8-13-2010

DDASaccident799

HD-AID
Humanitarian DeminingAccident and Incident Database

DDAS Accident Report

Accident details

Report date:	20/12/2013	**Accident number:**	799
Accident time:	22:30	**Accident Date:**	13/08/2010
Where it occurred:	Al Lafa MF, Kassala	**Country:**	Sudan
Primary cause:	Field control inadequacy (?)	**Secondary cause:**	Management/control inadequacy (?)
Class:	Missed-mine accident	**Date of main report:**	05/10/2010
ID original source:	2-10/03	**Name of source:**	UNMAO
Organisation:	[Demining group]		
Mine/device:	PRB M35 AP blast	**Ground condition:**	agricultural (recent)
Date record created:		**Date last modified:**	20/12/2013
No of victims:	1	**No of documents:**	2

Map details

Map east:	E362908.9	**Map north:**	N151254.6

Accident Notes

inadequate metal-detector (?)

inadequate training (?)

mechanical detonation (?)

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

protective equipment not worn (?)

Accident report

A report of this accident was made available as a PDF file in 2013. It’s conversion into a document file has led to some of the formatting being lost. It is reproduced below, edited for anonymity. The Annexes referenced in the file were not made available, but a report on the management failings of the Demining Group involved was included and is reproduced under “Related papers”. Text in square brackets [ ] is editorial.

BOI Report

Executive Summary

1. The accident occurred in (NR 205) on the 13th August 2010 in a cleared mine field (?) in Al Lafa Kassala where a tractor driver was injured by an Anti-Tank (AT) PRB 35 mine whilst cultivating an area of land that had been released through full manual clearance by [Demining group]. The tractor driver suffered injuries to his upper and lower right limbs.

2. In accordance with NTSGs, the Director of UNMAO-Sudan issued a written convening Order on the 03 October 2010 for a mine accident BOI. The BOI members were: Chairman: [Name removed] BEM UNMAO, MR [Name removed] NMAC. MR [Name removed] UNMAO, MR [Name removed] [2nd Demining group], MR [Name removed] [Demining group].

3. The BOI sat, and conducted all proceedings in Kassala with the exception a of a site visit, and concluded from the available information that:

[Demining group] had missed the AT mine PRB 35 that was detonated by the tractor and the two other AT PRB 35 mines located after the accident by the military engineers. Information from the site during the current re-clearance of the DA, has uncovered one more AT PRB 35 mine and one more PBR 35 AP mine. The mines found after the accident should have been detected and cleared during the initial Clearance.

As per the Implementation Plan (IP) [Demining group] were conducting full manual clearance of the site using Minelab F3 detectors, these detectors were trialed and were found to detect both AP and AT PRB 35 mines to the required clearance depth.

SOPs of the organization involved in this accident need to be reviewed in relation to Internal QA on site documentation, Accident Report writing, and actions to be taken whilst investigating explosion.

There was insufficient internal and external QA visits conducted on the site through out the clearance process.

4. Recommendations of the board are:

4.1 [Demining group] Greater supervision and/or training are provided to ensure that the basic levels of record-keeping and completion documentation are maintained in accordance with NTSGs in the future. The relevant documents should be able to relate to task/ground to the reader; it should be possible to accurately cross-reference data.

4.2 The following documentation is added to the [Demining group] SOPs: Visitors Log, Detector running log, Stores & Equipment Register, Central Demolition Site (CDS) Standing Orders, Demolition Plans & Demolition Safety Briefs if utilizing a CDS.

4.3 Internal training should be conducted with all team leaders TFMs in the arts of finishing Completion Reports as laid out in the NTSGs Sudan.

4.4 Missed mines drills to be increased to a five metre box around any area where a mine is not found in a mine row. [Demining group] SOPS to be amended and NTSG to be amended to reflect the miss mine drill.

4.5 To comply with NTSGs, Internal QA should be conducted by the de-mining agency, which must submit the required number of QA forms relevant to the task once a month.

4.6. [Demining group] reverts to completing the UNMAO daily report not the weekly progress report.

4.7. (NMAC UNMAO Offices Kassala) should carry out a review of all QA practices. If training is needed, support should be given.

4.8. The Kassala UNMAO sub-office should carry out a review of all contractors on site task documentation in relation to quality of recording.

4.9 Kassala Operations Officer to assist QA by conducting external QA which he currently does not do, and to take a more active approach in the events that are unfolding in the Area of Operation.

4.10. NRMAO to issue an immediate safety notice to all contractors and sub office's on the requirements of creating a safe working lane to sites where accidents or detonations have taken place before any movement is allowed in the area.

