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DDAS Accident Report

Accident details

Report date:	09/02/2008	**Accident number:**	563
Accident time:	12:28	**Accident Date:**	05/07/2007
Where it occurred:	Area 8-003 CBU 434, Nr Tyre, Tayr Debba Municipality, Sur Sub-district, El-Jenoub Province	**Country:**	Lebanon
Primary cause:	Field control inadequacy (?)	**Secondary cause:**	Management/control inadequacy (?)
Class:	Missed-mine accident	**Date of main report:**	12/07/2007
ID original source:	07/2007	**Name of source:**	UNMAS
Organisation:	[Name removed]		
Mine/device:	DPICM M77 submunition	**Ground condition:**	bushes/scrub dry/dusty metal fragments rocks/stones steep slope
Date record created:		**Date last modified:**	09/02/2008
No of victims:	2	**No of documents:**	1

Map details

Longitude:		**Latitude:**	
Alt. coord. system:	UTM 710383-684790	**Coordinates fixed by:**	
Map east:		**Map north:**	
Map scale:		**Map series:**	
Map edition:		**Map sheet:**	
Map name:			

Accident Notes

inadequate training (?)

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

pressure to work quickly (?)

protective equipment not worn (?)

safety distances ignored (?)

visor not worn or worn raised (?)

Accident report

The report of this accident was made available in February 2008 as a collection of files and pictures. Its conversion to a DDAS file means that some of the original formatting has been lost. The substance of the report is reproduced below, edited for anonymity. The original files are held on record. Text in [ ] is editorial. Deminers in Lebanon are often called “Searchers”.

BOI Investigation report

Ref: 07/2007

Reference:

a. Lebanon National Technical Standards and Guidelines (TSG’s)

b. International Mine Action Standards (IMAS)

c. [International commercial demining agency] Standard Operational Procedures (SOPs)

d. Map: UNIFIL JENIMAP

e. MACC SL Mine / UXO information

1. Introduction

In accordance with the National Technical Standards and Guidelines (NTSG), the MACC SL Programme Manager, [Name removed] and Lt.Col. [Name removed], LMAC Representative, issued a Verbal Convening Order on Thursday the 5th July 2007, for an accident investigation Board of Inquiry (BOI). The MACC SL Board members are Lt. [Name removed], LAF Plans Officer and [Name removed], QA Officer MACC SL.

This is a comprehensive report by the Board of Inquiry (BOI) team into the Accident on the 5th of July 2007 which is based on the MACC SL investigation, statements from [International commercial demining agency] personnel involved in the accident, evidence from the accident site and the [International commercial demining agency] Demining Accident report. The accident is considered preventable.

The [International commercial demining agency] BAC Accident report was forward to the MACC SL BOI team on 12th July 2007, and is attached at Annex A [Follows this report]. The time of the accident was 1228hrs on the 5th July 2007 in Area 8-001, BAC site, CBU 434, UTM 710383 –684790, which is located near the village of Tayr-Dibba, approximately 7 kilometres north east of Tyre.

The BOI is an impartial investigation conducted by the MACC SL on behalf of the Lebanon Mine Action Centre (LMAC) Lebanon. 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 5th July 2007 at 1228hrs, two [International commercial demining agency] BAC searchers were involved in an accident, which was caused by an uncontrolled detonation of an M77 sub-munitions. The detonation took place during a period when all searchers were not conducting search/clearance operations but were preparing to start work after a 10 minutes rest period.

As a result of the explosion the two searchers sustained non-life treating injuries from the detonation of the M77. The injuries and injured are: [Victim No.1] received injures to his ankle/leg area and buttocks and [Victim No.2] who suffered a deep cut on his thigh and minor injuries to his head. Immediately after the detonation both searches ran towards the CP, and were restrained by the TL who commenced medical treatment.

It is of the opinion of the BOI that the searcher, [Victim No.1], was conducting unauthorised, BAC search/clearance operations when the sub-munitions detonated. [International commercial demining agency] SOPs were not followed by the two searchers, however it is inconclusive as to the exact cause of the sub-munition's detonation i.e. whether or not the cluster ammunition was initiated by the [Victim No.1]'s right foot when he slipped from the steep terrain causing the sub-munitions to detonate or if [Victim No.1] slipped and his foot made contact with the partially buried sub-munitions causing it to detonate or the sub-munitions exploded when [Victim No.1] was a few metres away.

The task site, CBU 434, is a combination of both flat and steep terrain, with the steep areas requiring greater planning to allow searchers to conduct clearance in a safe manner.

[The site on the steep side of a ridge. The point of detonation is roughly central in the photograph below.]

Based on all evidence, the BOI concludes that the immediate response to the accident by the team leader and the treatment by the medics enabled an effective casevac and subsequent medevac from the task site to Jabel Amel Hospital and then to Hammoud Hospital.

