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DDAS Accident Report

Accident details

Report date:	09/12/2019	**Accident number:**	826
Accident time:	07:33	**Accident Date:**	06/09/2017
Where it occurred:	Area 2, CBU-575 FO, UTM 704262-3667890, Tayr Harfa village	**Country:**	Lebanon
Primary cause:	Field control inadequacy (?)	**Secondary cause:**	Management/control inadequacy (?)
Class:	Vegetation removal accident	**Date of main report:**	06/09/2017
ID original source:	9/2017	**Name of source:**	RMAC-N
Organisation:	[Name removed]		
Mine/device:	M77 Submunition	**Ground condition:**	bushes/scrub; dense vegetation; trees; woodland
Date record created:		**Date last modified:**	09/12/2019
No of victims:	1	**No of documents:**	1

Map details

Alt. coord. system:	UTM 704262-3667890	**Coordinates fixed by:**	

Accident Notes

disciplinary action against victim (?)
inadequate training (?)
vegetation clearance problem (?)
visor not worn or worn raised (?)

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. 9/2017

Report Category: Accident: BAC SUBMUNITION

Cause: Uncontrolled detonation of mine/UXO by: Human

Report Compiled By: RMAC-N, [name removed], RMAC-N Chief of QA

Location: Tayr Harfa, Date: 6th September 2017

Casualty(s): Human

Agency Involved: [International demining organisation]

1. Introduction

In accordance with National Mine Action Standards (NMAS), the Chief of RMAC-N [name removed] issued a Verbal Convening Order on Wednesday the 6th of September 2017 for an accident investigation Board of Inquiry (BOI).

The board members are [name removed] RMAC-N Chief of QA, QA officer [name removed], QA officer[name removed], QA medic [name removed] and RMAC-N CLO [name removed].

This is a comprehensive report by the Board of Inquiry (BOI) into the RMAC Accident that occurred on the 6th of September 2017 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 07:33hrs (local time) on the 6th of September 2017 in Area 2, CBU-575 FO, Coordinates 704262-3667890 which is located in Tayr Harfa village.

The BOI is an impartial investigation conducted by the RMAC-N on behalf of the Lebanon Mine Action Centre (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 6th of September 2017at [International demining organisation] task CBU-575 FO, an uncontrolled detonation of an M77 sub-munitions occurred while [International demining organisation]BAC 2 searcher [the Victim] was working in his lane at 07:33 am, 5 minutes before taking his first break, and led to an injury.

The injuries sustained by [the Victim] resulted in severe wounds and fractures in his hands and legs, fragmentations in the chest and head and injuries to the eyes.

Based on all available evidences, the BOI team concludes that the accident occurred with the searcher while he was cutting vegetation in his clearance lane (un-cleared area), with a saw which disturbed the sub-munitions and caused the accident.

There is conclusive evidence to suggest that incorrect procedures were applied and that [the Victim] was not working in accordance with [International demining organisation] Lebanon SOP and National Mine Action Standards (NMAS) at that time.

The RMAC BOI team considers that; the accident was caused by an SOP breach.

3. Location of Accident: CBU-575 FO, Area 2–BAC 2, Tayr Harfa Village, UTM 704262–3667890

4. Date and Time of Accident: 6th of September 2017, 07:33hrs (local time).

5. Reported By: [name removed], Operations manager, [International demining organisation]

6. Reported To: [name removed], Chief of RMAC-N

7. Person(s) Involved: [the Victim], [International demining organisation] Searcher/deminer

8. Investigation Team: [Name removed]n, Chief of QA, RMAC-N; W.O. [name removed], RMAC-N; W.O. [name removed], RMAC-N; [name removed] QA Medic, RMAC-N; [name removed], CLO, RMAC-N

9. Date and Time of Investigation: 6th of September 2017, 09:25hrs (local time).

10. Execution of the Investigation

Approach to Site
The accident site is located at IMSMA Task number CBU-575 FO which is located in Tayr Harfa village. [International demining organisation] BAC 2 started clearance at CBU-575 FO on the 25th of April 2016, cleared to date 97,760 m2 and destroyed 2,907 sub-munitions. The RMAC-N investigation team, [Name removed], [Name removed] and [Name removed] arrived to the accident site at 09:25 am. RMAC-N CLO [Name removed] met the casualty at Jabal Amel Hospital.

After a site briefing and arrival formalities, the team began the investigation. The BOI team approached the accident location and met [International demining organisation] OM [Name removed] and BAC 2 SS [Name removed] at the site.

Process: Visual; Verbal; Instrument (Schonstedt locator).

