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DDAS Accident Report

Accident details

Report date: 09/12/2019	Accident number: 827
Accident time: 11:00	Accident Date: 16/03/2010
Where it occurred: Area 7-007 CBU 478, Deir Qanoun Ras Al Ain village, Tyr, Aljanoub	Country: Lebanon
Primary cause: Unavoidable (?)	Secondary cause: Victim inattention (?)
Class: Other	Date of main report: 16/03/2010
ID original source: 01/2010	Name of source: LMAC
Organisation: [Name removed]	Ground condition: rocks/stones; steep slope
Mine/device: M77 Submunition	Date last modified: 09/12/2019
Date record created:	No of documents: 1
No of victims: 1	

Map details

Longitude:	Latitude:
Alt. coord. system: UTM: 710192 3677501	Coordinates fixed by:
Map east:	Map north:
Map scale: Version: Feb 2007	Map series:
Map edition: UNIFIL UNTSO-OGL	Map sheet:

Accident Notes

Inadequate metal-detector (?)

Accident report

A report of this accident was made available by the national mine action authority in 2019. Some of the original formatting has been removed but the original report is held on file. The substance of the report is reproduced below, edited for anonymity. Text in square brackets [] is editorial.

REGIONAL MINE ACTION CENTRE – NABATIYEH: (RMAC-N)

BOARD OF INQUIRY (BOI) INVESTIGATION REPORT Ref No. 01/2010

Accident during BAC involving a SUBMUNITION

Cause: Uncontrolled detonation of mine/UXO by: Human

Report Compiled By RMAC-N: [Name removed]: RMAC-N QA Officer

Location: Deir Qanun Ras Al Ain

Date: 16 March 2010

Casualty(s): Human

Agency Involved: [International demining organisation]

Annexes [Not made available]

- A Area Map – Location of CBU 478
- B IMSMA Demining Accident report
- C IMSMA Casualty report
- D Initial casualty report
- E Medical report (Arabic and English)
- F [International demining organisation] Internal accident report
- G RMAC-BOI Witness statements
- D Casualty's statements

1. Introduction

In accordance with National Mine Action Standards (NMAS), the RMAC Programme Manager, [Name removed] issued a Verbal Convening Order on Tuesday the 16th March 2010, for an accident investigation Board of Inquiry (BOI). The board members are [Name removed], Operations Officer and [Name removed], QA officer.

This is a comprehensive report by the Board of Inquiry (BOI) into the [International demining organisation] BAC Accident that occurred on the 16th March 2010 which is based on the RMAC-N investigation, statements from [International demining organisation] personnel involved in the accident and evidence from the accident site.

The accident occurred at 1100hrs (local time) on the 16th March 2010 in Area 7-007 CBU 478 UTM 36S 0710192-3677501 which is situated near the village Deir Qanoun Ras Al Ain.

The BOI is an impartial investigation conducted by the RMAC-N on behalf of the Lebanon Mine Action Center (LMAC). The primary objective of the BOI is to examine evidence in order to conclude the cause of the accident and make recommendations for the prevention of further accidents.

2. Executive Summary

On the 16th March 2010 at [International demining organisation] task CBU 478, an uncontrolled detonation of a US M series M77 sub-munition occurred while [International demining organisation] searcher [the Victim] was conducting sub-surface instrument search.

[The Victim] sustained fragmentation injuries to his right leg in the thigh and lower leg. When he stood on an unstable rock in his clearance lane, this caused a sub-munition underneath the rock to detonate.

Based on all available evidence, the BOI team concludes that the accident occurred due to the failure of [the Victim] to carry out a sufficient check of the rocks and underneath the rocks in his clearance lane before progressing forward.

There is conclusive evidence to suggest that incorrect procedures contributed to the accident and it is concluded that [the Victim] was not working in accordance with [International demining organisation] Lebanon SOP and National Mine Action Standards at that time.

The RMAC-N BOI investigation team considers that it is conclusive that the accident was preventable.