It is recommended that [International commercial demining agency] conduct a one day of refresher training for BAC Team 3, specifically revising all safety requirements and BAC drills. Special consideration should be taken for revision and reinforcement of the command and control requirements by Site Supervisors/TL when searchers are conducting BAC clearance operations, marking of cleared and un-cleared areas should be emphasized to all members of the team as described in [International commercial demining agency] SOP and marking method of the progressive clearance should be high lightened.

Based on the available information, evidence gathered at the accident site and interview statements, it is of the BOI's opinion that clearance activities on terraced areas should be given special focus. It is clear that if the correct safety measures and command and control procedures were undertaken correctly the accident would not have occurred. Therefore the accident is considered preventable.

3. Location of Accident

Area of accident: Area 8-003 CBU 434, Tayr-Dibba, District-Tyre, Prov-Aljanoub, UTM 710557-684699

11. Date and time of investigation: 5 July 2007, 1245hrs

12. Execution of Investigation

Approach to Site

The accident site is located at IMSMA Clearance Task Number: CBU 434 which is located approximately 7Km north-east of Tyre, in an olive grove, adjacent to a steel factory, 1.5km east of Tayr-Dibba village.

The MACC SL investigation team comprising Lt. [Name removed] and [Name removed] drove to the accident site, Lt. [Name removed] travelled with [Name removed] the senior QA officer. The journey took approx. 10 minutes. On arrival at the site, the site supervisor welcomed and briefed the BOI team at the control point. The BOI team was then escorted to the accident site. No additional clearance was required to allow inspection of the accident site, as the area had been previously cleared

CBU 434 stretches from an orange plantation to the north and south to terraced areas containing olive trees. A steel factory located within the strike area.

A [International commercial demining agency] EOD Team was located at the CP during the time of accident and the EOD supervisor informed the BOI during the interview that he is the person who reported the accident to the [International commercial demining agency] radio room. He then handed over to the situation to the site supervisor to coordinate the accident evacuation procedures.

The [International commercial demining agency] site supervisor, [Name removed], informed the BOI that the site had been secured while waiting for the BOI to arrive at the site and no disturbance of the site had occurred during this period. Photos of the accident site were taken by the BOI during the investigation.

13. Evidence on the Ground

Accident Site

The accident occurred inside the olive plantation, on a steep terraced area south west of the main control point (CP). The CP which is located at the steel factory.

The two searchers were deployed from 0700hrs to commence operations in this area of the olive plantation. [International commercial demining agency] BAC Team 3 continued work with regular 10 min rest breaks during 50 min of operations, until the time of accident.

- Searcher number one ([Victim No.2]) was deployed on his box to conduct sub-surface clearance by the team leader.
- [Victim No.2] completed this task at 1210hrs and he informed his team leader.
- The two searchers remained together during break time.
- After the break the two searchers returned to conduct operations, this is when an uncontrolled detonation happened, resulting on both searchers sustaining injuries: [Victim No.2] a deep cut on his thigh and cut to his head. [Victim No.1] suffered injuries to his right ankle and a deep cut on his right buttocks.
- Blood stains were seen on stones 20cm from what is believed to be the seat of detonation.
- The hand tool used for grass cutting was seen lying on the rock almost 2m below from the seat of detonation to the west.
- Signs of shrapnel from a shaped charge were evident approx. 1.5m to the south east from the seat of detonation.
- The cell phone and the sunhat belonging to [Victim No.2] were identified 5m to the north west below the site of detonation.
- The area where the detonation happened did not support the facts that the BAC sub-surface procedures in accordance with [International commercial demining agency] SOPs were being employed on the site.
- The visor, detector and the knee pads were located adjacent to the sunhat 5m from the seat of detonation.
- The surrounding cleared area indicates that a number of sub-munitions,M77s had been located and destroyed, as the red/yellow topped pickets were seen on the upper terrace 2m from the seat of detonation.
- The box where the detonation happened was marked on three sides only.

- There was no marking evident at the site indicating in which area current clearance was being conducted.

Crater

No crater was evident at the site of detonation, however there was approximately 50cm of ground disturbance. Blood stains were seen on a stone 20cm from the area of the disturbed ground. The BOI where able to view the detonation site/area from a point of 1.5m.

14. Vehicle(s) and Equipment

Ambulance

Three ambulances were positioned at the CP to support the three teams BAC teams, 3, 4 and 6. Additional support would have been provided from the EOD ambulances (3) and medics which were located at the CP during the time of accident.

Detectors

[Victim No.2]

The BOI found [Victim No.2]'s detector was 50m from the seat of the detonation. The detector was turned off and positioned adjacent to his equipment. The transit case of the detector was located 30m from the seat of detonation.

[Victim No.1]

[Victim No.1]'s schonstadt was positioned 5m to the north west below the seat of detonation. There was no evidence of damage to the equipment. The schonstadt was in the turned off mode. The BOI concludes that the detector was not in use during the time of accident, as the schonstadt showed no evidence of damage.