4.11. The detector trial conducted on the Mine lab F3 and the Ebinger 421 GC (Annex J) have high lighted that the Ebinger 421 GC will not detect PRB35 AT mine at the required clearance depth. All companies must be warned and a review taken by HQ UNMAO in relation to allowing this detector to be used in country against these mines.

1. Introduction

1.1 An accident occurred in Al Lafa, Kassala on 13th August 2010. A tractor driver was injured whilst cultivating a portion of land using a tractor in preparation for planting. The Sudanese Red Crescent notified the Kassala sub-office the next day about the details surrounding the admittance of the tractor driver to the teaching hospital in Kassala.

1.2 On 14th August 2010, Quality Assurance (QA) Officer [Name removed 1] was the officer in charge of the sub office, as the Operations officer (Ops) [Name removed] was on Leave, [Name removed 1] sent an email informing the Regional office and Headquarters office that an accident had taken place in the AI Lafa area. On the 15th August 2010, [Name removed 1] then arranged for National Operations Assistant [Name removed] and the QA assistant from the sub-office along with members of the Kassala NMAC office to visit the site and to complete a Dangerous Area (DA) mine field accident report and a victim report. This was based on information from the sub office national QA Officer who stated that the accident site was out side the [Demining group] cleared area. By this time the local military engineer's had visited the site and found two other AT PRB 35 mines close to the tractor. They marked around the site with local bushes to warn other people of the hazard. [Name removed 1] returned to Damazin on the same morning. QA Officer [Name removed] then arrived at Kassala and took over as Officer-In-Charge of the Kassala UNMAO sub-office.

1.3 On the 16 August 2010 the mine field, DA and victim reports were sent to the Northern Region Mine Action Office (NRMAO). The first reports from the national QA officer in Kassala indicated that the accident site was 300 mtrs outside the [Demining group] cleared area. This information led the regional office to thinking this was a new DA. During this period the Regional Coordinator was on leave, the reports stayed with the NRMAO office until the 23 August 2010. The Regional Operations Coordinator, [Name removed], sent an email to [Name removed] and [Name removed] (International Operations Officer who by this time had returned from leave) stating that the information within the DA report was insufficient. He further requested that the sub-office provide more details. On the same day, [Name removed] confirmed receiving the email.

1.4 On the 30 August 2010, the revised DA report was sent back to NRMAO. A new DA number was generated, NR 895. [Another Demining Group] was chosen by Regional office to conduct a GMAA on the site, based on their availability. [This Demining group] was currently working on a different site and were only able to be tasked on the 16 September 2010.

1.5 On the 16 September 2010, [the Other Demining Group] was tasked to conduct a GMAA task on the reported accident site. During the mapping stage of the site, [the Other Demining Group] found that their records showed that the accident site was within the area that [Demining group] had cleared. [The Other Demining Group] reported this to the sub- office. NRMAO and the sub-office decided that a mapping exercise would be held to decide whether the accident site was or was not inside an area recorded as cleared.

1.6 A joint meeting was held in the Kassala sub-office on the 26 September 2010 between representatives from UNMAO, NMAC, and [Demining group]. The meeting was to try and

determine whether or not the accident site was indeed inside a [Demining group] cleared area. The meeting looked into the sub office databases and checked the details against maps and records of the site held in the sub office. The final outcome could not determine whether the accident definitely occurred inside an area that [Demining group] had cleared. NRMAO then checked the accident coordinates with the completion maps from the survey team [Name removed].

1.7 On the afternoon of 26 September 2010, NRMAO requested [Demining group] to conduct a detailed joint investigation into the accident site to confirm or not whether the accident took place inside an area that [Demining group] had cleared.

1.8 On the 28 September a joint team from [Demining group], NMAC, UNMAO visited the site and confirmed that the accident was indeed inside their area that had been released. [Demining group] then produced a detail accident investigation report and forwarded it to Regional office for their attention. [This was not made available.]

1.9 . Upon receipt of the accident report from [Demining group], UNMAO HQ issued a convening order for a Board of Inquiry (BOI).

1.10. In accordance with the National Technical Standards and Guidelines (NTSG), the Programme Manager of UNMAO-Sudan issued a written convening order on 3 October 2010 for a Demining Incident Board of Inquiry (BOI) to explore the findings of the preliminary investigation. (See Annex A)

1.11 The Board members are:

[Five names removed.]

1.12 The entire Board convened in Kassala Sub Office on the 4th, 5th, 6th October 2010. On the 7th of October, [name removed] returned to Khartoum. The remaining members met in the afternoon of the 13th of October to review the findings of the report.

