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DDAS Accident Report

Accident details

Report date: 14/11/2013	Accident number: 805
Accident time: 11:00	Accident Date: 05/03/2013
Where it occurred: Maquetela Task, Maxixe Town, Inhambane Province	Country: Mozambique
Primary cause: Field control inadequacy (?)	Secondary cause: Field control inadequacy (?)
Class: Missed-mine accident	Date of main report: 26/03/2013
ID original source: PH	Name of source: {Demining group}
Organisation: [Name removed]	
Mine/device: PMN AP blast	Ground condition: bushes/scrub dense vegetation metal scrap soft
Date record created:	Date last modified: 14/11/2013
No of victims: 3	No of documents: 1

Map details

Longitude: 35° 18' 59" E	Latitude: 23° 51' 22" S
Alt. coord. system:	Coordinates fixed by:
Map east: Inhambane	Map north: Massinga
Map scale: Inhambane	Map series: SF36Z
Map edition: Nil	Map sheet: 92

Accident Notes

inadequate area marking (?)
disciplinary action against victim (?)
inadequate training (?)
mechanical follow-up (?)
mine/device found in "cleared" area (?)
safety distances ignored (?)
no independent investigation available (?)
visor not worn or worn raised (?)

Accident report

The Demining group's internal report of this accident was made available in 2013. Edited for anonymity, the substance of the report is reproduced below. Text in square brackets [] is editorial.

Internal report

This is an accident resulting from a missed mine (Lat: S23°51'22.1" Long: E35°18'59.9"). Near the site of the accident, approximately 1.5 metres away was a partially excavated PMN, marked with a mine marker. Immediately prior to the accident, the Team Leader (TL) passed deminer [Name removed A, who was working in a lane near the marked mine. The TL noticed that [Name removed A] was demining parallel to a barbed wire fence that runs through the site. The TL spoke to [Name removed A], informing him that he was to cease demining parallel to the fence, which was contrary to the normal clearance direction and readjust his work area to correspond with the normal direction of clearance.

The TL then moved to the Control Point (CP) to report the find to the [Demining group] radio room in Inhambane. It has been alleged that on the way he commented to at least one of three deminers working nearby, words to the effect that more than one type of mine was being found now (previous finds had been OZM72 bounding fragmentation mines), however this has been unable to be substantiated up until this point.

Whilst the Team leader was at the CP reporting the find, the three deminers – [Victim No.1], [Victim No.2] and [Victim No.3] - moved from their lanes to view the PMN. It was at this stage that [Victim No.1] stepped on the missed PMN. The missed mine was located approximately 1.5 metres from the marked PMN.

After the explosion, [Victim No.1] was given primary first aid and evacuated to Chiquque hospital in Maxixe, as part of the team Casevac plan. [Victim No.2] received initial first aid treatment in the vehicle and was further treated on admission to Chiquque Hospital and [Victim No.3] received minor first aid treatment in the vehicle on the way to the hospital, not later at the team camp site, as the enquiry team was previously told and as was stated in the preliminary report.

History of the worksite

The task is an old Mozambican Defence Force (FADM) ammunition dump, surrounded by a belt - type minefield. Operations on site were being conducted by [Demining group] Integrated Teams One-Alpha, Two-Alpha and Team Three-Alpha, who were combined together.

Army ammunitions have been moved from the area years ago but the minefield was not cleared. Currently, while Mozambique advances towards the Landmine Ban Treaty deadline in 2014, a district-by-district clearance approach has been coordinated by National Mine Action Authority (the National Demining Institute / IND).

Initial general reconnaissance of the area was coordinated by IND and conducted by a combined team consisting of representatives from [Demining group], the Mozambican Army, the IND and UNDP at the end of 2012. It was agreed to start a combined mine clearance operation between [Demining group] and Mozambican Army Teams. During the rainy season between January and February, the Mozambican Army demining team was stuck in one locality affected by floods and [Demining group] International team started demining the area.

Description of the worksite

The scene of the accident was divided into two taped off areas. The accident scene (photo A1 [below]), containing the mine crater was marked by an approximately 2m x 2m taped box with a smaller - approximately .5m x .5m - taped box, in which was contained the marked PMN (photos A2 & A3 [held on file]). There was no other demarcation tape present or, oddly, evidence of safe lane marking present. A barbed wire fence runs through the work area (photo A4 [held on file]); however in some places (yet uncleared) only portions of the barbed wire remain.



Clearance methods in use at the time of the accident

The type of task being conducted at the time was manual demining, conducted by deminers from team IT1A and elements from team IT2A and IT3A. The normal direction of clearance is from north-east to south-west (up-hill); however it has now been confirmed that the deminer [Name removed A] changed direction and cleared two lanes in a south easterly direction, paralleling the barbed wire fence because the going was easier (less dense vegetation). It was during the clearance of the second lane that [Name removed A] missed the first PMN and discovered the second PMN, which he subsequently marked. See photo A5 [held on file] for a general view of the accident scene, from another angle, also showing the area where the casualty was treated.