11. Evidence

11.1 Ground
Accident Site
The location of the accident was on the north east side of CBU-575 FO. The area consists of flat to medium slope ground containing medium to thick vegetation (mostly oak trees and bushes and high grass) and some rocky outcrops in the area. The land is not cultivated but sometimes used as grazing for goats.

The accident was located 50 cm away from the base stick in searcher [the Victim]'s clearance lane towards the dangerous area.

An accident occurred at the same task on the 18th of July 2017 where an [International demining organisation] searcher received injuries to his right hand due to the detonation of an M77 sub-munitions (same breach of vegetation cutting procedures).

Marking: Marking in general on the task was in accordance with NMAS and [International demining organisation] SOP.

Crater: The crater is located about 50 cm following the base stick towards the dangerous (un-cleared) area.

11.2 Vehicle(s) and Equipment
Ambulance: One ambulance and medic was located at CBU-575 FO at the time of the accident.

Searcher Tools
The Schonstedt locator was located just behind the base stick.
The Schonstedt was turned on with a high sensitivity setting when the BOI team arrived.
The searcher's tools were also located just behind the base stick.

Items damaged
- The searcher's working gloves were shattered due to the explosion. [A picture shows the torn gardening gloves.]
- The searcher's saw was damaged due to the explosion. [A picture shows several teeth missing near the tip of the one-handed saw.]

Personal Protective Equipment (PPE)
The searcher's PPE was damaged as follows:
- Several shrapnel in the vest but only one penetrated. [A picture shows a hole in the outer cover below the collar.]
- Several fragmentations scratches on the visor and the helmet.

11.3 Explosive Ordnance involved in accident

The type of explosive ordnance involved in the accident is believed to be one M77 sub-munitions; weighing approx. 250 g in total (Dual Purpose sub-munitions containing approx. 45 g of high explosives(RDX/TNT), point detonation impact fuze). [The weight of the firing pin falling through a few millimetres provides enough inertia to carry the striker forward into the stab-sensitive detonator.]

[The picture shows fragments recovered from the site.]

11.4 Casualty Information

Casualty's position: Searcher [the Victim].

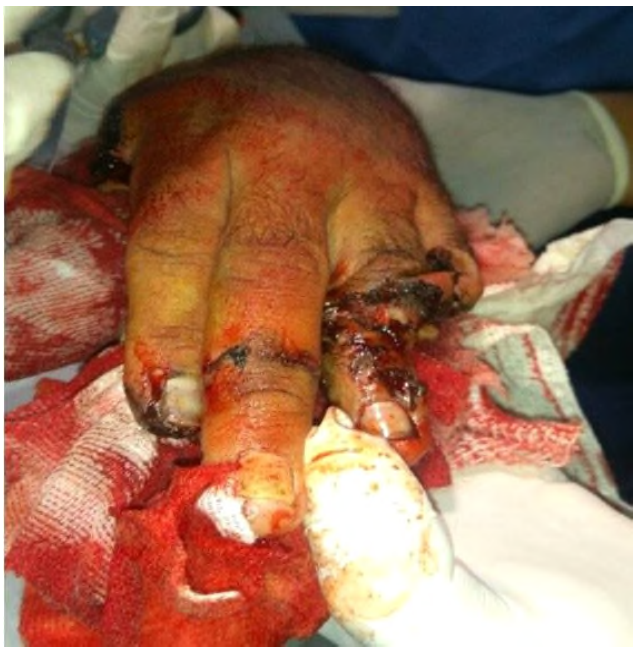
According to the injury and to the statement of the searcher, he was standing and cutting vegetation with a saw which obviously disturbed the sub-munitions and caused the explosion.

Description of Injuries of searcher [the Victim].

The searcher sustained:

- Fragmentation in the right eye which resulted in him losing that eye.
- Fragmentation below the left eye which was removed and he still has vision.

- Fragmentation went through the inside right of his helmet and caused injuries to his head which are not believed to be life threatening.
- There are minor lacerations on his right hand which not serious.
- Ali received numerous injuries on his left hand resulting in the loss of his small finger. He received other serious injuries to his left hand but we do not know to what extent at this time.
- Broken right knee cap.
- Fragmentation in both legs.
- Fragmentation in the chest which is believed to have entered his right lung. (medical report attached) [Medical report not made available.]