Demining Tools

[Victim No.1]

BAC hand tools were found scattered approx. 5m from the bottom of the terrace wall approx. 5m from the seat of detonation. One grass cutter was found together with a tool bag, the other grass cutter was found inside the box positioned on top of a rock.

The hand trowel was located closer to the detector and there were no damages evident on this tool. Searcher, [Victim No.1] informed the BOI that the only tool he was using was the grass cutter and when the explosion happened he was no longer using it as he was removing vegetation from the uncleared area to a previously cleared area.

[Victim No.2]

The tools of [Victim No.2] were positioned almost 50m away from the seat of detonation. The only tool which was located with [Victim No.1]'s hand tools was a grass cutter. However it is not clear which one of two grass cutters belonging to [Victim No.1] or [Victim No.2].

Base Stick

[Victim No.1]

The base stick was located approx. 5m north of the seat of detonation and no damage was evident on it. It was confirmed by the searcher that he was not using the base stick during the time of accident.

[Victim No.2]

The base stick belonging to [Victim No.2] was found together with the rest of his BAC equipment approx. 50m from the seat of explosion.

Personal Protective Equipment (PPE)

Ballistic Visor

[Victim No.1]

[Victim No.1]'s visor was located approx 5m from the seat of detonation. The visor was inspected during the investigation and there were no evidence of any damage to it.

Dust/dirt was located on the inner side of the visor and it was positioned in such away that the inner side was facing the direction of the detonation is believed to have occurred.

It is inconclusive as to whether searcher ([Victim No.1]) was putting on his visor during the time of detonation as the injuries he sustained were to his right ankle and his right buttock and nothing on the left leg/side.

[The undamaged visor.]

[The unused protective apron.]

[Victim No.2]

[Victim No.2] was not wearing any PPE during the time of detonation; all his personnel equipment including his PPE was located in one area approx. 50m from the seat of detonation.

Ballistic Body Armour

[Victim No.1]

PPE armour was located at the position where the casualty ([Victim No.1]) received medical support. No blood stains were identified on the PPE and the body armour was not damaged. During the investigation the site supervisor and the medic acknowledges that [Victim No.1] was wearing his PPE and that they are the ones who remove it during treatment.

Knee pads

Knee pads were seen scattered approx. 5m to the north of the seat of detonation. [Victim No.1] was not wearing them when accident occurred.

14.1 Explosive Ordnance

CBU 434 is an area which was subjected to the Israeli strikes during the recent Lebanon Israel conflict. Numerous M77s are located in and around the surrounds of the plantation of Tayr-Dibba village.

During the clearance of CBU 434 there is evidence of un-exploded M77 and shrapnel from ammunition was located. The team had located 68 x M77s.

14.2 Casualty(s) (position, clothing)

Casualty's Positions

It is assumed by the BOI that the searcher [Victim No.1] was walking on a downward slope to place the already cut vegetation 5m from the seat of detonation, where it is possible that searcher [Victim No.2] was standing.

[Victim No.1] is believed to have been moving from the working area and accidentally slipped on the steep ground disturbing the partially buried M77, causing it to function.

The injuries [Victim No.1] suffered were around the rear of his right ankle.

[Victim No.2] suffered a deep cut on his left thigh and sustained minor injuries on his head.

[Victim No.2] told the BOI that he was approx. 30m from [Victim No.1] when the accident occurred. However looking at the location of his equipment, which was close to the seat of detonation, the BOI is not convinced by this statement.

The BOI has assumed that [Victim No.2] was possibility approx. 5m from the blast, as his equipment, cell phone, sunhat and grass cutting tool was found approx. 5m from the seat of detonation.

Casualty's Clothing

Clothing which was located at the place of stabilization belonged to [Victim No.2].

The trousers of [Victim No.2] were cut and removed by the other team members to allow medical support to be administered.

No clothing was seen for [Victim No.1] in this area.

14.3 Interviews

The following [International commercial demining agency] personnel were interviewed in this sequence by the MACC SL BOI on the 5th, 6th and 9th of July 2007.

14.4 Casualty Information

The following information regarding the accident of the two searchers ([the Victims]) was obtained by the BOI during interviews conducted at the [International commercial demining agency], Tyre office:

Medic's diagnosis at accident site on 05 July 2007

The casualty [Victim No.2] suffered injuries in the front of his thigh and a deep cut on the rear/ top of his head. The team leader arrived first and undertook first aid, prior to the arrival of the medics.

When the medics arrived they stabilized the casualty and escorted him to hospital.

[Victim No.1] suffered from deep cuts on his right ankle and light bruises to his right arm around the elbow.

The senior medic treated [Victim No.1] while the two remaining medics treated [Victim No.2].

The medics stopped the bleeding from [Victim No.1] and at around 1239hrs transported him to Jabel Amel Hospital, Tyre.