2. Accident details

2.1 Mr [Name removed] a local farmer was cultivating his land with his tractor during the day and the hours of darkness on the 13 August 2010. This is a normal practice in the Kassala area as the day time temperatures often soar into the mid forties. The land he was cultivating had been subjected to a GMAA Survey and a clearance operation by [Demining group] between March 2009 and July 2009. A DA report created by the sub office on 26 August 2010 after the accident indicates that the land had been cultivated once before without any incidents.

2.2 At around 2230hrs on the evening of the 13 August 2010, a large explosion was heard from a local police station near the accident site. An officer from the station went to the area to find the damaged tractor and the driver, who had suffered injuries to his right upper arm and right leg.

2.3 A report was sent to the Military Intelligence office in Kassala at around 2300hrs stating that a farmer had been injured and that the police were evacuating him to the teaching hospital in Kassala.

2.4 The next morning, on 14 August 2010, an intelligence officer from the Kassala military, along with the police officer visited the site of the explosion. They observed that there was an unexploded mine lying close to the scene of the accident. Therefore, the military engineers from Kassala were called and arrived on site around 1000hrs.

2.5 The engineers searched around the site on the 14/15 October and they visually located one (AT PRB 35) mine lying on its side in a furrow that had been created by the action of the

plough. They then searched a 20 meter radius around the tractor using prodders and located a second (AT PRB 35) mine. Both mines were removed and destroyed.

2.6 The military engineer conducting the search indicated that given the depth of the crater where the mine exploded, they estimated that the mine was approximately 30 cms (this was only an estimation as others have estimated the depth to be between 18 -25cm deep: it should by noted that NTSGs Chapter 4 Par 2.18 states that the min clearance depth is 13 cm) from the surface. The area was sealed off using local materials and the site was left.

2.7 The Sudanese Red Crescent (SRC) operates an office in the Kassala teaching hospital. Meanwhile, at 1000hrs, on the morning of 14 August 2010, the Kassala sub-office received a phone call from the (SRC) that a mine accident has taken place and one man had been injured. This was the first time that UNMAO had heard of this accident. The National QA officer verbally gave the information to Regional office that the area where the accident had taken place was outside the [Demining group] cleared area.

2.8 On the 15 August 2010, the sub-office sent the National Operations Officer, National QA Officer and the NMAC QA officer to the site to complete IMSMA DA, victim, and mine field accident reports. During this visit the team observed the second AT mine PRB 35 been found by the military, both mines were taken away by the military and destroyed at a safe distance.

Analysis.

2.9 After reviewing the site documentation, it is clear that both [Demining group] and the sub-office had not managed the team well. [Demining group] documentation presented to the board is inaccurate, with vital elements missing such as the site map and visitors log. A closer look at the daily diaries indicates that excessive metres had been cleared by the deminers in one day, while the total of the metres for a days work had been reduced and added to next days work. (QC) was not conducted on a daily basis, with almost one month passing without any internal quality assurance recorded. Daily deminers metres were not recorded on occasions. Attendance records show no medics on site during the completion day. The completion report is not correctly completed, no photos of reference points, distances are excessive between turning points in violation to NTSGs, the detail map of the completion is very poor with no details other than a shaded box, start point is not on the start line. No permanent fixed bench mark recorded.

2.10 The management of the mine field from the Sub office lacked professional Quality Assurance (QA) and documentation checking through out the mine field clearance. Excessive clearance rates are clearly seen on days when no internal QC has been recorded. Clearance rates have not been fully reported with reduction in meters that are added to the next days work. The total number of external QA conducted does not comply with Annex A of Chapter 14 in the National Technical Standards Guidelines (NTSGs). The QA of the completion is not as required with distances, bearings and mapping not to the standard that is expected in NRMAO.

2.11 During the joint detailed investigation and visit to the accident site shortly after the accident, safety was compromised by [Demining group], NMAC, and UNMAO by allowing there own personnel to enter the hazard area, without having first established a clear route to the site of detonation as seen by the photos used in the [Demining group] report and DA report attached. Had the sub office visited the site more often they would have been able to identify the area where the detonation had taken place, failing to check the clearance completion report led to a delay, in establishing the location of the accident site and confirming whether it had occurred in a cleared area.

2.12 Whilst the regional data base was used to cross check the accident coordinates they wrongly checked against the survey completion report, which only compounded things, the clearance completion report should have been used. There was a 212 meters error between the bench marks, when a printed comparison map was produced this showed two separate mine fields with the same shape but apart by the error margin. Regional Office took the right decision to confirm on the ground with the joint team to identify once and for all the exact location of the detonation.

3. Location of the Accident/Incident

3.1 The area lies 30 kilometers to the southeast of Kassala and runs along the border with Eritrea. The ground is of a sandy light soil nature and there are areas of thick bush scattered within it. During the rainy season it is subjected to flooding. The actual site was a former military camp during the civil unrest close to the Eritrea border.

