed to inform his section leader, team leader or supervisor that he was having difficulties. He was using a new Ebinger 421GC detector, serial number 537. This detector was successfully tested on 30 June 2003 in [Demining group] Vavuniya office in presence of DMAO Technical Advisor ,[Demining group] Operation officer and MAT Supervisor. The test was realize by using a test piece containing a Live detonator of Pakistani AP P4 mine buried at 13 cm from the top side of the test piece. After this test another detector use by the team was successfully tested in the same condition.

The accident crater was approximately 15 cm behind to the base stick, and ground checked by the deminer. It has a depth of 19cm and a diameter of 54 cm.



[A picture of the crater is shown above.]

This indicates that the mine was buried more than 13 cm below the surface. The centre of the crater was 75cm from an existing barbed wire fence. Excavation of the crater revealed fragments of a China Type 72 antipersonnel blast mine (see device technical report on Annex g).

The mine was activated by the inside of the deminer's left heel. The sole of the boot sustained no damage. I surmise that the deminer may have stood on the side of his investigation hole and pushed the very loose sand onto a mine. This sand initiated the mine and also provided a buffer from the effect of the blast lessening the potential injury .

b) The casualty sustained calcaneus heel minor crack on his left leg. There were 2 deep lacerations, one on either side of the heel. There was also a very minor scratch on the right forearm that required no medical treatment. The injuries to the foot were caused by the passage of the explosive shock wave. The surgeon who conducted an exploratory procedure found no large foreign objects in the lacerations.

[It took four minutes for the victim to receive medical care, and 25 minutes to reach the local hospital where he was stabilised for 30 minutes before being moved to a final surgical facility 120 km away (2 hours).]

c) There was no damage caused to any [Demining group] equipments or private property. Only the deminer's left boot were slightly damaged in the blast. (see photograph below).



d) The deminer had successfully completed the [Demining group] basic deminer course which was held in Vavuniya during the period of 10 March to 05 April 2003. Due to the lack of demining equipment he was placed on standby until June 16 2003. Since that date he has been working in Talaimannar minefield, [Demining group] supervisory staff had closely monitored him; he spent his first week in a low-risk area and only moved into the minefield when it was felt that he had enough confidence . During his second week of work he found 6 mines.

e) Deminers had started work at the site at 6.30am. The accident happened at 7.50 am. There had been no rest periods in that time. The morning is a relatively cool part of the day. The next scheduled break for the deminer was a 30-minute break at 8.00am – for breakfast.

f) The deminer had started work two weeks prior to the accident. He had not had leave.

g) No internal QA evaluations had been conducted.

h) No refresher training have been carried out for the team.

The casualty was wearing his personal protective equipment, his helmet and visor, his kneepads and his boots according to the Sri Lanka [Demining group] SOP .

J) The Helmet, visor, a protective jacket has been inspected and no fragmentation pieces mark or any part of mine body or soil or part The only parts of the equipment related to this accident is only boots. If the deminer has not wearing boots, most probably severe injuries would probably caused to the deminer.

k) 1 ambulance and 2 trained medic with fully equipped trauma kit were available on site The medic and ambulance reached the deminer within approximately 3 minutes of the detonation. He was immediately given first aid and evacuated to Mannar Base Hospital, in accordance with the casualty evacuation drill. The medic acted professionally, quickly and in accordance with his training.

l) The area where the deminer was working in a heavily metal contaminated area, (adjacent to rusting barbed wire exposed to salt sea air for the last ten years) the signals from the mine detector may have confused the deminer.

It is impossible to clear these areas from "metal free" . Working in these areas, the deminers have been told by the section leader to excavate all readings down to 13 centimetres, and quite often means excavating the entire area it is more likely that the mine was buried at a depth of greater than 13cm.

The weather was good at the accident time no strong wind or heavy temperature was reported .There is no evidence, or reason to suspect, that drugs, medication or alcohol contributed towards the accident.

- m) In the sandy areas extremely contaminated by particles of metal like old rusty barbed wire fence . Excavation drill to a depth of 15cm minimum should replace detectors in this area.
- n) The deminer had no known health concerns prior to the accident. During the training period of the basic deminer course he has passed a complete medical check given by surgeon working in Vavuniya government hospital. Nothing special was reported
- o) Drinking water is available at the site. All deminers have water bottles and are encouraged to drink as much as they need. Deminers are given a daily food allowance and can buy food from a shop close to the minefield. Covered rest areas are established throughout the minefield.
- p) There is no systematic rotation of deminers between lanes. The composition of the team varies from week to week to give deminers experience of different tasks between Vavuniya and Mannar district .