3. Location of Accident / Incident

Task No / 7-007; Team No: BAC 1

Village / Dist / Prov: Deir Qanun Ras Al Ain TYR / ALJANOUB

Grid Ref: UTM: 710192 3677501

4. Date and Time of Accident / Incident

16 March 2010, 11:00 hrs (local time)

5. Reported By: [International demining organisation], [Name removed], Site Supervisor

6. Reported To: RMAC-N, [Name removed], RMAC-N Chief Of Operations

7. Person(s) Involved

[International demining organisation], [the Victim], Searcher BAC Team 1, ID Number: 63584

8. Investigation Team

RMAC-N, [Name removed], Operations Officer, ID Number: RMAC-N 4

RMAC-N, [Name removed], QA Officer, ID Number: RMAC-N 2 D

RMAC-N, [Name removed], UNDP QA Advisor

9. Date and Time of Investigation: 16 March 2010, 13:30 hrs (local time)

10. Execution of the Investigation

Approach to Site

The accident site is located at IMSMA Task number CBU 478 which is approximately 1km south-east of the village of Deir Qanoun Al Ain. The RMAC-N investigation team drove to the accident site from the RMAC-N. The journey took approximately 1 hour and the route was primarily paved and in a reasonable condition.

The RMAC- BOI team arrived at the control point separately as the members came from different locations. [Name removed] RMAC-N QA Officer was the first member of the investigation board to arrive at the site. He ensured that the site was secure in accordance with the NMAS and in preparation for the arrival of the remainder of the investigation team.

[Name removed] and [Name removed] then arrived at the site at approximately 1330hrs. After a site briefing and arrival formalities, the team began the investigation. Due to the site being a BAC task the investigation team approached the accident site accompanied by the Site Supervisor [Name removed] and the [International demining organisation] Operations Manager [Name removed] and [Name removed] T.A BAC/EOD.

Process: visual Verbal.

11. Evidence

11.1 Ground

Accident Site

The site of the accident was on a northern slope of a valley running east to west. This slope consisted of rocky terrain interspersed with small bushes, grass and soil. There are large boulders and smaller rocks and stones strewn across the slope. The land is not cultivated or being used by local people.

The area of the accident was in an area being cleared by [the Victim] just on the other side of a large boulder that he had to climb over to progress forward. [The white arrow points to the place of detonation.]



Vegetation

The vegetation consists of grass, plants and small bushes varying in size from knee to waist height, which grow in irregular patches across the slope of the ridge.

Crater

The crater was located on the reverse side of a large boulder, with scattered rocks in the vicinity.



[The white arrow points to the crater. The red arrow shows the direction of clearance.]

Marking

Marking in general on the task was in accordance with [International demining organisation] Lebanon SOPs and NMAS. However at the accident site the marking was not in compliance with [International demining organisation] SOP. At the time of the accident [the Victim] was investigating a locator signal but his base stick was placed to his right. The base stick should have been in front of him marking his boundary between the cleared and un-cleared area.

11.2 Vehicle(s) and Equipment

Ambulance

One ambulance and medic was located at CBU 478 at the time of the accident.

Detector

Schonstedt GA-72CD Magnetic locators are used by the team to carry out sub-surface instrument search. The setting used on this locator was extra high sensitivity. [The Victim]'s

locator was situated behind the large rock he was working in front of. The locator was turned on and at the correct setting and not damaged during the accident.

BAC Tools

[The Victim] was using a pair of hand-pruners for vegetation cutting and these were positioned on the large boulder to the right and behind the crater which suggests he was not using them at the time of the accident. He also had the standard 1.2m wooden base stick that is used to mark the boundary the un-cleared and cleared area in front of him. This was positioned to the right of his clearance lane and at the time of the accident he was not using it.

Personal Protective Equipment (PPE)

At the time of the accident [The Victim] was wearing his [International demining organisation] issued PPE (Visor and body armour).

Visor: this is a polycarbonate visor that offers protection to the front of the head and the throat. There was no evidence of damage caused by the effects of an explosion found on the visor.



Ballistic Body Armour

The body armour consisted of a ballistic blast apron offering protection to the front of the torso and groin. There was no evidence of damage caused by the effects of an explosion found on the body armour.

