Landmines

Security Training Module for NGOs

Produced for the OFDA/InterAction PVO Security Task Force

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Module Landmines

Goal

To minimize the risks associated with working in mined areas or where the presence of landmines is possible.

Learning objectives

On completion of this module participants will be able to:

- Outline the risks associated with landmines.
- Describe different categories of landmine and the way they are triggered.
- Explain precautions to take in an area in which landmines may be located.
- List areas likely to be mined.
- List indications of the presence of mines.
- Describe actions to take on finding oneself in a minefield, or on suspicion of being in a minefield.

Key learning points

Landmines are indiscriminate. Everyone is vulnerable.

Avoid traveling in areas of known landmine risk or into an area on which you have inadequate information.

Take the initiative to find out about the potential dangers: talk to local people, de-mining personnel, and other agencies working in the area.

If you become involved in a landmine incident:
warn others, remain calm, do not act hastily, be patient.

Report all landmine incidents and publicize the danger to others.

1.0 The landmine problem

Landmines are inexpensive, some available for as little as $3 each. Because they are so cheap, they have been distributed by the millions. Estimates vary, but a figure of over 100 million mines in the ground worldwide is often quoted. Mines are generally distributed randomly and the individuals who lay them do not keep records. Therefore, in many cases long after a conflict ends, mines lay undetected waiting to be detonated. It is an unfortunate fact that mines are often distributed specifically to cripple a society's infrastructure and they are placed in locations that guarantee detonation by the civilian population. They are often placed, for example, around water sources or in fertile fields used for growing crops. Civilians are faced with the choice of attempting to earn their livelihood in the face of this danger or resettle. The latter is usually not a realistic solution.

Mines are commonly manufactured from plastic and are difficult to detect with standard metal-sensing mine detection equipment. In addition to being dangerous, mine clearing is a very long and expensive process. Therefore, areas remain mined for many years. An estimated 2,000 people a month are injured by landmines, around half of whom will die, the majority of them men, women and children going about their daily lives.

Relief workers are often required to work or travel in mine affected areas. It is therefore essential to become aware of the dangers associated with landmines and how to minimize the risks.

2.0 Types of landmine

There are many different varieties of landmine produced by tens of countries worldwide (there are over 350 varieties of anti-personnel mine alone). The following gives a brief guide to the terms used and the main types of mine.

> ***Warning***:
> knowing what a landmine looks like does not necessarily mean you will be able to locate mines in the field. Landmines are often buried, disguised or simply difficult to see.

2.1 Anti-personnel mines

An anti-personnel (AP) mine is designed to kill or injure anyone who comes into contact with it, e.g. through a trip-wire or direct pressure switch. Although usually placed by hand, AP mines can be deployed from aircraft or by other means, like a mortar or rocket.

There are five main types of anti-personnel mine:

Blast mines: the most commonly found anti-personnel mines, they explode when stepped on. Generally cylindrical in shape, ranging in size from 7 to 16 cm in diameter and 5 to 10 cm in height. Some are slightly larger and rectangular or "shoe-box" shaped. Laid in the ground, they kill or inflict injury through the blast of the explosion alone. Most modern blast mines are made of plastic and are therefore difficult to detect. They tend to be colored tan, olive, green, black, brown or gray. Example: Soviet and Iraqi made PMN.

Fragmentation mines: often placed on stakes so that the mine is resting about 21cm above the ground or tied to trees. They are also known as stake mines. Activated by trip wires just above the ground, they have metal casings designed to rupture into fragments when the mine is detonated, or which are packed with metal fragments which when dispersed by the force of the blast are the primary cause of death or injury. Example: Soviet POMZ-2; Yugoslav TMR 2

Bounding fragmentation mines: generally triggered by trip wire and/or direct pressure. Once triggered, the mine leaps into the air to about chest level before fully detonating. The explosion shoots metal fragments in a 360 degree horizontal arc which can kill up to a distance of about 35 meters and cause severe injury up to 100 meters, or more. Bounding mines are usually shaped like a can, with a single spike or multiple spikes protruding from the top. They are generally 15 cm in diameter and 28 cm in height. When these mines are laid it is common to see the spikes above the soil. Trip wires can run as far as 30m from these spikes. Example: Italian Valmara 69.