14.5 Accident Details (Circumstances / Sequence of Events)

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

On 5th July 2007 between 1228hrs and 1230hrs, two [International commercial demining agency] searchers [Victim No.1] and [Victim No.2] were involved in an accident during BAC search operations in task CBU 434 which resulted in them sustaining injuries. [Victim No.1] suffered severe injuries closer to his ankle and a deep cut on his right buttock and [Victim No.2] suffered injuries on his head and to the front of his thigh. The accident was reported by the [International commercial demining agency] Headquarters, Tyre, to the MACC SL Operations, Tyre.

It is not clear as to the exact time of the accident as there is a discrepancy between the above times. The [International commercial demining agency] Radio Operator's initial report to the MACC SL Communications Room (which is written in the MACCSL radio log) and the IMSMA casualty report submitted by [International commercial demining agency] indicate that it was 1230 hrs. Witness statements indicate it happened at 1223hrs and others indicate 1228hrs, with the supervisor saying 1228hrs in his briefing. The [International commercial demining agency] Demining Accident report indicates 1228hrs. Additional information regarding the timing gathered during the interview process indicate that it is most likely that the accident occurred at 1228hrs, therefore, unless proven to the contrary, 1228hrs shall be detailed as the time of accident.

At 0700, [International commercial demining agency] BAC Team 3 was co-located with Team 6 and commenced operations at apporx.0715hrs. Due to the size of the area, the teams were split into three groups of three searchers and two groups of two searchers, being led by an international site supervisor and three section leaders. The team started work at 0715hrs and the team leader [Name removed] was in charge of the two group's, one with three searchers and the other team with two searchers (this included the two victims). The teams working with [Name removed] were deployed approx. 100m apart.

Prior to commencing operations the site supervisor informed the BOI that a daily briefing was conducted at the control point by himself, pertaining to the safety procedures; marking and proper BAC drills as per Organization SOPs.

The working routine of one hour work in the field, including a 10mins break, at the designated rest area for each individual team continued until the time of accident. During the time of accident the supervisor and the team leader were located at the control point.

On hearing the detonation the supervisor together with the EOD team supervisor looked to identify its location. Moving along the road he met [Victim No.2] lying down on the road

bleeding. [International commercial demining agency] HQ was immediately informed. The team leader was the first person to reach the casualty, rendering first aid. The supervisor informed the BOI that when they were going to the field to check for the other searchers they met [Victim No.1] putting on the flack jacket heading towards the CP. The searcher was asked to lie down and the supervisor called the medic to attend to him. The second searcher [Victim No.1] was medically checked at 1233hrs in a previously cleared area. A 1240hrs the ambulance left for Jabel Amal Hospital. The casualties were both refereed to Hamoud Hospital in Saida for further examination. On the 6th July the two searchers were released from Hospital.

The interviews of the two searchers were conducted on Monday the 9th July 2007.

a. The BOI together with the [International commercial demining agency] Internal QA Officer were briefed by the site supervisor about the accident at the CP.

b. During the briefing the site supervisor, [Name removed] clearly maintained that the two searchers were not working at the time of accident however that they were preparing to commence operations.

c. The supervisor briefed the BOI that the two searchers were clearing up the slope before the time of accident.

d. The site supervisor also maintained that the site marking was done as per organization SOPs.

On visiting the accident site the BOI discovered that the situation on the ground was not the same as detailed in the brief by the site supervisor. The following were the points which are contrary to the supervisors briefing.

The BOI team was briefed by the site supervisor that the accident happened when the searchers were not working but preparing to commence operations, as had been planned, however talking to the searchers during the interview and considering the evidence physically on the ground it is of the opinion of the BOI that one searcher was working and the other was standing at approx 5m away. This supported by the evidence of the blood stains which is considered by the BOI as the blood from [Victim No.1]. [Victim No.2]'s sun hat with holes on the top was located 5m from the seat of explosion.

15. Geography and Climate

The accident happened on a clear sunny day temperatures were approx. 30 degrees. The surrounding area contains orchard plantations with the local community approx. 1.5m towards the south [presumably km].

The area is undulating and it was very dry at the time of the explosion.

15.1 Communications

VHF radios are used to communicate at the task between the Team Leaders, Supervisor and Medics. VHF radios and mobile phones are used for communications between the task and operational base at Tyre.

The MACC SL Operations Room had been informed by [International commercial demining agency] Operations Room.

15.2 Site Layout and Marking

The immediate area where the accident occurred was not marked in accordance with [International commercial demining agency] SOPs. The only marking was to the boundary marking of the box.

The blue picket, start of work, was in place where the searchers were tasked to commence work at the beginning of the day's operations. Red and yellow pickets were seen outside the perimeter in previously cleared area. No marking of the clearance lane was in place; the rope was rolled and closer to the rest of the equipment which was not in use before the time of accident. The only other marking which was identified out of the work area was one red topped 60cm picket. No correct demarcation of the safe and un-safe was in place.