[A picture of the armour showed no damage. It is omitted to avoid identifying the demining group involved in the accident.]

11.3 Explosive Ordnance involved in accident

The type of explosive ordnance involved in the accident is believed to be an M-series M77 sub-munition. Prior to the accident [the Victim] had already located 2 x M77 sub-munitions that morning approximately 15-20m from the accident. M42/M46 sub-munitions have also been located at this site.

11.4 Casualty Information

Casualty's position

According to a verbal statement made by [the Victim] and the location of his injuries he was standing at the time of the accident.

Casualty's clothing

His right trouser leg was damaged from primary fragmentation from the explosion.

Description of Injuries

Fragmentation wounds to his lower right leg and right thigh.

11.5 Interviews

The following [International demining organisation] personnel were interviewed in this sequence by the RMAC-N BOI team on 16 March 2010 at CBU-478.

See Annex B – Witness Statements. [Written statements were not made available.]

[Name removed], Site Supervisor, ID Number: 63516

[Name removed], BAC Section Commander, ID Number: 63523

[The Victim], Searcher (Casualty), ID Number: 63584

[Name removed], Searcher, ID Number: 63544

12. Incident Details (Circumstances / Sequence of Events)

The following information is based on an assessment of the evidence obtained by the RMAC BOI team at the accident site and from witness statements.

Chronology of Events (According to witness statements and site documentation)

16 March 2010

0630 [International demining organisation] BAC Team 1 commenced operations at CBU 478.

1100 Accident occurred.

1102 BAC Team 1 reported the accident to

1110 The ambulance with [the Victim] departed CBU 478 for Jabal Amel hospital in Tyr.

1114 [International demining organisation] HQ reported the accident to the RMAC-N

1119 [International demining organisation] HQ sent the initial accident report to the RMAC-N by fax.

1125 The ambulance arrived at Jabal Amel Hospital.

1230 [Name removed] (LAF) arrived at CBU 478 for the BOI.

1330 [Name removed] (LAF) and [Name removed] (UNDP Technical Advisor) arrived at CBU 478 for the BOI.

1530 Examination of the accident site and interviews with the site supervisor and a searcher was completed and the BOI team departed for Jabal Amel Hospital.

General

[International demining organisation] BAC Team One started work at 0630hrs on the day of the accident. After a briefing by the site supervisor the searchers were deployed into their working areas.

They worked 50 minutes shifts taking 10 minutes breaks between shifts.

On the 5th shift that started at 1030 hrs [the Victim] continued working in his area.

The casualty was carrying out the duties assigned to him as a searcher with a [International demining organisation] BAC Team. Due to heavy metal contamination of the work site from household rubbish the casualty was using a combination of instrument search with a Schonstedt Locator and Full Excavation Drills. After locating two M77 sub munitions the casualty was directed by his supervisor to begin working in a clearance lane situated facing further up the hill to his immediate front.

After clearing the immediate area to the left and right of a large boulder (See Photos Annex C) [Not made available] the casualty climbed onto the boulder to clear to his immediate front. Due to a restriction of space on the boulder the casualty elected to place his base stick on the right hand side of the boulder. Whilst investigating a signal to his immediate front the casualty stood up to rest his knees at which time the submunition detonated below his feet.

The casualty remained on his feet and moved back into the cleared area in shock at the detonation as stated by the witness statements (Annex B) [Not made available]. At this point

the BAC team reacted to the accident as per the [International demining organisation] SOP and the CASEVAC began.

12.1 Medical Assistance and Evacuation (procedure, treatment, equipment.)

On the 16th March 2010, there was one medic [Name removed] at task CBU 478 who was positioned with the ambulance and driver at the control point during clearance operations.

At 1100hrs an explosion occurred. The supervisor gave the medic and driver instructions to move with the ambulance to the designated area. From there the medic entered the site on foot guided by one of the team searchers [Name removed]. The medic arrived at the accident location and immediately assessed the casualty. She found him to be fully conscious. She then found injuries to his right leg from the upper thigh to the lower leg and dressed these injuries with bandages. The team then moved the casualty to the ambulance. Once inside the ambulance and on the way to the hospital the medic performed periodical checks of the casualty's condition such as blood pressure and pulse.