### 3.

a) Close to the accident site an old bakery was establish some year ago all the ashes resulting the use of the oven of the bakery was sprayed all around for many year mixing with the original sand. The crater caused by the detonation was 19 cm deep, suggesting that the mine was buried at a depth greater than the 13cm recommended by [Demining group] SOP Sri Lanka .Since the team began working on this task on 19th February 2003 they had removed 986 Chinese Type 72A, 107 Pakistani P4s and 9 Claymore type mines by 20th June. Except for the mine involved in the accident, all other mines were surface laid or were laid within 5 cm under the surface.

(The area is located between 2 barbwire fences. The soil is heavily contaminated by metal from rusty fence and domestic scrap. The soil is constituted by sand and ash from an old bakery located close to the fence.)

The Deminer was relative inexperience due to his stand by after the training. It concern that the deminer became confused by the large number of signals he was receiving from his detector, and may not properly investigate all the reading .

Although it is most likely that the accident was caused by a deeply buried mine, it is not known if the deminer's non-compliance with SOPs contributed towards the accident.

### 4.

a) Detectors will not be used in the heavily metal contaminated area like between old rusty barbed wire fence. These areas should be cleared using excavation methods down to a minimum depth of 15cms.

And clearly identify from other area free of metal by using wooden red post deeply buried around all the perimeter of the no free of metal area.

b) No modification of equipment are required the deminer tool kit contain already a small hand gardening rake for excavation in sandy areas.

c) The complete team should receive a refreshing training on:

Action "on signal reading investigation " including immediate reporting to supervision staff in case of any problem or difficulties occur, full excavation drill and using detector in areas heavily contaminated by metal.

d) Detectors will not be used in the heavily metal contaminated area like between old rusty barbed wire fence. These areas should be cleared using excavation methods down to a minimum depth of 15cms.

e) The internal QC control should take place on a daily basis in high metal contaminated areas.

f) In order to maximise the working time in the cooler morning hours, working time should be rescheduled. The system of rest breaks should be re implemented in accordance with [Demining group] Sri Lanka SOPs.

Signed: [Demining group] Operation Officer

Annexes: [All held on file, but none with embedded photographs/]

A copy of the terms of reference for this report

A copy of the preliminary investigation report

Statements of witnesses and concerned [Demining group] personnel

Photographs of accident site and equipments

A sketch map of the accident site

A medical report from Vavuniya general hospital

A device technical report

### Victim Report

**Victim number:** 570

**Name:** [Name removed]

**Age:**

**Gender:** Male

**Status:** deminer

**Fit for work:** not known

**Compensation:** Not made available

**Time to hospital:** 25 minutes

**Protection issued:** Not recorded

**Protection used:** Not recorded, worn

#### Summary of injuries:

INJURIES

minor Arm

severe Foot

COMMENT

See Medical report.

#### Medical report

A scribbled medical note from Base hospital, Vavuniya includes "Plan: has to be non weight bearing for 3 months".

The National Authority report listed the injuries as: "fractured left heel bone. Deep lacerations both sides of heel. Scratch on right forearm".

The casualty sustained calcaneus heel minor crack on his left leg. There were 2 deep lacerations, one on either side of the heel. There was also a very minor scratch on the right forearm that required no medical treatment. The injuries to the foot were caused by the passage of the explosive shock wave. The surgeon who conducted an exploratory procedure found no large foreign objects in the lacerations.

## Related papers

The following are held on file.

A copy of the terms of reference for this report

A copy of the preliminary investigation report

Statements of witnesses and concerned [Demining group] personnel

Photographs of accident site and equipments

A sketch map of the accident site

A medical report from Vavuniya general hospital

A device technical report

## UNDP National Mine Action Authority investigation report

District Mine Action Office, Vavuniya: 1st July 2003

This was made available in 2006. It is an edited version of the Internal report and contained no new information. It is held on record.

## Statements

### STATEMENT – SUPERVISOR

1. [Demining group] deminer, [the victim], stepped on and initiated a mine whilst conducting his demining duties at Taliemannar Pier at approximately 0750 hours on the morning of 26 June 2003. As the [Demining group] Supervisor on site I submit this report.

### Background.

2. The [Demining group]'s Vavuniya MAT has been conducting a demining operation in an area of Mannar island known as Taliemannar Pier (East). We started operations on 19 February 2003, and to date have cleared 5000 square meters (of the estimated 9000) and removed and destroyed some 1000 mines. (Chinese Type 72, Pakistan P4 and various models of the "Claymore" type mine)

3. Recently we have received approval to start clearance on a minefield at Taliemannar west, an area approximately 300 meters from the current operation. Work was started at this site on 17 June 2003.

4. We have had eight deminers on site since the start of the operation, recently more equipment (PPE, Visors, detectors, etc) have become available and we have been able to employ deminers trained earlier this year. [The victim] has been on site for two weeks. He has been under constant supervision for those two weeks and assessed as being competent.