3.2 During the BOI site visit the area had been cultivated. It was reported that the first time a tractor had been used in the cultivation process took place last year, after the clearance had been completed. In the Kassala area it is customary to plough, in the direction of north-south first, then to plough east-west, to break up the ground facilitating the hand planting of onions. An impact survey was carried out in the area in April 2007 by [Demining group], which generated SHA NR 35, and later was assigned DA number NR 1033. The [Demining group] survey Team identified two mine fields during the survey. The Survey team, MTT 1, was using hand clearance drills with Ebinger GC 421 detectors. The DA was closed and two mine fields were issued, NR 204 and NR 205. These in turn were tasked to [Demining group] for clearance under the task number NR 709.

3.3 The clearance started on NR 204 and NR 205 on 12 April 2009 until 23 July 2009.

The Clearance team MTT5 was conducting hand clearance drills with Mine lab F3 detectors. The task was subjected to very few external and internal QA visits, during these QA visits no adverse comments recorded.

3.4 After the completion in July 2009 the area was released back to the local authorities. Local farmers began to cultivate the area with onions. Last year in the same area were the accident occurred the area was ploughed with no incident.

3.5 The area lies very close to a border crossing point with Eritrea. A new road has been built to facilitate traffic moving in and out of Ethiopia. The clearance of the mine field is now a high priority as the area is heavily populated with local farmers.

3.6 GPS readings of the detonation site and the areas where the two other mines were located were taken during the [Demining group] investigation, the GPS readings could not be confirmed by the BOI team, due to the lack of a safe lane to these areas, instead, the BOI observed the site from a known safe area.

3.7 The [Demining group] investigation recorded the following coordinates:

[Demining group] GPS reading of the explosion site: N151254.6 E362908.9

4. Casualties

4.1 One casualty occurred in this accident, Mr [Name removed] who suffered major injuries to his upper right arm and lower right leg. He received immediate medical treatment and has been referred to a Khartoum hospital for further treatment.

The BOI interviewed the list of witnesses provided below.

[Names of witness removed.]

6. Details of Activities on the Day of the Accident

6.1 No demining activities were been conducted in that area on the day of the accident.

7. Details of the Mine/UXO involved

7.1 Please see Annex D [Not made available.]

8. Evidence of Re-mining

8.1 There is no evidence of re-mining. The two other mines located by the military engineers were reported as deeply buried, given the area had been ploughed twice this would explain why the mines were deeper that the normal depth. The clearance team now re-clearing the site has reported finding one AT and one AP mine around the tractor, the AT mine was in line with the other two located by the military engineers shortly after the accident.

9. Particulars of Insurance

9.1 Not applicable because casualty is not conducting a demining activity or part of demining operations. He may have individual health insurance but this was not confirmed.

10. Within the [Demining group] Task dossier, none of the following documentation was located:

a. No Survey Reports

b. No Records of internal quality assurance being carried out during the period of 29/06/2009 to 22/07/2009.

c. Form T carried out (Prep & Set-up) front page not completed;

d. No Documents to support the two CASEVAC Drills carried out (02 & 09/10/2009);

e. Details of ordnance destroyed or what explosive/accessories utilized (30/06/2009);

f. No pictures of RP, BM

g. No separate visitor's log, or safety brief.

h. No casevac Plan.

i. No communication Plan.

j. No separate team Nominal rolls with blood groups ID card numbers etc, details not entered on the daily diaries.

k. No site map.

A full list is of other missing documentation, including completion details is listed with explanations at Annex J. [See Related papers.]

11. Conclusion

[Demining group]

11.1 [Demining group]'s own detailed investigation report confirmed that the area where the accident occurred and the two other mines were found, were indeed inside the cleared DA.. The BOI also concludes this.

11.2 The documentation presented by [Demining group] for the task had vital parts missing, there was no site map presented to the board. [Demining group]'s, on site daily diaries were not filled in correctly. The completion report is inaccurate with the number of items found not matching the items destroyed, distances between the turning points not in line with NTSGs the completion map lacking detail.

11.3 Additionally, there was a lack of internal QC conducted during the task. This would have identified clearance speeds, the on-site documentation should have been corrected by [Demining group] Technical Field Managers(TFM) Team Leaders(T/L) Furthermore, the National Mine Action Centre (NMAC) mine field report recorded a large number of mines but only part of those mines were found by [Demining group]. Nothing was done to investigate where the missing mines were.

UNMAO Sub Office

11.4 External QA was not conducted as per NTSG. External QA would have identified the grave lacking in the on site documentation, and picked up the lack of QC from [Demining group], Clearance rates clearly indicate in (Annex J) that the team was rushing the clearance of the mines along the4 mine row.