Directional fragmentation mines: triggered by trip wires or by remote control. They are usually shaped like a curved rectangular box which sits on two legs. Mines are placed to fire steel balls at high velocity in a predetermined direction. They usually fire within a 60 degree arc and cause serious injury or death up to 50 meters from the detonation. Examples: American M-18 Claymore; Soviet MON-50. Larger, circular shaped versions can destroy vehicles.

Scatterable mines: scattered by aircraft, helicopter or artillery, they settle on the ground without exploding and some send out their own tripwires. They are small enough to fit into the palm of your hand. The Soviet PFM-1 'butterfly' blast mine, found in Afghanistan, glides to the ground. The 'wings' of the mine tends to attract the attention of children. Such mines are typically found scattered in significant numbers over a relatively limited area of ground. So, if you see one there are likely to be many others.

2.2 Anti-tank mines

Anti-tank (AT) mines are normally round or square, of metallic or plastic construction, and range in size from 23-40cm in diameter and 10-16cm in height. Blast effect anti-tank mines can contain up to 14kg of high explosive. AT mines are designed to disable battle-tanks and other armored military vehicles. They will destroy light-skinned relief vehicles and account for serious multiple casualties to relief personnel.

AT mines may be placed on the ground (such as at check-point barriers) or they are commonly buried several inches below the road surface. The relatively high pressure of a vehicle, or tank, is required for detonation. Some anti-tank mines are detonated by tilt rods or trip wires connected to mechanical fuses. To prevent the removal of anti-tank mines and to incapacitate foot soldiers abandoning a disabled armored vehicle, anti-personnel mines are often placed around or on top of anti-tank mines. Therefore, wherever there are anti-tank mines assume there are also anti-personnel mines in the vicinity and act accordingly.

2.3 Unexploded ordnance and booby traps

In addition to mines, areas of ongoing or former conflict will be contaminated with unexploded ordnance (UXO): grenades, mortar and artillery shells, bombs, rockets, and cluster bombs. In many conflicts a relatively high proportion of munitions will fail to detonate leaving a deadly legacy of unstable explosive waiting to be triggered in the same way as a land mine. This is especially the case in countries like Laos that have experienced heavy aerial bombardment. In the case of cluster munitions it is not uncommon for up to a third of bomblets to fail to go off. Therefore, beware:

- If you see one bomblet look out for the rest
- Never touch ordnance found lying around.
- Do not be tempted to collect souvenirs.

Booby traps are not common but that does not mean to say that you should not be aware of the possibilities. Strategically useful or valuable items may be booby trapped during a conflict: military installations, fuel storage, wells, pumping stations, water tanks, electricity generating installations, government buildings, etc. Stay away from possible targets or suspicious devices until competent military or specialist organizations have given clearance. You, or your agency, may be in the position of highlighting the dangers and arranging for the necessary checking and clearance with the relevant authorities.

3.0 Precautions

3.1 Agency measures

According to international law, any area containing mines should be clearly marked as a minefield with perimeter fences and markers. However in many conflicts, mines are laid without such markers. Large areas of countryside may be potential minefields, with the evidence of mines being a casualty - either human, animal or vehicle. Therefore, it is important an agency follows some basic measures when working in a mine affected area:

- Obtain specialist assistance to carry out a risk assessment.
- Arrange for staff and those associated with the program to receive mine awareness training.
- Provide staff with guidelines supported, if possible, with maps of known areas of risk and posters showing mines and procedures. Display posters and maps where staff will see them.
- Avoid high risk areas.
- Establish, or contribute to, an inter-agency reporting procedure to record mine incidents.
- Continually update knowledge through local contacts.

Some of these measures are likely to be included in procedures covering broader security issues.

3.2 Preparation for a journey

Before entering any unfamiliar zone, gather as much information as possible. Ask if other vehicles have recently passed safely over your intended route. If it becomes clear that mines are a possibility and there is no alternative but to proceed, then make preparations and pay particular attention to areas where mines are likely to be laid and watch out for signs of mines.

(Refer also to “Preparation and journey planning” in the Vehicle module)

Preparations include:

- plan your route and give your trip plan (at least your intended route and estimated time of arrival) to your base.
- carry a radio and keep in contact with base.
- ensure that you have a good first aid kit in the vehicle and that you know how to use it (large "shell dressings" are essential).
- carry water, two spare wheels and a tow rope.
- ensure that everyone is familiar with how to look for mines and what to do in case of a landmine incident (see below).