In [Victim No.2]'s area of responsibility the only marking which were left on the ground was the blue topped picket and the rest of the pickets were removed due to the completion of his work.

15.3 Command and Control

Two teams, BAC Team 6 and 3 were operating at task CBU 434 and Team 3 was split into three smaller sub-sections of 2 x 2 searchers each and 1x 3 three searchers. Team 6 was working simultaneously on the same CBU. Each sub-section commanded by a team leader. A supervisor was in overall command of the task and the control point was situated a safe distance from the nearest working searcher. All searchers were working at the correct safety distance and although the nature of the terrain may not allow the team leaders to see all the searchers simultaneously, it is possible for them to monitor all searchers regularly. There was an adequate amount of safe lanes enabling effective access to each working searcher for casevac purposes.

According to information gathered during the interview process, the casualty had been checked by the team medic prior to the commencement of work before the accident. The site supervisor only visited the site before the searchers started work in the field. The team leader checked the searchers twice from the time of deployment until approx. two hours before the time of accident.

16 Planning

CBU 434 is part of the task dossier 8-001 which was issued to [International commercial demining agency] as part of the cluster clearance in South Lebanon. Clearance started the 14th of May 2007.

Accreditation

[International commercial demining agency] BAC Team 3 has received Full Operational Accreditation from the LMAC/MACC SL.

Training

Team 3, like all [International commercial demining agency] BAC Teams had recently been re-organized, with combined revision training being conduced on the 30th June 2007, this also included a casevac exercise. On Monday the 2nd July the team was conducting a casevac exercise/drills.

17 Details of Non / Compliance to Agency SOP / NTSG / IMAS

BAC drills were **not** conducted in according with the organization SOPs on CBU 434 by the searchers involved in the accident. The evidence viewed by the BOI was that the searcher [Victim No.1] worked without proper boundary markings, safety distance from searchers, without PPE, marking of the lanes where clearance is in progress was **not** in place and the use of cell phones while working. There was a lack of command and control of searchers during the execution of their duties, with the site supervisor located in the CP from the start of operations. Also the team leader failed to identify and correct faults until after the accident happened.

18 Conclusions

a. It is the opinion of the BOI that [Victim No.1] a BAC searcher for [International commercial demining agency], inadvertently caused an item of explosive ordnance, which is considered to be an M77 sub-munition, to function while conducting BAC operations. Information gathered during the interview process indicates that [Victim No.1] was carrying cut vegetation which he removed from the area he was working and that he stepped near the M77 causing loose items on the ground the detonation the M77. The BOI further conclude that [Victim No.2] was standing approx. 5m from the seat of explosion when accident happened.

b. As a result of the explosion [Victim No.1] and [Victim No.2] sustained non life threatening injuries. [Victim No.1] suffered a deep cut above his right heel and bruising on the right arm around the elbow area. [Victim No.2] suffered a deep cut on his left thigh and injuries on his head. The BOI team concludes that searcher [Victim No.1] was walking down towards [Victim No.2] and then in the process he slipped and initiated the partially buried M77, injuring himself and [Victim No.2] who is believed by the BOI to have been 5m from the explosion. This is supported by the evidence obtained at the accident site during investigations: the location of equipment and other items belonging to [Victim No.1] were found near to the seat of explosion. Both searchers were evacuated to Jabal Amel hospital then to Hamoud Hospital in Saida. Due to a [International commercial demining agency] re-organization the team leader had completed 5 operational working days with this new team.

c. There is no discipline problems were identified by either the supervisor or the team leader.

d. CBU 434 was known to contain sub-munitions (M77).

e. The BOI concludes that the team leader had knowledge of the actions of the searchers and he failed to correct them.

f. The BOI also concludes that the searchers were in a hurry to clear the area and by doing so breached safety.

g. The site supervisor had limited idea about the operations on his site. This was confirmed by his brief of the events of the accident and site operations which were not reflected when a visit by the BOI to the accident site was conducted. In additional the site supervisor had not physically visited the working operations from the start of the day.

h. The BOI concludes that the searchers did not want to reveal the truth of the matter as to what caused the accident and their activities during time of accident. The working

distance between each of the searchers involved in the accident, is based on the evidence viewed on the ground e.g. broken cell phone, sun hat and the grass cutting tool for [Victim No.2] which was located 5m from the seat of explosion.

i. The searchers were working on a steep incline without the necessary steps for them to conduct safe clearance procedures.

j. Due to many differences in timings of the accident, the accident is considered to have occurred at 1228hrs.

k. There was insufficient command and control at task CBU 434.

l. BAC drills at CBU 434 were NOT conducted in accordance with the [International commercial demining agency] SOP.

m. The accident is considered to be preventable.