### Work Schedule

5. Due to the extreme heat in the middle and latter part of the day, (40 degrees +) we have adopted an "early start, early finish" working day. Incorporating a 15 minute break every hour, the working day is as follows:

- |    |      |   |  |
|----|------|---|--|
| a. | 0615 | - | on site;                                   |
| b. | 0630 | - | start work; (work through until breakfast) |
| c. | 0800 | - | breakfast (30 minutes);                    |
| d. | 1215 | - | lunch break (45 minutes); and              |
| e. | 1430 | - | finish work.                               |

## **Events Prior to Mine Accident**

6. The team arrived on site as usual and began work, the Team Leader, [Name excised] was at the Taliemannar West site with Section Leader, [Name excised], two deminers and medic, [Name excised]. Myself and Section Leader, [Name excised], were at the Taliemannar East site with nine deminers. I had just arrived back at the Control Point (CP) after an initial check around the site. The medic, [Name excised], and driver [Name excised] were at the CP.

## **Mine Accident**

7. At 0750 a muffled explosion was heard in the minefield (the accident site is approximately 350 meters from the CP) [The medic] used the Motorola (site communication VHF radio) to contact the Section Leader who said that there had been an accident and to come to the beach area of the minefield. The medic, driver and I drove to the accident site in the ambulance.

8. On arriving at the accident site, the Section Leader and two deminers had evacuated the injured deminer to the roadside and were in the process of removing his PPE. [The medic] assessed the injury was to the left foot and removed the boot, then transported him to the CP to stabilise him prior to evacuation to Mannar hospital.

9. I remained at the accident site, rang Mannar Hospital to advise that an injured deminer was on his way and instructed the Section Leader and a deminer to remain at the accident site, that nothing was to be moved and to mark off the accident site and control the crowd that had gathered.

10. The Team Leader had arrived at the accident site, he and I made our way to the CP. [The medic] was in the process of stabilising the patient and preparing him for transport to the hospital. The injured deminer had some bruising and puncture wounds on his left foot, he was conscious and coherent, albeit he had stood on a mine he was in remarkable good condition. The ambulance left the site at 0810.

## **Post Accident**

11. I rung Bala ([Demining group] National Operations Officer) in Vavuniya and informed him that there had been a mine accident, that the patient was on his way to Mannar Hospital and asked him to ring the hospital and confirm that they had received my message that a mine injury patient was on his way.

12. I rung [Name excised, Demining group]'s Senior Technical Advisor and informed him of the accident, he asked me to contact the District Mine Action Officer, [name excised], and advise him of the situation. [He] would inform [Demining group] HQ and other necessary notaries.

13. At approx 1100 the surgeon for Mannar Hospital came to see me on site (I know him personally after conducting Mine Awareness Training at Mannar Hospital last month) and he advised that the deminer was in no serious trouble, he had lacerations to his left foot, some bruising and a minor fracture of his heel bone, he will be up walking in a week, a lucky man!!!! The injured deminer was transferred to Vavuniya Hospital at 1700hrs to be with his wife and family.

14. [Name excised] arrived on site at approximately 1200hrs He explained the investigation procedure to me and we proceeded to the site to conduct his initial investigation. [Name excised] left the site to return to Vavuniya at approximately 1330, he took with him [the victim]'s Ebinger (No 537) his PPE body armour, helmet and visor, and his boots (boots being the only property damage)

## **My Observations**

15. In a drama filled few minutes, the medic [name excised], quietly and confidently accessed and managed the incident with the professionalism that he has displayed since becoming a member of [Demining group].

16. The evacuation procedure of the injured deminer from the minefield (although I was not present at the scene) appears to have gone smoothly and is a credit to the Section Leader and deminers on site. ( We have conducted evaluation drills on a regular basis, training pays off)

17. On examining the accident site and talking with the Section Leader, it appears that the deminer was moving in his cleared area behind the basestick, stood up to get his shears in order to cut some grass and stood on the mine. He fell into the cleared area and was easily extracted from the site by the Section Leader and two deminers.

18. The area the deminer was working in is a heavily metal contaminated area, (adjacent to rusting barbed wire exposed to salt sea air for the last ten years) the signals from the mine detector may have confused the deminer. It is impossible to clear these areas "metal free" Working in these areas, the deminers have been told to excavate all readings down to 13 centimetres, and quite often means excavating the entire area.

19. From the size of the crater left by the mine detonating, (19 cm deep x 54 cm wide) and the relatively minor injuries received by the deminer, it may be that the mine may have been deeper than the deminers are required to check?

20. There was no damage to any equipment on site. he Deminer's PPE was not damaged, his boot showed the only signs that there had been a mine accident at all. The blast had separated the boot upper from the sole over approximately 5 cm along the inside of the heel area, the sole and leather boot upper were not damaged.

