

DDAS Accident Report

Accident details

Report date: 15/02/2008	Accident number: 565
Accident time: 10:45	Accident Date: 22/10/2007
Where it occurred: Demolition ground, Xieng Khoung Province	Country: Laos
Primary cause: Inadequate survey (?)	Secondary cause: Unavoidable (?)
Class: Missed-mine accident	Date of main report: 02/11/2007
ID original source: None	Name of source: UNDP
Organisation: [Name removed]	
Mine/device: M-19 AT blast	Ground condition: demolition site (explosives) grass/grazing area route/path
Date record created:	Date last modified: 15/02/2008
No of victims: 1	No of documents: 1

Map details

Longitude:	Latitude:
Alt. coord. system: Not recorded	Coordinates fixed by:
Map east:	Map north:
Map scale:	Map series:
Map edition:	Map sheet:
Map name:	

Accident Notes

inadequate investigation (?)
inadequate survey (?)
mechanical detonation (?)
mine/device found in "cleared" area (?)
protective equipment not worn (?)
visor not worn or worn raised (?)

Accident report

The report of this accident was made available in February 2008 as a PDF file. 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 file is held on record. Text in [] is editorial.

ACCIDENT – XIENG KHOUNG 22 OCTOBER 2007

Date: 2 Nov 2007

Introduction

A fatal accident occurred in Xieng Khoung on 22 October 2007 in an area that had been cleared by UXO LAO. This report describes the sequence of events leading to the accident, the causes of the accident and makes recommendations for the future.

Background

UXO LAO in Xieng Khoung are in the process of establishing a new permanent demolition ground. They have a growing stockpile of UXO which urgently needs to be destroyed. UXO LAO have been provided with an area and have been preparing and improving access roads to make it more useable. The accident happened as part of the UXO LAO route preparation work, some of the access route was uneven and they had contracted a local tractor owner to plough and then level parts of the track. Whilst carrying this activity the tractor was blown up and the driver, [the Victim], killed.

Chronology

13 September, the demolition area was tested and approved by local authorities and UXO LAO, map attached. An assessment of the access routes was made resulting in a decision to improve the access track.

17 – 21st September, combined technical survey and UXO clearance of the access route. This activity is described in detail in the body of this report, in summary a 2,013m x 6m track was searched and the centre line marked; 2 x BLU 24, 1 x BLU 26, 3 x 40mm and 16 x 20mm items were found. The track was declared clear for access, map attached.

22 October, 0800 hrs tractor commences work to plough and level areas of the track under supervision of SEOD and 4 person survey/ clearance team (a multi functional team charged with preparing the demolition area). Two areas of track were ploughed, and the tractor had moved on to a third area of the track where it had commenced work and completed one plough run along the southern side of the track.

22 October, 1045 hrs, as the tractor moves back down the track after completing the first plough run an explosion occurs under the rear left wheel, this splits the tractor in two and kills the driver. Map and photographs attached. Immediate action drills were carried out by the SEOD officer [Name removed], (who was at one end of the plough run and 58m from the blast and the tech survey team who were at the other end of the plough run and 176m from the blast.

22 October, 1050 hrs, UXO LAO Provincial operations office were informed about the incident and post incident procedures supported. The on site team divided to recover the body and to secure the area for later investigation.

22 October, The UXO LAO Provincial Coordinator and senior SEOD officer were both attending a meeting in Vientiane and were informed of the incident at around 1200 hrs, (their phones having been switched off during the morning meeting). They instructed that an initial investigation should proceed.

22 October, UXO LAO and JMAS move to the accident site at round 1300 hrs. and commence initial investigation into the cause, further details are provided in the main part of this report. Concurrent activities of informing the family of the deceased, the provincial authorities and assisting with funeral arrangements etc.

23 October, Provincial inquiry and investigation into the incident, involving UXO LAO and local authorities, police and others, report attached.

24 October, informal information reports the incident to NRA STA, early evening.

25 October, NRA request more information from UXO LAO and initiate a Board of Inquiry to examine the incident. Initial analysis report from JMAS TA received concluding that the cause was suspected to be the detonation of a plastic anti tank mine, type unknown.

26 – 28 October, NRA Board of Inquiry team travel to Xieng Khoung (first available flight), and commence follow up inquiry with interviews and examination of the accident site.

Site history and clearance task

Xieng Khoung Province is heavily contaminated by UXO, both air dropped and from land battles. The area of the demolition ground had not been specifically searched in the past, but had been extensively used for grazing and cultivation in recent years. Some of the surrounding area had been ploughed using tractors. The remains of two Pathet Lao tanks, destroyed during the war, were within 2 km of the accident site, emerging reports after the accident suggest that one of these tanks was thought to have been disabled by a mine, the other by a rocket.