According to the statements from the [International demining organisation] personnel at the site, from the time of the accident to the evacuation of the casualty from the task site took approximately 10 minutes and the ambulance arrived at Jabal Amel hospital 15 minutes later. Therefore, a total time of 25 minutes had elapsed from the time of the accident to the casualty's arrival at hospital.

12.2 Geography and Climate

The area of the accident site is located approximately 1 km South East of the village of Deir Qanoun Ras Al Ain. This village is south east from the city of Tyr in southern Lebanon.

The task site is on a rocky slope of a valley with sparse vegetation.

The immediate area of the accident was on a rocky slope consisting of large boulders, smaller rocks with soil, grass and small bushes.

At the time of the accident the weather was calm, sunny and warm with clear sky. Visibility was good.

12.3 BAC Procedures

The team was conducting sub-surface instrument search using Schonstedt locators. The vegetation in the cleared area which comprised bushes and grass had been cut by [International demining organisation] during clearance.

Based on the evidence gathered during the investigation the sub-surface instrument procedures were not being conducted in accordance with [International demining organisation] Lebanon SOPs.

The team had cleared 46500 square meters with the location of 38 submunitions, utilizing the clearance methodology stated in the [International demining organisation] SOPs.

12.4. BAC Equipment

The equipment at site was in accordance with the [International demining organisation] SOPs and NMAS.

12.5 Communications

The [International demining organisation] Team utilized handheld VHF Radios for internal team communications. Communications between the team and the RMAC-N were maintained by VHF radio. The team also had access to mobile phones.

12.6 Site Layout and Marking

The site marking in general was in accordance with the [International demining organisation] SOP but the marking used by the casualty was not in accordance with [International demining

organisation] SOP. This was due to him investigating a signal without using his base stick and there was no marked boundary between him and the cleared and un-cleared area.

12.7 Command and Control

The [International demining organisation] team composition was in accordance to their SOP; previous internal and external QA reports had indicated good command & control at all levels.

12.8 Quality Assurance and Quality Control

Internal QA

Between the period of 13 January 2010 and 16 March 2010 a total of seven Internal [International demining organisation] QA inspections were conducted by T.A BAC/EOD [Name removed] and Site Supervisor [Name removed] at CBU 478.

The overall conclusion of the reports was acceptable.

External QA

Between the period 27th January 2010 and 16 March 2010 a total of eight RMAC-N QA inspections were conducted at CBU-478. The overall conclusion of the reports was acceptable.

12.9 Planning

Planning

CBU-478 was tasked to the [International demining organisation] by the RMAC-N after 12 spot tasks were conducted by the LAF EOD Teams in the area. [International demining organisation] had previously worked in the area conducting visual instrument aided clearance operations in 2006 and 2007.

Accreditation

The [International demining organisation] team received operational accreditation on 11 January 2010.

Training

The last training for the team had occurred prior to the accreditation of the team when they returned from the leave break in December.

13. Details of Non Compliance to Agency SOP / NMAS / IMAS

The Demining operations (sub-surface BAC) at CBU 478 are not in compliance with [International demining organisation] SOP.

14. Task Status: Current. Start Date (12.01.2010)

15. Background Information

CBU 478 is a BAC task within the task dossier 7-007 issued to [International demining organisation] by the RMAC-N. During the 2006 Hostilities with Israel sub-munitions were dispensed into the area by Israeli rockets and projectiles.

[International demining organisation] completed the task in September 2007. Since then a number of sub-munitions were located by the local people in [International demining organisation] cleared areas. [International demining organisation] did the majority of this clearance using surface only search. [International demining organisation] were re-issued the task to re-clear it using sub-surface instrument search in January 2010.

16. Conclusions

From the evidence gathered the board concludes the following:

- a. An uncontrolled detonation of a US M series M77 submunition occurred in an area in front of searcher [the Victim]'s clearance area whilst he was conducting sub-surface instrument search.