11.5 Interviews

The following [International demining organisation] personnel were interviewed by the RMAC-N BOI team on 6thof September2017 at CBU-575 FO.
[International demining organisation] [Name removed], BAC 2, Site Supervisor (SS)
[International demining organisation] [Name removed], BAC 2, Team Leader
[International demining organisation] [Name removed], BAC 2, Deputy Team Leader
[International demining organisation] [Name removed], BAC 2, Searcher
[International demining organisation] [Name removed], BAC 2, Searcher
[International demining organisation] [Name removed], BAC 2, Medic

12. Accident Details (Circumstances / Sequence of Events)

CBU-575 FO is a site located in Tayr Harfa village area 2; the area containing CBU-575 FO and adjacent sites was heavily bombarded by the IE during 2006 hostilities; [International demining organisation] was tasked to start clearance at this site on April 20th 2016, [International demining organisation] BAC 2 started clearance at the site on April 25th 2016 and cleared to date 97,760 sqm and destroyed 2,907sub-munitions (M42, M46 and M77). The majority of the destroyed items were found on the surface while the rest were found at different depths (not deeper than 7 cm).

On the 6th of September 2017 when [International demining organisation] BAC 2 deployed to clearance site, all searchers were guided to their lanes, started working; team located 5 M 77

sub-munitions before the accident occurred, during that time both TL and SS have passed by searcher [the Victim]'s lane and other team members.

At the lane where the accident occurred the injured searcher was cutting vegetation in the un-cleared area using a saw (Schonstedt locator was found turned on with high sensitivity setting, located just behind the base stick, about 70 cm away from the explosion location; the base stick was 50 cm behind the accident location and vegetation was cut to an extent of 120 cm following the base stick towards the dangerous area).

During the internal investigation an M77 sub-munition was located on the surface right next to cut vegetation in a different lane than the one where the accident occurred; which shows weakness in supervision, command and control not just in the lane where the accident occurred, but in the entire task.

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

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

6th of September 2017:

06:36 - Arrival at the site. Morning brief by SS and locators tests. The team split into 2 groups, one group monitored by the TL [Name removed], the second by Deputy TL [Name removed].

06:51 - Start of operations.

07:33 - Accident occurs

07:35 - SS [Name removed] informed [International demining organisation] OM and [International demining organisation] radio room and tasked the medic to deal with the casualty and prepare it for being evacuated to the hospital.

07:36 - RMAC-N was informed.

07:37 - The injured searcher was evacuated from his clearance lane to the medical point by searcher [Name removed] and TL [Name removed] where he received the

treatment needed by medic [Name removed] and got prepared for being evacuated to the hospital.

07:50 - Ambulance left the site evacuating the casualty to Jabal Amel Hospital in Tyre.

08:02 - [International demining organisation] OM [Name removed] and OO [Name removed] arrived to the accident site.

08:15 - The ambulance evacuating the casualty reached Jabal Amel Hospital in Tyre.

08:34 - [International demining organisation] PM [Name removed] arrived to the accident site.

09:16 - [International demining organisation] PM [Name removed] left the site.

09:35 - RMAC-N BOI team arrived to site and started the investigation.

09:35 - RMAC-N BOI team conducted QC in the injured searcher's lane and located one M 77 sub-munition that was not marked or located by the searcher about 40 cm away from the explosion in the area where vegetation were cut to ground.

10:42 - RMAC-N BOI team left the site heading to Jabal Amel Hospital.

12:00 - The casualty was moved from Jabal Amel Hospital heading to Hammoud Hospital in Saida for further treatment and medical operations.

12:45 - The casualty reached Hammoud Hospital in Saida.

The investigation was followed up by a visit to the hospital to take the statements of the casualty and Medical report on the 6th of September 2017 by the BOI team.

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

On the 6th of September 2017, there was one medic [Name removed] at task CBU-575 FO who was positioned with the ambulance and the driver at the control point during clearance operations.

At 07:33 hrs an explosion occurred. The medic moved immediately, and reached the accident location, finding one casualty [the Victim], he conducted first aid and stabilization procedures with the searcher [Name removed] and then evacuated the casualty to Jabal Amel Hospital accompanied by TL [Name removed] having the same blood group as the casualty should he need it.

According to the statements from [International demining organisation] personnel at the site and from the radio log, the time taken for the casualty treatment at site was 17 minutes and the time to reach the hospital from the site was 24 minutes.

The last CASEVAC exercise was conducted on 29th August 2017.

12.2 Geography and Climate

The area of the accident site is located in Tayr Harfa village.

The task site is on a mainly flat area (some areas are slightly sloping) containing thick to medium vegetation consisting mainly oak trees and some bushes and high grass with some rocky areas.

At the time of the accident the weather was clear and hot. Visibility was good

12.3 Communications

[International demining organisation] BAC 2 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.

12.4 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 in general; nevertheless some gaps were noticed by RMAC-N QA regarding vegetation cutting procedures and were highlighted to the team to improve.

12.5 Quality Assurance and Quality Control

External QA: Between the period stretching from the25th of April 2016 to current date a weekly basis RMAC-N QA inspections were conducted at CBU-575 FO.