Evidence of mines is rare, some known mined areas do exist in Xieng Khoung and TM 57 mines have been recovered in other areas of the Province. No mine information from around the incident area was known to UXO LAO prior to the accident. Local war history is not well documented and during the war local communities generally fled the fighting and were not present at the time of land battles. Mine warfare was engaged in, but in a variety of ways, including the laying of small mine fields and more commonly by the use of individual mines as weapons in areas likely to be transited by enemy forces.

Generally, given the nature of the war, the bombing of targets in Xieng Khoung and the jettisoning of bombs on the Plain of Jars from aircraft returning to their bases, the entire Province is considered as potentially UXO contaminated unless proven other wise.

Given the history, UXO LAO decided that although the access track had been transited many times by vehicles including Gaz trucks, land cruisers and tractors, a sub surface instrument search of the access track should be conducted. A multi functional survey and clearance team under the supervision of a SEOD operator was subsequently tasked to do this work. The route was surveyed, mapped and then checked, in the following sequence. The route was 2,013m long and 6 m wide. Two UXO LAO personnel were deployed as vegetation cutters moving along the route ahead of the clearance team, using mechanical hand held

'strimmers'. The clearance team divided the road into sections, depending on the geography and then they divided the 6m width into 1m wide lanes for clearance. The clearance was then conducted by a three person team, with the lead person using a Mine Lab F1A4 detector with a large search head, he would mark any indications; the second person would pinpoint the signal using an Ebinger 505 detector and mark the spot; the third person would excavate the area for UXO / metal. Following removal or destruction, the Mine Lab would be used to confirm that no other signals were detectable from the area.

At the commencement of the tasks the detectors were checked and detection confirmed as being able to detect a BLU 26 target at 30cms and a 20mm target at 25cms. All detectors were reported to have passed these checks.

The clearance of the track took place between the 17th and 21st September. The following items of UXO were found: 2 X BLU 24, 1 X BLU 26, 3 X 40mm, 16 X 20mm. The clearance was to an UXO free, not metal free, standard, in this case signals indicating small items of metal would have been disregarded or not detected.

An estimate of the clearance rate is as follows:

Area 2,013 m long by 6 m wide, total 12,078 square meters, cleared over five days average rate 2,417 m per day, daily working times, start work on site 0800 hrs until 1200 hrs with 10 minute breaks after 50 minutes work, resulting in up to 3 hours 20 minutes working time, lunch 1200 – 1300, then a work period 1300 to 1530 (or later depending on the length of area being cleared) with two 10 minute breaks, resulting in up to 2 hours 10 minutes clearance time, giving a total clearance time of 5 hours and 30 minutes each day.

This would average out as a clearance rate of 449 square meters per hour or 7.5 square meters per minute. Some work time would have been taken up with marking, moving lanes and investigation. The results did yield a number of UXO and the clearance team was made up of very experienced UXO technicians.

Following the clearance and survey of the route a period of time elapsed before track reconstruction work commenced. This work was planned to include grading of the track in places and the construction of culverts to aid drainage.

Incident

The tractor was contracted by UXO LAO to help plough and grade the track, and was being supervised by the SEOD officer and the survey team to work within specific areas within the width of the cleared route. Two other areas along the route had been ploughed and one plough length had been completed along the stretch of land where the incident happened. For the ploughing the tractor, a Russian built Belarus tractor unit, weighing in excess (with a four disc plough attachment) of 3720 kgs, moved along the right side of the track in a westerly direction, (we don't know the ground pressure). At the end of the plough run and under the direction of the SEOD officer the tractor turned around and was proceeding in an easterly direction with the plough unit raised, returning to the start point when it would have turned round under the direction of the survey team.

The UXO LAO team vehicle, a Land Cruiser, had transited the route twice that same morning prior to ploughing. This stretch of track had two distinct wheel tracks that vehicles had been using, but due to the area ploughed, on the return journey the tractor wheels were outside of the two distinct tracks with the rear left wheel in the centre of the track and along side or within the final plough furrow. The left rear wheel took the force of an explosion which broke

the tractor in half with the rear portion and cab thrown some 10m from the crater and the front portion some 5m from the crater. See attached maps and photographs.

The UXO LAO SEOD officer was closest to the blast at 58m in an area hit by dirt and other secondary fragmentation. No UXO LAO staff received physical injuries. The SEOD officer and the survey team personnel moved directly towards the scene of the explosion but were unable to help the tractor driver whose injuries proved fatal.