19 Recommendations

The BOI agree with the recommendations identified in the [International commercial demining agency] internal investigation report, attached at Annex A, [see below] dated 12th Jul 07 and recommend the following addition area be addressed in addition to the internal [International commercial demining agency] report recommendations:

a. The site supervisor [Name removed] and the Team Leader [Name removed], receive a written warning regarding his lack of supervision and command and control of the operations on this site.

b. Extreme care should be taken when working on difficult steep terrain. Steps should be made on steep area for searchers to have balance when conducting clearance.

c. Extreme vigilance and regular monitoring of searchers should be enforced when conducting BAC, by site supervisors and TL.

d. Searchers separated to different teams and should also be reminded on the safety requirement related to smoking and the use of mobile phone when conducting operations (these should be removed when conducting search operations).

e. Supervisory staff should ensure that PPE is worn correctly at all times when working in the hazardous area; this should be followed up by [International commercial demining agency] internal QA requirements.

Report Written By: QA Officer, MACC SL

Report Agreed By: AF Plans Officer, LMAC/MACC SL

Internal report

REPORT ON A BATTLE AREA CLEARANCE ACCIDENT

AT CBU 434

UTM 710383-684790 ON 05 JULY 2007

References:

A. Lebanon National Technical Standards and Guidelines (TSGs).

B. International Mine Action Standards (IMAS).

C. [International commercial demining agency] International Limited Standard Operating Procedures (SOPs).

Introduction

1. A Battle Area Clearance (BAC) accident occurred at CBU 434 at 12:28hrs on 05 July 2007 when [International commercial demining agency] BAC searchers, [Victim No.1] and [Victim No.2], were conducting BAC clearance drills in a M77 sub-munition strike area. An uncontrolled detonation took place resulting in injuries to these two searchers.

Clearance Site description

2. BAC teams 3, 4 and 6 deployed to carry out BAC clearance on CBU 401 / 434 near Tayr Dibbah in Area 8 (sub-area 8-001) of the UNOPS project, South Lebanon. This BAC task is being conducted in an area contaminated with sub-munitions after the 2006 armed conflict between Lebanon and Israel. The task dossier record indicates it contains M42 sub-munitions, but [International commercial demining agency] has found 68 X M77 so far during clearance. The soil in the task area has medium levels of metal contamination and has thick vegetation in certain areas; the task site also has a metal fabrication factory located at the centre, as a result some areas are heavily contaminated with scrap metal and raw metal stores. The clearance methodology used is instrumental subsurface clearance down to 10cm and visual surface search in certain areas; all drills being used are as described in [International commercial demining agency] LSOP and is been carried out in accordance with this SOP.

Sequence of Events

3. Events leading up to the accident:

BAC teams 3, 4 and 6 deployed to CBU 401 / 434 and arrived on site at 06:39hrs. This was under the supervision of [Name removed], the site supervisor for this task. BAC team 3 has been working on this site since 14/05/07. On 08/06/07 BAC team 4 joined them and on 11/06/07 BAC team 6 joined them on the site.

4. The team tested their locators and made their equipment ready and then received a safety brief from [Name removed]. The focus of this briefing was safety (vegetation cutting / excavation drills), locator checks and medical checkups (see Annex B part 4: Daily Worksheets for complete info).

5. The teams deployed into the BAC area. However due to the restriction of work space caused by locals spraying insecticide the teams were split into different areas.

6. The work shifts was as follows:

07H08 Supervisor conducts site inspection

07H15 – 08H10 Start of work first shift

08h20 – 09H22 2nd shift and 1x M 77 located

09H35 – 10H40 3rd shift and 3 x M 77 located

11h10 – 12H00 4th shift

12h10 – 12H28 5th shift and work stopped because of uncontrolled detonation.

This information was extracted from the daily worksheet (See Annex B part 4: Daily work sheet).

7. The team leader of BAC 3 [Name removed] was placed in control of the area to the south-west of the metal factory and he was responsible for the supervision of the two searchers [the Victims] working on the uncleared boxes of vegetation on the walls of the areas between terrace 1 and terrace 2.

8. At the start of the fifth shift, one searcher, [Victim No.2], had finished his area, and was told by the team leader [Name removed] to pack up his equipment and to be ready to move to a new area. The other searcher, [Victim No.1], was told to continue work in his area.

9. The team leader had just left the area to find a new area to place [Victim No.2] when an uncontrolled detonation occurred in the area that he just left (approximate time: 12:28hrs).

Description of the Accident

10. [Victim No.1] was conducting vegetation cutting from both the top and bottom of the terrace wall using the safe areas from which to conduct this drill. The uncontrolled detonation occurred when he moved vegetation that was cut.

11. He heard the detonation, not realising that it was in his lane; he then saw that [Victim No.2] was injured, and moved down towards him.

12. When [Victim No.1] got to the bottom of the terrace, [Victim No.2] had already walked out towards the base lane, and he followed him when he realised that he was also injured.

Medical treatment and Casualty evacuation procedure

13. Medic [Name removed] and medic [Name removed] conducted all required medical procedures on [Victim No.2]; they dressed all the injuries, put in a Ringer IV line, administered oxygen and placed a neck collar on the victim.