11.5 The completion report was lacking in detail, yet was accepted by the Sub Office and signed off as completed by both the QA and Operations officers in Kassala (Annex B.) QA Officers at the time of completion was Mr [Name removed, QA Officer, Mr [Name removed] Operations Officer.

11.6 The Sub Office needs to review their QA visits and to create a schedule to visit all mine fields and ensure that all mine fields are visited in compliance with NTSGs.

11.7 During the investigation of the accident NRMAO data base check, the grid location was checked against the completion report of the Survey team. This was an error. If the clearance completion report had been used it would have established that the grid location was indeed inside the [Demining group] reported cleared area, the error in cross checking delayed the final out come.

11.8 During the accident investigation by the sub office visits, both, [Demining group], NMAC and the Sub Offices allowed their members to enter into the dangerous area, without establishing a safe cleared lane to the site of the detonation. Currently [Another demining group] are re-clearing the site and have located to date, two other mines one AP (PRB 35) and one AT (PRB 35) A closer look at the photos taken by these individuals clearly shows that it very fortunate that no other person was injured

11.9 The detector trial conducted on the Mine Lab F3 and the Ebinger 421 GC has high lighted that the Ebinger 421 GC will not detect PRB35 AT mine at the required clearance depth. All companies must be warned and a review taken by HQ UNMAO in relation to allowing this detector to be used in country against these mines.

12. Recommendations

[Demining group]

12.1. Greater supervision and/or training are provided to ensure that the basic levels of record-keeping and completion documentation are maintained in the future. The relevant documents should be able to relate to task/ground to the reader; it should be possible to accurately cross-reference data.

12.2. The following documentation is added the [Demining group] SOPs: Visitors Log, Detector running log, Stores & Equipment Register, CDS Standing Orders, Demolition Plans & Demolition Safety Briefs if utilizing a CDS. These items would allow cross checking of information form the completion reports and [Demining group] own daily diaries.

.12.3 To comply with NTSGs, Internal QA should be conducted by [Demining group], which must submit the required number of QA forms relevant to the task once a month.

12.4. Internal training should be conducted with all team leaders TFMs in the arts of finishing Completion reports as laid out in the NTSGs Sudan.

12.5. Missed mines drills to be increased to a five meter box around any area where a mine is not found in a mine row. [Demining group] SOPS to be amended.

12.6. [Demining group] reverts to completing the UNMAO daily report not the weekly progress report. NRMAO/ Sub office Kassala

12.6 (NMAC UNMAO Offices Kassala should carry out a review of all QA practices. If training is needed, support should be given.

12.7 The UNMAO sub-office should carry out a review of all contractors on site task documentation in relation to quality of recording.

12.8 Kassala Operations Officers to assist QA by conducting external QA.

12.9 NRMAO when cross checking accident, incidents grid locations should ensure that the most updated and latest completion report is used.

12.10 Care must be taken when providing photos of a location where accidents have taken place, coordinates must be provided as not to confuse reference points against the accident location.

12.11 The detector trial conducted on the Mine Lab F3 and the Ebinger 421 GC has high lighted that the Ebinger 421 GC will not detect PRB35 AT mine at the required clearance depth. All companies must be warned and a review taken by HQ UNMAO in relation to allowing this detector to be used in country against these mines.

12.12 UNMAO to issue an immediate safety notice to all contractors and sub office's on the requirements of creating a safe working lane to site of the accident/ detonation before any movement is allowed in the area of the detonation.

12.13 UNMAO should consider that the clearance depth is only 13 cm, a normal plough will normally plough a furrow of around 30 cm deep, should the clearance depth be increased in areas were ploughing is expected or consider that all areas were AT mines are present that only mechanical assets should be used.

[Signed by the Chairman and all BOI members.]

Victim Report

Victim number: 995 **Name:** [Name removed]

Age: **Gender:** Male

Status: civilian **Fit for work:** not known

Compensation: Not known **Time to hospital:** Not recorded.

Protection issued: None **Protection used:** None

Summary of injuries: severe Arm; severe Leg

COMMENT: No medical report was made available.

Related papers

A report into the Demining Group's clearance of the area [Presumed to be an Annex] was made available. Conducted for UNMAO, it involves the examination of all available records. This report is reproduced below, edited for anonymity.