Activities of those involved at the time of accident

Deminer [Name removed A] discovered one PMN after investigating a metal detector signal and informed the Team Leader [Name removed B]. Deminer [Name removed A] then moved to another demining lane to fetch a pair of wire-cutters

Team Leader [Name removed B] informed three deminers nearby (Victims 1, 2 and 3) about the mine found by [Name removed A].

Team Leader [Name removed B] was on the move to the Control Point to pass the information via HF vehicle radio to the [Demining group] Mozambique Mine Action HQ in Inhambane, while the three deminers approached [Name removed A]'s demining lane to see the mine found.

The accident occurred when [Victim No.1] stood on a mine not detected by [Name removed A], which was located close to the mine they went to see.

Procedures and equipment in use at the time of the accident

At the time of the accident, the team was only conducting manual demining, using Ebinger 420Si, German made Metal Detectors. An internal 2-metre wide casevac lane was mechanically “prepared” by a Tempest machine, followed by a double check with explosive detection dogs. Deminers were placed along the safety lane, clearing towards the internal edge of the minefield, crossing directly into the other side.

Events at the worksite leading up the accident

The team had been operating in the usual timeframe of “30-minutes ON LANE and 15-minutes OFF LANE”. The Team Leader (TL) is to supervise each deminer on a regular basis and conduct internal QA in the form of a “double-check” of every 10m² cleared by each deminer. A few minutes before the accident, the team leader passed by the deminer [Name removed A]’s lane and was informed about a PMN AP mine found. The TL realized that the deminer [Name removed A] was not clearing in the direction previously defined i.e. cutting the minefield with a vertical line, or clearing “uphill”. Instead, the deminer changed direction and followed the barbed wire direction on the internal limit of the minefield i.e. moving across the frontage of the minefield. The TL then walked toward the CP intending to inform the HQ radio room about the mine found. On his way to the CP, the TL informed the other two deminers ([Victims No. 1 and 2]) about the PMN mine found. One of those two deminers passed the information to a third deminer ([Victim No.3]) and all three approached Deminer [Name removed A]’s lane to see the mine found. When [Victim No.1] and [Victim No.2] were close to the mine found, [Victim No.1] accidentally stepped on another PMN AP mine “missed” by [Name removed A] before finding the second PMN.

Events following the accident

Once the accident occurred, all deminers stopped work, closed their lanes, and made their way to the CP. Deminer [Name removed C] arrived at the accident site first and commenced clearance around the casualty [Victim No.1]. While this was happening the TL [Name removed B] and deminers [Name removed A] and [Name removed D] arrived, with the medic, who waited while the clearance around the casualty was being conducted. Once the clearance of the casualty was complete, the TL, deminers [Name removed A] and [Name removed D] approached the casualty and moved him to a known safe area, where primary first aid was conducted by the medic prior to removing the casualty from the minefield and taking him to the hospital. The other casualties, [Victim No.2] and [Victim No.3] had made their own way to the CP. It should be mentioned at this stage that [Victim No.3] was not injured in the mine explosion but when he fell over (from the shock of the explosion).

The three casualties were taken to Chiquque Hospital in Maxixe, where [Victim No.1] and [Victim No.2] were admitted immediately and treated. [Victim No.3] was examined but did not require further hospital treatment.

The time of the actual site casevac was 8-10 minutes (from arrival at accident site to the team vehicle turning on to the main road). The evac from the site to the hospital took 30 minutes. This time was questioned (not in the witness interview though), given the relatively short distance from the site to the hospital; the reason for the seemingly long time was given due to the condition of the road, traffic on the road and that the medic was treating [Victims No.1 and 2] en route.

Statements

Due to the size of the witness statement documents, the statements have not been included in the main body of this report but will be attached separately. [Not made available.]

Investigator's summary

It is clear that, according to who was spoken to, there are still varied accounts of what actually happened in regards to the events leading up to the accident. Regardless of that, it still remains that the mine was missed and an accident caused due to a combination of human error, poor command and control on site and lack of discipline on the part of the three individuals who went to view the mine. Action has already been taken to ensure all Team Leaders are fully aware of the implication of such events happening again, particularly in regards to the command and control and self-discipline aspects.

Further action in the form of increased quality management of the side of the project (which will include the employment of a full-time QC Officer) will be taken to ensure that SOPs are strictly adhered to at all times that teams are deployed in the field.