14. Medic Dr [Name removed] conducted all required medical procedures on [Victim No.1]; he dressed all the injuries, put in a Ringer IV line, administered oxygen and placed a neck collar on the victim.

15. The casualties were then moved towards the emergency vehicles under the control of the team leader ([Name removed]) and Dr [Name removed].

16. At 12:38hrs the first ambulance left the site, and at 12:40hrs the second ambulance left the site on route to Jabal Amel hospital.

17. The casualties were accompanied by the Assistant Medical coordinator [Name removed] in the first ambulance.

18. [Name removed] then instructed the rest of the team members to close their lanes and retrieve their equipment and also to close the accident lane and to leave all items undisturbed.

19. The casualties arrived at Jabal Amel at 12:46hrs and 12:48hrs respectively, which is the designated nearest hospital for casualty stabilisation. The [International commercial demining agency] paramedics assisted by the hospital staff then changed the dressings and re-assessed the victims in a sterile area.

20. A CT-scan was done on [Victim No.2] and fragmentation could be seen in his wounds.

21. At 14:00hrs both casualties were loaded back into the ambulances for transportation to the Hammoud Hospital in Saida.

22. At 14:36hrs the casualties arrived at the Hammoud Hospital and were handed over to the waiting Emergency response staff and the [International commercial demining agency] casualty evacuation procedure ended.

Follow Up investigation of the accident

23. At CBU 434 the initial accident investigation began with [International commercial demining agency] QA supervisor [Name removed] assisted by [International commercial demining agency] Ops manager [Name removed]. The scene of the accident was photographed and left untouched for the MACC SL/LMAC investigation team.

24. The MACC SL/LMAC investigation team arrived at about 13:45hrs. This consisted of MACC SL QA officer's [Name removed] & [Name removed]. They were joined by Lt [Name removed] of the LMAC. They were briefed by [Name removed] and the site supervisor [Name removed] and then escorted to the accident scene. Here they made notes and took photographs and then returned to the control point to question the team members involved in the accident.

25. The 4 X M77 that were found that day, were marked and left to be destroyed the following day.

Casualties' details

26. Casualty one:

Name: [Victim No.2] – BAC 028

Position: Searcher

Experience: He has worked with [International commercial demining agency] International from 01 Oct 2006 in South Lebanon on the UNOPS project.

27. Casualty two:

Name: [Victim No.1] – BAC 030

Position: Searcher

Experience: He has worked with [International commercial demining agency] International from 01 Oct 2006 in South Lebanon on the UNOPS project.

Description of injuries:

28. Casualty one: [Victim No.2] Minor injuries to left & right thighs, right arm, left forearm and head.

29. Casualty two: [Victim No.1] Minor injuries to right leg and the right buttock.

Conclusions

30. Based on the statements and the visit to the site the investigating officer concludes the following:

Both searchers involved in the accident were fully trained, accredited and experienced searchers familiar with the site and had just taken a rest break.

[Victim No.1]:

- He was conducting vegetation cutting (in full PPE) at the top of the terrace when the uncontrolled detonation occurred; it could not be confirmed that he searched the vegetation with his locator for sub-munitions before conducting the vegetation cutting; his locator was found in the 'Off'-position at the bottom of the terrace.
- Most vegetation that was cut, was found at the bottom of the terrace, so it is assumed that vegetation already cut, was either thrown down from the top or allowed to roll down over the uncleared area and allowed to drop down to the bottom of the terrace.
- [Victim No.1]'s base stick was found on the bottom terrace with no lane marking ropes attached to it, and the bottom boundary tape was not open to form a lane. No blast / fragmentation damage could be found on it, so it can be assumed that it was not being used. No other improvised methods for the use of the base stick was authorised by the supervisor or the team leader.
- While conducting an interview with him, he stated that he turned (to the left) to move vegetation when he heard the detonation, which would account for his injuries only on his right side.
- [Victim No.1] also stated that once he heard the detonation and saw that the other searcher, [Victim No.2], was bleeding, and moved down towards the base lane.

[Victim No.2]:

- [Victim No.2], as per his statement, was not wearing any PPE when the detonation occurred, it is not clear why he was not wearing his PPE, one can only assume he removed it because he finished his area and was about to move to a new area and forgot that [Victim No.1] was still working; taking this into account and the fact that it is also not clear if he was 25m away when the detonation occurred, it could account for the amount of fragmentation injuries he sustained.
- Also, the searcher cutting vegetation, [Victim No.1], stated that he looked at [Victim No.2] and saw him bleeding, this would be very difficult if he was 25m away, seeing that the terrace makes a curve and would have made visibility difficult.
- Victim No.2]'s mobile phone and hat were found at the bottom of the terrace wall that was worked on by [Victim No.1].