During the afternoon of the 22nd October the scene of the incident was investigated by UXO LAO with assistance from JMAS Technical Advisors, resulting in the following information:

- That the crater was some 90cms deep by 2.7m across.
- That the crater had carbon deposits throughout and no specific carbon ring could be identified.
- That no metal fragmentation was found other than just some fragments from the tractor.
- That many pieces of burnt plastic were found embedded in the crater sides and base, (samples retained).

In the process of investigation the crater was excavated and enlarged.

In conclusion it was assessed that the blast and evidence of plastic fragmentation was commensurate with the results of a large plastic anti tank mine blast, exact type unknown at that time, the damage was considered as being possible from an anti tank mine.

Subsequent investigation by the NRA Board of Inquiry team found no contrary evidence or information and the Board agreed with the initial conclusion, which is that the explosion was caused by the left rear wheel of the tractor activating an anti tank mine, of plastic casing, type unknown. Further research indicated that the mine was an American made plastic anti tank mine an M19, technical details attached.

Discussion

Whilst plastic cased anti tank mine are well known, no history of their use or of previous cases of recovery by UXO teams in Lao PDR is known. TM 57 mines have been recovered along with TM 46 anti tank mines, both of which had metal cases. It is known the TM 62 series of mines were used in Lao PDR and within that series plastic mines are available, (also metal cases, cardboard and wood), but from research with the MOD no records of plastic TM62 mines are known within Lao PDR.

Given the story of a Pathet Lao tank being destroyed, the use of American made mines was investigated and the technical details of the M19 plastic anti tank mine researched. From the fragments recovered part of the “activator-well plug” was identified, pictures attached.

The existence of such mines, poses a hitherto unrecognized threat and risk. Current UXO detection procedures rely on the identification, through survey, that an area is not mined and then on detection of specific metal targets and the disregard of metal smaller than ‘target’ size. This doctrine has enabled rapid clearance of land as ‘UXO free’ compared to previous processes of ‘metal free’ and has thus far been without reported incident.

Following the accepted procedures and clearance process, the clearance methodology adopted by UXO LAO, in the absence of any known mine threat (at the time), was considered by the Board as reasonable.

The depth of this mine, whilst unknown for certain is thought to have been between 30 to 40 cms, (possibly shallower due the excavation of a ploughed furrow). The mine is likely to have been in place in excess of 35 years.

The remaining threat: it is unknown if more mines are present in the area, whilst land use in the area, guerilla tactics of war fighting and lack of previous evidence would make this unlikely, the fact that this incident happened means the presence of more mines cannot be ruled out.

With immediate effect the route should be closed for access by vehicles whilst consideration is given to subsequent clearance plans. From a tactical view point the presence of other mines further along the route could be considered unlikely however the areas close to the scene of the explosion, between sloping ground to the north and an earth mound feature to the south should for the time being be considered as a 'suspect hazardous area'.

Liability Issues

The issue of liability for compensation of the victims family, a widow and three children, should be discussed within the NRA and the resulting decisions documented.

Conclusions

That the accident was caused by the activation of a plastic cased anti tank mine, an American M19.

That the clearance drills carried out by UXO LAO prior to the accident were reasonable given the known situation at the time of clearance.

That this was an unfortunate accident.

Recommendations

That the area around the incident site is placed out of bounds.

That vehicles are prohibited from transiting the area.

That an access route to the demolition site should be cleared at least to a standard of 'metal free' to increase the likelihood of detecting low metal content plastic cased mines, and that consideration should be given to use of other detection means (MDD, GPR).

That the resulting issue of liability and possible insurance solutions are researched and clear policy guidelines provided by the NRA.

Signed Team Leader and Team member

Attachments [not made available]

1. Board of Inquiry Convening Order
2. List of persons interviewed
3. Provincial Inquiry Report of findings
4. UXO LAO report
5. JMAS report

6. Map of incident
7. Photographs of the scene
8. Technical details of the M19 mine

Victim Report

Victim number: 739	Name: [Name removed]
Age:	Gender: Male
Status: driver	Fit for work: DECEASED
Compensation: Not made available	Time to hospital: Not recorded
Protection issued: None	Protection used: None

Summary of injuries:

FATAL

COMMENT: Not Medical report was made available. No injury details were recorded.

Analysis

The primary cause of this accident is listed as “Inadequate survey” because the survey failed to identify the threat from minimum metal mines and so the previous search of the area was deliberately restricted to a search for UXO.

The secondary cause is listed as “Unavoidable” because the survey anticipated all of the known threats and the choice of clearance processes was entirely reasonable.

The accident investigation is recorded under “Notes” as inadequate because it does not include details of where the accident occurred and lacks any details of the injuries sustained.

This record will be updated if the Annexes to the report are made available in future.