Refresher training was conducted in two phases; Phase 1 was a meeting on 08 March 2013 with all Team Leaders, Operational Supervisors, Chief of Operations and the Project Coordinator, followed by a visit to the accident site (photo A14 [held on file]). Phase 2 consisted of two days of refresher training in the field over the period 10 and 11 March, focussing on the following:

- Minefield marking
- Investigation drills
- Check and double check procedures
- Command and control

Refresher training was also conducted by the Communications Team Leader in conjunction with the Medical Coordinator in regards to the passage of information during and after an incident or accident, in order to improve upon the points mentioned in paragraph.

Investigator's recommendations

The following recommendations were made:

- a. That disciplinary action (dismissal) is taken against the deminer [Name removed A];
- b. That disciplinary action (dismissal) is taken against the Team Leader [Name removed B];
- c. That disciplinary action (written warnings) is taken against the deminers who left their lanes to view the mine;
- d. That a review of the appropriate SOPs be carried out, and if necessary amended as required;
- e. That in the event of another accident, the inquiry team be structured and investigation be carried out as follows;
 - The inquiry team takes time to consolidate and compare information gained from the investigation upon return from the investigation site. Such consolidation and comparison would have allowed specific witness/interviewee questions to either "drop out" or be formulated from the information sharing;
 - The investigation team should have all been present during the interviews. This would allow a broader range of examination and also opportunities to catch answers to questions that may be missed by a sole interviewer, thus allowing these particular question(s) to be redirected in another way;
 - Depending on the number of witnesses/interviewees, interviews could be conducted over a period of two days as opposed to trying to interview everyone associated with

the event in "one hit". This would allow for better and more accurate cross-checking of information and would also mean less stress on the part of the interviewer, translator and in particular, the interviewee.

f. That refresher training is carried out for communications team in conjunction with Medical Coordinator.

Additional information

[Only PPE from Victim No.1 was damaged. Victim No 1 suffered light facial injuries so it is presumed that he was wearing his frontal apron but not the Mask visor. The same is presumed for the other victims.]

[Victim No.1] - trained by [Demining group] in 2010: experienced for 2.5 years.

[Victim No.2] - trained by [Demining group] in 2000: experienced for 13 years.

Victim Report

Victim number: 992

Name: [Name removed]

Age: 25

Gender: Male

Status: deminer

Fit for work: not known

Compensation: Not made available

Time to hospital: 38 minutes

Protection issued: Frontal apron
Mask Visor

Protection used: Frontal apron

Summary of injuries: minor Face; minor Leg

AMPUTATION/LOSS: Leg Below knee

COMMENT: No Medical report was made available.

Victim Report

Victim number: 993

Name: [Name removed]

Age: 37

Gender: Male

Status: deminer

Fit for work: presumed

Compensation: Not made available

Time to hospital: 38 minutes

Protection issued: Frontal apron
Mask Visor

Protection used: Frontal apron

Summary of injuries: minor Face; minor Legs; severe Hand

COMMENT: No medical report was made available.

Victim Report

Victim number: 994

Name: [Name removed]

Age:

Gender: Male

Status: deminer

Fit for work: yes

Compensation: Not made available

Time to hospital: 38 minutes

Protection issued: Frontal apron
Mask Visor

Protection used: Frontal apron

Summary of injuries:

COMMENT: Light injuries from falling. No injuries requiring hospital treatment.

Analysis

The primary and secondary causes of this accident as listed as *"Field control inadequacy"* because it seems that a deminer was working without area marking and varying the direction of his lane without permission when he missed a PMN mine. The Field manager corrected some of this but did not comment on the lack of marking and may have spoken to other deminers in a way that encouraged them to go to view the discovered PMN. When the other deminers looked to see the PMN (apparently the first PMN found in an area where other mines were OZM 72 fragmentation mines) one stepped on the missed mine.

A shallow PMN generally has a large metal-detector signature so is not normally "missed" with a modern metal detector. The lack of marking leaves some uncertainty over whether the area had been detector searched. Presuming that it was, the area was strewn with metal fragments (shown in a photograph) so the deminer may have been ignoring signals smaller than the OZM-72, which has a very large signature.



The presence of a lot of metal fragments (including barbed wire) in the vicinity implies that both the deminer and the Team Leader conducting QA on his work were ignoring signatures smaller than the anticipated mine. This is not uncommon when there is complete confidence that there are only hazards with a large metal signature present. However, the Field supervisor should have known that it is normal practice to protect bounding fragmentation mines with AP blast mines and so have ensured that all metal was recovered until the type(s) of AP blast mine present had been identified. Given the size of a PMN signal, some small metal fragments could then have been safely left. All the fragments shown in the photograph

are ferrous, so the use of a hand-held magnet could have accelerated clearance dramatically (see http://www.nolandmines.com/magnets_for_fragment_reduction.htm).

The demining group's investigators conducted a thorough, open and transparent investigation that is to be commended. They made a series of sensible recommendations that should avoid repetition. Those recommendations included some that would improve future investigations, so showing a degree of professionally constructive self-criticism that is rare.