The conduct of team leader, [Name removed], seems to be above suspicion, although there is some concern with regards to his command & control skills, it must be noted that he is still under probation as a new team leader; these concerns will be addressed by his supervisor.

The casualty evacuation was carried out in a well controlled, co-ordinated, safe and effective manner.

The site safety was emphasised by the site supervisor and team leaders that morning stressing the importance of careful vegetation cutting & locator search drills.

In all probability, the sub-munition was disturbed during the movement of the cut vegetation, causing it to detonate. This is supported by the lack of fragmentation / blast damage to any of the hand tools.

This accident is regarded as preventable.

The detonation was caused by an M77 being moved as a result of cutting or moving vegetation.

Recommendations

30. It is recommended that:

- Strict supervision of the all BAC searchers is reinforced and to be maintained by the Site Supervisor and Team Leaders with particular emphasis on gentle, slow vegetation cutting drills and using the locator prior to vegetation cutting to check for the presence of sub-munition.
- Shift duration is monitored and reduced as the ambient temperature rises.
- Both [Victim No.1] and [Victim No.2] should undergo a full BAC training course of at least 5 working days under close supervision. Although quite a few assumptions have been made because of the lack of statement evidence from these two members, both should be given a final written warning for their actions.
- The team leader, [Name removed], should be given the opportunity to continue with his team leader training, with particular attention to command & control techniques.
- No follow-up actions are required for the supervisor, [Name removed] or the medics involved.

Annexes: [Some made available, but no original statements]

Photographs

Register of documents: (separate file)

IMSMA Demining Accident report

Site specific documents

Refresher training program

Training attendance register

Site daily worksheets

Casualty evacuation & Medical reports

Witness statements

Signed: [Name removed] [International commercial demining agency] SL QA Officer

12 July 2007

Distribution. External: [International commercial demining agency] Managing Director; MACC SL / LMAC

Internal: [International commercial demining agency] Programme Manager; Operations Manager

Victim Report

Victim number:	736	**Name:**	[Name removed]
Age:	21	**Gender:**	Male
Status:	deminer	**Fit for work:**	presumed
Compensation:	Not made available	**Time to hospital:**	20 minutes
Protection issued:	Frontal apron Long visor	**Protection used:**	Frontal apron

Summary of injuries:

minor Arm

minor Back

severe Leg

COMMENT: See Medical report.

Medical report

From IMSMA report and BoI text:

Date of birth: 16/01/1986

The sketch shows injuries to right arm and lower limbs

Time before first hospital reached: 20 minutes

[Victim No.1] suffered injuries to his right ankle and a deep cut on his right buttocks.

[Victim No.1] suffered from deep cuts on his right ankle and light bruises to his right arm around the elbow.

The medics stopped the bleeding from [Victim No.1] and at around 1239hrs transported him to Jabel Amel Hospital, Tyre.

[Victim No.1] suffered severe injuries closer to his ankle and a deep cut on his right buttock.

[Victim No.1] Minor injuries to right leg and the right buttock.

Victim Report

Victim number:	737	**Name:**	[Name removed]
Age:	21	**Gender:**	Male
Status:	deminer	**Fit for work:**	presumed
Compensation:	Not made available	**Time to hospital:**	18 minutes
Protection issued:	Frontal apron Long visor	**Protection used:**	None

Summary of injuries:

minor Arms

minor Legs

severe Head

COMMENT: See Medical report.

Medical report

From IMSMA report:

Date of birth: 01/08/1985

The sketch shows injuries to right arm; upper limbs, lower limbs, head/neck

18 minutes until first hospital facility reached.

[Victim No.2] a deep cut on his thigh and cut to his head.

The casualty [Victim No.2] suffered injuries in the front of his thigh and a deep cut on the rear/ top of his head. The team leader arrived first and undertook first aid, prior to the arrival of the medics.

When the medics arrived they stabilized the casualty and escorted him to hospital.

[Victim No.2] suffered injuries on his head and to the front of his thigh.

[Victim No.2] Minor injuries to left & right thighs, right arm, left forearm and head.

A CT-scan was done on [Victim No.2] and fragmentation could be seen in his wounds.

Analysis

This accident is classed as a "Missed-mine accident" because it seems that Victim No.1 initiated the submunition inside the area that he has already "cleared". The lack of marking inside the working area makes this uncertain.

The Primary cause is listed as a "Field control inadequacy" because the Victims were not working to their SOPs and their errors were not corrected. Fundamental safety rules – such as the wearing of PPE, maintenance of safety distances and the clear delineation between areas searched and not searched – were breached.

The secondary cause is listed as a "Management control inadequacy" because the investigators determined that the international "site supervisor had limited idea about the operations on his site", and sought to mislead the investigators about the true details of the accident.

This accident investigation was ably conducted and the report is well detailed. So many basic safety rules were breached that one cannot help wondering whether this was a case when the suspension of operational accreditation to the International demining group would have been justified? Perhaps not, if QA visits showed that this was an unusual state of affairs.