October 5, 2010

BOI UNMAO Sub-Office Kassala 04 - 06/10/2010

Instructions from BOI Chairman:

1. Check all External & Internal QA Forms in Completion Folder.

2. Check Completion Report for errors.

3. Check Completion Folder for errors.

4. Check & compile map & results to present to BOI members.

1. External & Internal QA Reports carried out at Al Lafia, M/F ID NR-205:

The following External & Internal QA's were carried out at Al Lafia over the period June 1 - July 23, 2009:

External QA:

Date	UNMAO	QA Form	Grade	[Demining group]	Time	Remarks
01/06/09	[Name removed 1]	J	Medium	[Name removed 2]	1045 - 1200	1st day of work
25/06/09	[Name removed 1]	J	Medium	[Name removed 2]	1145 - 1350	DD states QA Officer off site @ 1350, DD states 1320hrs
30/06/09	[Name removed 1]	F J	Medium High	[Name removed 2]	1255 - 1400 0950 - 1230	What was destroyed No detector test
07/07/09	[Name removed 1]	J	Medium	[Name removed 2]	0910 - 1145	No detector test
23/07/09	[Name removed 1]	E	High	[Name removed 2]	1005 - 1120	No Benchmark & different GPS*

Internal QA:

Date	UNMAO	QA Form	Grade	[Demining group]	Time	Remarks
11/06/09		N	Medium	[Name removed 2] [Name removed 3]	0905 - 1135	
14/06/09		J	Medium	[Name removed 2] [Name removed 3]	1000 - 1130	No detector test
16/06/09		L	Medium	[Name removed 2] [Name removed 3]	1000 - 1115	No HLS details
20/06/09		J	Medium	[Name removed 2] [Name removed 3]	0955 - 1120	
28/06/09		L1	Medium	[Name removed 4] [Name removed 2]	0800 - 0948	Front page incomplete
23/07/09		E	High	[Name removed 5] [Name removed 2]	??	No timings Different GPS*

* Different GPS reading utilised for the same location.

NB:

a. No Form T carried out (Prep & Set-up);
b. No paperwork to support the two CASEVAC Drills carried out (02 & 09/10/2009);
c. No detail of ordnance destroyed or what explosive/accessories utilised (30/06/2009);
d. Front page of Form L1 incomplete;
e. No record of Internal QA being carried out over the period 29/06 - 22/07/2009.

2. Completion Report errors:

The Completion Report was checked thoroughly and the following errors were found:

a. No pictures/details of RP and/or Benchmark (BM);

b. Size of area is different to the totals contained within the Daily Diaries;

c. Mines located differ from totals in contained within the Daily Diaries;

d. The Completion Map is missing the following details:

(1) North arrow;

(2) Legend;

(3) Mine-row(s) (site map which is missing);

(4) BM;

e. Distances between SP to TP & TPs to TPs too great; (TP1 - TP2 = 224.7m, 50m max);

f. Date of completion on CR (25/07/2009) different to that on Handover Certificate (23/07/2009).

NB: It has been mentioned that the large Tondob tree in the centre of the old Military Camp was the BM but it is also listed as the Reference Point. The SP should be clearly visible from the RP/BM and is to consist of three metal pickets driven flush to the ground. In addition the SP should be located adjacent to the Start Line where clearance activities begin (in this instance the SP was 208m away from the Start Lane).

IPs and/or TPs should be inserted when either the difference in bearing is 2 degrees or greater and/or a maximum of 50m apart.

3. Completion Folder errors:

The Completion Folder was checked and the following errors were found:

a. No Visitor Brief/Safety Brief;

b. CASEVAC Plan;

c. No Communications Plan;

d. Number of A/T & A/P mines located as listed in the Daily Diaries (258) differ from the totals inserted in the Completion Report & Handover Certificate (267);

e. Number of SM20 & Electric Detonators utilised during demolitions differ from the Daily Diaries (SM20 x 178 & Elec Det x 172) to the Explosive Register (SM20 x 283 & Electric Detonators x 299);

f. No Team Nominal Roll c/w relevant details (Blood Group, ID Card No, etc, etc);

g. No Site Map;

h. No Internal or External QA Form T (Prep & Set-up) carried out;

i. No paperwork to support the two CASEVAC Drills carried out (02 & 09/06/2009);

j. No demolition paperwork to verify ordnance destroyed and location;

The following table highlights the errors in the Daily Diaries:

Date	Cleared m^2	QCm^2	Remarks
01/06/2009	137	25	Arrive on site @ 0900 & working @ 0915hrs
02/06/2009	338	112	
03/06/2009	431	195	
04/06/2009	396	176	
05/06/2009	293	134	DD stop work @ 1325 & CL @ 1100hrs
06/06/2009	377	158	
07/06/2009	90	0	Nil Internal QC
08/06/2009	616	175	DD stop work @ 1320 & CL @ 1300hrs
09/06/2009	491	63	CASEVAC @ 1018hrs (8mins) - CL stated visitor to CP to carryout QA but no QA carried out & no details of visitor in DD.
10/06/2009	292	80	
11/06/2009	285	165	DD stop work @ 1350 & CL @ 1320hrs
12/06/2009	279	50	DD stop work @ 1300 & CL @ 1100hrs
13/06/2009	439	65	
14/06/2009	410	55	
15/06/2009	455	100	
16/06/2009	469	70	
17/06/2009	425	90	
18/06/2009	314	55	
19/06/2009	301	50	BIS - No record in Explosive Register CL - Dems @ 1105hrs yet deminers still in M/F
20/06/2009	350	50	
21/06/2009	320	55	
25/06/2009	504	156	DD stop work @ 1540 & CL @ 1520hrs No record or time of dems
26/06/2009	575	120	
27/06/2009	663	325	Dems @ 1339hrs - No record in Explosive Register
28/06/2009	661	237	No m^2 entered in page 2 of DD but the m^2 on page 1 was reduced by 200m^2, why? No Internal QC carried out
29/06/2009	783	320	No Internal QC carried out
30/06/2009	532	150	
01/07/2009	731	215	M^2 cleared was reduced by 100m^2, why?
02/07/2009	923	0	M^2 cleared was reduced by 100m^2, why? No Internal QC carried out
03/07/2009	667	130	M^2 cleared was increased by 100m^2, why?

			No CL
04/07/2009	660	100	M^2 cleared was increased by 100m^2, why?
05/07/2009	631	125	
06/07/2009	863	0	M^2 cleared was reduced by 100m^2, why?
07/07/2009	657	135	
08/07/2009	913	260	
09/07/2009	952	315	
10/07/2009	801	230	
11/07/2009	908	240	
16/07/2009	924	362	
17/07/2009	889	175	DD incomplete (other information)
18/07/2009	1,050	235	
20/07/2009	382	95	382m^2 shown in summary yet 689m^2 shown on page 1 DD incomplete (other information)
21/07/2009	724	0	No shift details and no Internal QC carried out
22/07/2009	1,073	0	No shift details and no Internal QC carried out
	24,974	5,798	

DD - Daily Diary
CL - Communication Log
BIS - Blow-in-situ

The following table highlights the errors in the explosive & accessories register and/or Daily Diaries:

Date	Explosive Register		Daily Diary		Remarks
	SM20	Elec Det	SM20	Elec Det	
17/06/2009	20	25	N/A	N/A	Issued to [Identifer removed] 1
19/06/2009	NR	NR	2	2	
25/06/2009	NR	NR	2	2	
27/06/2009	NR	NR	3	3	
28/06/2009	6	6	6	6	
29/06/2009	14	14	12	12	
30/06/2009	13	13	8	8	
01/07/2009	10	10	9	9	
02/07/2009	20	24	17	17	
03/07/2009	13	13	10	10	
04/07/2009	19	19	11	11	
05/07/2009	16	17	7	7	
06/07/2009	18	22	10	16	
07/07/2009	20	20	13	13	
08/07/2009	12	12	5	5	
09/07/2009	19	19	8	8	
10/07/2009	1	1	0	0	

11/07/2009	26	24	10	10	
16/07/2009	13	13	8	8	
17/07/2009	14	14	10	10	
18/07/2009	17	17	10	10	
19/07/2009	12	12	NR	NR	
20/07/2009	NR	NR	10	10	
21/07/2009	0	4	NR	NR	
Totals:	**283**	**299**	**178**	**172**	

NR - No record in Explosive Register and/or Daily Diary.

The following table highlights the errors in the accounting for A/P & A/T mines located:

Date	Cleared m^2	QCm^2	PRB-M3 A/T	PRB-M35 A/P	No 4 A/P
01/06/2009	137	25			
02/06/2009	338	112			
03/06/2009	431	195			
04/06/2009	396	176			
05/06/2009	293	134			
06/06/2009	377	158			
07/06/2009	90	0			
08/06/2009	616	175			
09/06/2009	491	63			
10/06/2009	292	80			
11/06/2009	285	165			
12/06/2009	279	50			
13/06/2009	439	65			
14/06/2009	410	55			
15/06/2009	455	100			
16/06/2009	469	70			
17/06/2009	425	90			
18/06/2009	314	55			
19/06/2009	301	50	0	0	1
20/06/2009	350	50	0	0	0
21/06/2009	320	55	0	0	0
25/06/2009	504	156	1	0	2
26/06/2009	575	120	1	0	0
27/06/2009	663	325	4	0	3

28/06/2009	661	237	3	0	4
29/06/2009	783	320	4	1	11
30/06/2009	532	150	5	1	6
01/07/2009	731	215	6	0	9
02/07/2009	923	0	7	3	11
03/07/2009	667	130	4	2	8
04/07/2009	660	100	10	3	8
05/07/2009	631	125	7	4	3
06/07/2009	863	0	7	3	7
07/07/2009	657	135	8	8	5
08/07/2009	913	260	3	3	2
09/07/2009	952	315	4	5	3
10/07/2009	801	230	1	0	0
11/07/2009	908	240	5	3	7
16/07/2009	924	362	2	5	3
17/07/2009	889	175	4	4	6
18/07/2009	1,050	235	4	4	5
20/07/2009	382	95	5	0	10
21/07/2009	724	0	0	0	0
22/07/2009	1,073	0	0	0	0
	24,974	5,798	95 (98)	49 (52)	114 (117)
	Total A/T mines		**95**	**Total A/P mines**	**163**

() Figures in brackets have been obtained from the CR, other figures from Daily Diary.