Accreditation: [International demining organisation] BAC 2 received a renewal for the full accreditation on January 2017.

Training: The last training received by [International demining organisation] BAC 2 was on the 19th of July 2017 due to the accident that occurred on 18th July 2017 within the same team.

13. Details of Non Compliance to Agency SOP / NMAS / IMAS
The following points are clear and obvious evidence of breach of [International demining organisation] SOP / NMAS:

1. Cutting vegetation methodology applied by the searcher (cutting to an extent of 1.2 meters following the base stick in an un-cleared area without checking with the locator).
2. The injured searcher was cutting vegetation standing, not kneeling.
3. Lack of command and control concerning both the SS and the TL (they both checked the injured searcher's lane before the accident and did not apply the correct procedures, in addition most of clearance lanes at that site were being cleared the same way; over reaching in vegetation cutting).

14. Task Status: Current: Start Date (25th April 2016)

15. Background Information
CBU-575 FO is a CBU task within the task dossier issued to [International demining organisation] by the RMAC-N. CBU-575 FO is a heavily bombarded area by the IE during 2006 hostilities.

16 Conclusions
From the evidence gathered the board concluded the following:

a. An uncontrolled detonation of an M77 sub-munitions occurred with the searcher [the Victim] while he was cutting vegetation
b. The searcher was standing in his lane (in an un-cleared area), not using the base stick, he was cutting vegetation from the entire lane before checking with the locator (adopting a different clearance methodology than the one approved in the clearance plan).
c. The detonation was most likely caused by impact when hitting the sub-munition with the saw.
d. Neither the TL nor the SS took any actions to adopt the correct vegetation cutting procedures (weakness in command and control).

e. The casualty evacuation from the site to the hospital was carried out in a timely and professional manner.

f. PPE (body armour and visor) were worn in compliance with [International demining organisation] SOP/NMAS, nevertheless the visor was obviously not placed correctly which caused injuries to the eyes.

g. During investigation RMAC BOI team received full cooperation from [International demining organisation].

The accident is considered to be conclusive as preventable.

17. Further Actions and Recommendations

Three days refresher training to be conducted for all [International demining organisation] teams including: the use of the detector, the right marking procedures, vegetation cutting, rocks and stones removal, command and control and procedures taken after an accident on site.

a- Closer and accurate supervision from all levels to ensure there is strict adherence to task Clearance Plan, [International demining organisation] SOP and NMAS.

b- [International demining organisation] to emphasize on the internal Quality Management process, by separating QA/QC from Operations.

c- A written warning to be issued to [International demining organisation] BAC 2 searcher [the Victim].

d- [International demining organisation] SS [Name removed] and TL [Name removed] to be demoted to searchers.

e- [International demining organisation] BAC 2 to be moved to a different site.

Report Written and Agreed By: [Name removed], RMAC-N, Chief of QA

RMAC-N Chief of OPS, [Name removed]

Chief of RMAC-N, [Name removed].

Victim Report

Victim number: 1044 **Name:** [Name removed]

Age: **Gender:** Male

Status: deminer **Fit for work:** no

Compensation: Not made available **Time to hospital:** 41 minutes

Protection issued: Frontal apron; Long visor **Protection used:** Frontal apron, visor worn raised

Summary of injuries: Amp eye; Amp finger; minor Hand; severe Chest; severe Eye; severe Hand; severe Head; severe Legs

COMMENT: No medical report was made available.

Analysis

The primary cause of this accident is listed as a ‘Field control inadequacy’ because the Victim (and others) was working incorrectly and the field supervisors did nothing to correct the errors. The visor was worn in a raised position and the locator was not used to check vegetation before cutting it (despite a recent accident involving a submunition entangled in vegetation). The fact that field behaviour was not revised after the first accident reflects a failure of senior management to review and correct the behaviour of field supervisors. It may be that both the field supervisors and the searcher/deminers were not appropriately trained. It is the responsibility of senior management to ensure that field supervisors are appropriately trained and supervised. Their failure to do this explains why the secondary cause is listed as a ‘Management control inadequacy’.

The accident investigators recommended that internal QA/QC be separated from Operations. This can give internal organisational QA/QC a measure of ‘independence’ from the field supervisors as long as the internal QA/QC people are appropriately trained and command the necessary authority to correct errors.

The accident investigators recommended that the field supervisors be demoted and that all staff receive refresher training. If the original training failed to result in staff having the required knowledge and skills, it is probable that repeating that training would also fail. The demining organisation should have devised effective ‘Continuation’ training for all staff (including supervisors), and included tests to ensure that knowledge and skills had been transferred and retained.