- b. [The Victim] was not conducting clearance in accordance with [International demining organisation] SOP Chapter.12.4.3 .4. This section of the [International demining organisation] SOP states that if a signal is encountered, the base stick is to be put on the ground between the Searcher and the area containing the signal. His base stick was to the right of where he was working and was not being used. He had encountered and was investigating a signal just prior to the accident but there was no marking between an area he had cleared and the un-cleared area.
- c. [The Victim] disturbed a rock to his front with his right foot that caused a sub-munition that was underneath this rock to detonate. It is not possible to say whether this rock was in an area that had been cleared or was still un-cleared due to the base stick not being used. Also it is not possible to say whether [the Victim] was stood in a cleared or an un-cleared area prior to the accident as the base stick was not being used.
- d. From the injuries sustained by [the Victim] and from the evidence on the PPE, [the Victim] was standing at the time of the accident.
- e. It is of the BOI team's opinion that the command and control during the clearance operation at CBU 478 was according to [International demining organisation] SOP and NMAS.
- f. The marking of the site in general was in accordance with [International demining organisation] SOP and NMAS. The marking used by [the Victim] at the time of the accident was not according to [International demining organisation] SOP due to the absence of the base stick in the front of his lane
- g. The casualty evacuation from the site to the hospital was carried out in a timely and professional manner.
- h. During the course of the investigation the RMAC-N BOI team received full cooperation from [International demining organisation].
- i. [The Victim] was extremely lucky not be more seriously injured in this accident. The rock covering the sub-munition shielded him from most of the blast and fragmentation. Had he been working with his base stick and standing in an area he had thoroughly cleared behind his base stick then it would be possible to ascertain whether the sub-munition underneath the rock was missed by him. If it was behind the base stick he may have missed it due to it not being detectable to his locator underneath the rock. Because the base stick was not being used, the sub-munition may have been under a rock that he didn't check yet with his locator or missed it due to it not being detectable to his locator underneath the rock.
- j. The accident is considered to be conclusive as preventable.

17. Further Actions and Recommendations

One day refresher training to be conducted for Team One. (Completed)

- a. Two hours refresher training for other teams including briefing about the accident and the cause. (Completed)
- b. Closer supervision from all levels to ensure there is strict adherence to [International demining organisation] SOP.

Report Written By: [Name removed], RMAC-N QA Officer

Report Agreed By: [Name removed], RMAC-N Operations Officer

Comments by RMAC-N Chief of OPS, [Name removed]

Comments by the RMAC-N Chief of QA, [Name removed]

Comments by the RMAC-N Programme Manager, [Name removed]

[No comments were included in the file provided.]

Victim Report

Victim number: 1045	Name: [Name removed]
Age:	Gender: Male
Status: deminer	Fit for work: presumed
Compensation: Not made available	Time to hospital: 25 minutes
Protection issued: Frontal apron Long visor	Protection used: Frontal apron; Long visor

Summary of injuries: severe Leg

COMMENT: No medical report was made available. The injury is classed as 'severe' because it is presumed that surgery was required to remove the fragmentation.

Analysis

The primary cause of this accident is listed as “Unavoidable” because it is not clear whether the submunition detonated in front of the area that the deminer had searched. It detonated when he stood to stretch after having been kneeling on a large rock in the lane. He must have disturbed something which struck the munition as he stood, but it is understandable that he should have to stand to stretch at times. The secondary cause is listed as “Victim inattention” because the investigators believed that the Victim was not working appropriately having put his base-stick to one side. This has been evident in some other accidents but the placing of a base-stick across uneven rocks may be impractical and putting it aside could be safer than trying to balance it, so the investigators may have been being unreasonable. However, there may be more evidence supporting their conclusion in the witness statements that were not made available.

The photographs show that the submunition detonated in front of a large rock in the lane. It is not clear that the Victim could have used the locator to search directly in front of the rock without being to one side of it. A larger detector search-head on a conventional metal-detector could not have been placed close to the ground but could have signalled on the submunition if held in the air above the rocks (the submunition being a large piece of metal). The Schoensdat locator stick is a low-cost, simple and robust ferrous metal detector that is not designed for wide area search so it should not be used when a conventional metal-detector could be used.