In many of the cases the communication log time for mine(s) found differs greatly from the Daily Diary.

Other issues:

1. No medic on site on July 23, 2009 for QA Completion;

2. No Form G (Explosive Storage) carried out (not a requirement but suggested);

3. Deminers, once mine row(s) were located, increased their daily output from approx 44m^2 to 75m^2 (chasing mines?). In addition the metal count decreased from an average of 200+/day to 16/day (eventually metal items were not recorded at all);

4. There is no record of whether the mines were located on the surface or sub-surface or a combination of both;

5. On June 7, 2009 the Team worked in protest (only 90m^2 cleared this day); what was the protest and was this resolved to the satisfaction of the individuals concerned?;

6. On four occasions m^2 cleared was either reduced or increased by 100m^2 from what the deminers actually cleared; how was this annotated on the site map for QC purposes?

7. On June 28, 2009 the reported figure was reduced by 200m^2.

8. On July 9,2009 the reported figure was reduced by 300m^2 and one deminer cleared **580m^2**. On July 20, 2009 the reported figure was increased by 300m^2.

4. Mapping:
All folders relating to NR-205 do not contain any site mapping. The only map available is in the CR (Trackmaker) and this is inadequate.

There is, unless the original maps are located, no possible way for the BOI Team to obtain the following information:

1. Number of mine row(s);
2. Location of mine-row(s);
3. Location of clearance lanes to deminer(s);
4. Location of daily Internal QC;
5. Daily Start location for each deminer (shift change if applicable);
6. Location of CDS, Firing Point & UXO Pit;
7. Which mines were BIS and/or removed after RSP;
8. Location of Survey Lanes;
9. Was a CDS utilised in the first instance.

NB: A suggested minimum requirements for a 'Trackmaker' map is shown on Page 8.

5. Recommendation & Conclusions:
It is recommended that greater supervision and/or training is provided to ensure that the basic levels of record keeping are maintained in the future. The relevant documents should be able to relate to task/ground to the reader; however this is not the case. In addition, it should be possible to accurately cross-reference data.

Suggested documents:

1. Visitors Log;
2. CR should provide sufficient information such as average mine depth, surface laid, sub-surface laid or combination of both. In addition it should be highlighted whether mines were BIS and/or removed to a CDS for destruction.
3. Detector running log;
4. Stores & Equipment Register;
5. CDS Standing Orders, Demolition Plans & Demolition Safety Briefs if utilising a CDS.

Due to the inaccurate record keeping and some missing documentation it is felt that no conclusion regarding the missed mines can be provided. It is further noted that the Completion Report and Folder should not have been accepted by UNMAO Sub-Office Kassala prior to the Handover Certificate being signed.

Stringent custodian procedures should be put in place to prevent important documents, in this case the site map, from being mislaid. It is near impossible for the BOI Members to confirm whether actions such as demolitions, destruction of all mines located have been completed and where the mine-row(s) were located without this vital information being available in the Completion Report and/or Folder.

(Name removed)

Analysis

The primary cause of this accident is listed as a *Field Control Inadequacy* because it seems that the field controllers allowed deminers to work at impossible rates and that the mines may have been missed because the area in question was simply not searched. The secondary cause is listed as a *Management Control Inadequacy* because the demining group involved is one of the best known NGOs in demining with extensive experience yet they failed to keep basic records of work conducted and did not ensure that an elementary quality management regime was in place. It seems that they also failed to conduct rudimentary checks on their detector's ability to detect the mines anticipated in the area.

The clearance by the military immediately after the accident involved the use of prodders which found AT mines but which could have caused severe injury has they prodded onto AP mines. More mines were found when the area was professionally cleared by a demining group tasked by the UNMAO, providing an example of the fact that prodding is unlikely to lead to the discovery of all mines.

The UNMAO investigators are to be commended for recognizing significant management control errors stemming from the lack of QM applied by their regional office to the work of the demining group involved. However, no individuals are directly criticized and no disciplinary action recommended, so it is not clear whether any improvements were made. That said, this is the best UN accident report seen for some years.