## Conclusion

21. The deminers are obviously distraught over the mine incident. The injured man was lucky to escape with only minor injuries. Factors I feel might have been an influencing factor on this accident:

- a. the Deminer's relative inexperience;
- b. the high metal content of the ground; and
- c. the depth at which the mine may have been.

Signed: Supervisor

## STATEMENT OF SECTION LEADER [Name excised]

I am [Name excised], Section Leader on the site where [the victim] was working on the 26 June 2003.

I was initially employed by [Demining group] as a deminer after qualifying on my Deminers course early November 2002. I was promoted to Section Leader in April of this year when the new MAT was formed in April.

On the morning of 26 June 2003 I was on site at Taliamannar East observing my section in the minefield. At approximately 0750 I heard an explosion coming from the work area of [the Victim]. I was about 25 meters away at this time observing deminer [Name excised].

I immediately went to see what the situation was and found [the Victim] was lying face up in an area that he had already cleared, he was not making any noise but I could see that he had some injury to his leg area, I summoned [Name excised] to give me a hand. I used the radio to summon the Medic and ambulance to the accident site.



By the time that [Name excised] and I had the deminer out to the roadside, the medic, ambulance and Supervisor were arriving, the medic took over control of the injured man.

The supervisor asked me to remain on site, manage the crowd that had formed and mark off the accident site to prevent any interference with the accident site.

The supervisor and [Name excised] of the DMAO arrived to conduct the initial investigation at approx 1200.

Signed: Section Leader

#### STATEMENT - DEMINER [Name excised]

I am [Name excised], I was working in the area where [the victim] was working on the morning of 26 June 2003.

I am employed by [Demining group] as a deminer after qualifying on my Deminers course early November 2002.

At approximately 0750 I heard an explosion coming from the work area where I knew [the Victim] was working. My section leader, [Name excised], was with me at the time.

The section leader went to investigate what had happened and shortly after called deminer [Name excised] (also working in the area) and myself to give him a hand to move [the victim] out of the minefield as it appeared he had initiated a mine.

We moved the injured deminer out to the road and the medic and ambulance arrived within the next minute. The medic assumed control of the injured man.

The Section Leader and I remained at the accident site for the remainder of the morning to secure the site.

Signed: Deminer

#### STATEMENT - DEMINER [the Victim]

I, [Name excised] employed in [Demining group] as a deminer since 2 week . After qualifying on my Deminer course on April 2003 and due to the lack of equipment I was on stand by position.

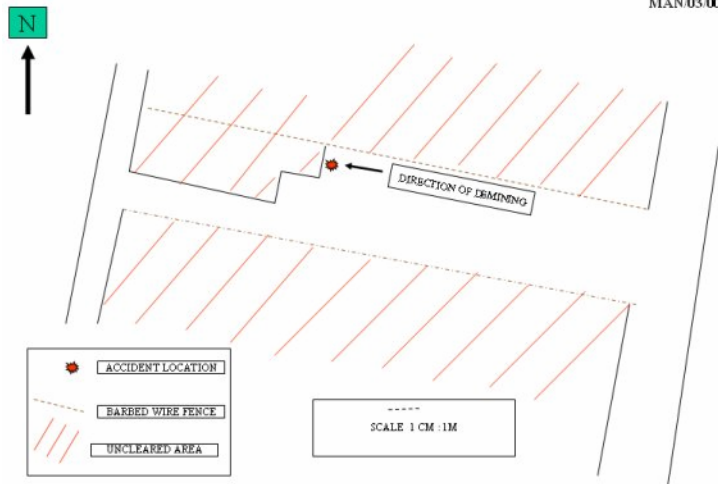
On June 16 2003 I have to start my work in Talaimannar and allocated in the refreshing training position in a low risk mine area . After this week I have started to work in a new area since Monday 23 June the day that I start I have found 6 mines in my new allocated area .

On 26 June 2003 , after the security briefing given by the team leader. Approximately 06 40 AM , I was send to my area to start work. I cleared the line about up to 1 to 1,5 meter and I made search for signal one position I got more signals and I made a deep hole to try to located the signals when I was satisfy with the investigation of the hole I moved my base stick and got up from my knee position to take the gardening shear in order to cut side vegetation at that time my left leg twisted skid towards in the previous excavation hole . Immediately I heard some noise and sand and dust all over my body the smoke also coming from the direction and I fell down . I realize that my left leg got sever painning .At this time section leader rush to the scene and pull me out of the mine area .

Signed: the victim

## Maps

A sketch map of the accident site.



## Analysis

The primary cause of this incident is listed as *“Unavoidable”* because it seems likely that the mine was buried at a depth beyond the search capacity of the deminer (and far deeper than the National minimum clearance depth of 10cm). The secondary cause is listed as *“Inadequate equipment”* because the deminer was not issued with tools capable of dealing with the threat. Powerful magnets could have made the clearance of fragmentation very much easier.