Whereas a light-skinned vehicle cannot withstand the blast of an anti-tank mine there are measures that can be taken to try to limit injury to people in a vehicle struck by a mine. Wet sandbags can be placed on the vehicle floor under each person to absorb the blast and metal fragments. People riding in the back of a pick-up or on the open bed of a truck should ride on top of a layer, or two, of wet sandbags. It is reported that tires partially filled with water (25%) can absorb some of the blast effect of, especially, anti-personnel mines. However, this will reduce tire life. Such measures are also likely to have an adverse

effect on the driving characteristics of the vehicle thereby compromising vehicle safety and reliability. The extra weight of wet sandbags must also be taken into account.

3.3 Recognizing mined areas

Landmines are used by warring parties to kill and incapacitate the enemy, to restrict movement and to protect important military or socio-economic targets. In a siege situation, mine fields are often laid in a ring by both defenders and attackers to defend a town or prevent access respectively. Landmines are also used to disrupt and terrorize society for a variety of political, social and economic reasons. This can result in mines being laid in areas such as farmland, plantations, forests and villages.

Knowing something about a conflict, its history and the tactics employed, may help to understand how mines were, or are, used and to be aware of potential mined areas.

Areas where mines might be laid:

- checkpoints (laid clearly in view to channel traffic through a narrow controlled section)
- bottlenecks such as narrow valleys
- at bends or dips in the road
- in road verges or ditches
- in road potholes
- any debris, plastic bag or other items placed on the road - do not drive over them!
- in and around craters or obstacles
- at parking areas and road junctions
- around abandoned vehicles and equipment (attractive items)
- in positions, including buildings, formerly occupied by troops
- any structure that has been used as a defensive position by troops (front and flanks)
- any building or structure which contains (or contained) vital equipment, such as power stations, radio stations, warehouses or government offices
- in buildings likely to provide shelter
- bridges and on approaches to bridges and crossings
- on approach roads to important towns
- railways, on either side of the track
- airports and airstrips in battle zones
- the land approaching canals and ditches
- any area which has been fought over by opposing forces, where each side has established strong defensive positions. This is especially true of lowlands separating heavily defended hill positions. Also berms (earth mounds) around bunkers, pillboxes, tank and artillery emplacements.

Indications of the presence of mines:

- Standard mine signs, which are square or triangular and bright red, with a skull and crossbones. The words Danger!! Mines!! will be written in the local language
- Improvised markings (piles of stones, crossed sticks, material on sticks or bushes, etc)
- Obstructions which dictate direction of passage
- Small irregular depressions in open ground

- Unusual shapes or colors
- Rotten wooden stakes, particularly with fishing line type wire attached
- Dead animals or the remains of animals
- Freshly disturbed earth or vegetation
- Damaged or cleared areas of bush, hedge or scrub
- Abandoned boxes or cans
- Destroyed vehicles
- Roads or paths that are avoided by the local population
- Suspicious metal or wooden objects on the ground
- Fences, which may at one time have been put up to mark a mined area
- When a mine detonates, it leaves a characteristic crater that is round in shape whereas a shell will leave an elliptical shape as it impacts at an angle
- Fertile land that is not used or fields of ripe crops that have not been harvested
- Trip wires – usually strands of steel wire attached to a fragmentation AP mine and either another mine or a solid object. If you see one, do not touch it or attempt to cut it.
- Tilt rods – steel rods anywhere from 16cm to 1 m in height attached to the mechanical fuse of a land mine. They are designed to detonate upon impact.

Note that mines can move over time. Mines may migrate down steep slopes. Plastic mines are waterproof and as they are airtight they may float. During heavy rains mines can be washed out of minefields and transported by water courses some distance downstream to areas previously clear of mines. Therefore, be careful near water courses, drainage ditches and road culverts.

4.0 Landmine avoidance

Seek ‘in-country’ mine awareness training on arrival in a region contaminated with landmines.
Ask questions whenever you are in a new area to determine landmine hazards. Continue to ask questions when traveling. Regularly talk to other agencies, especially de-mining agencies, surgical hospitals (ICRC), prostheses workshops, and, if advisable, the military.

Ask local people, especially farmers and animal herders, about areas you are unsure of. However, do not trust local people blindly. It is possible they know less than they claim or they may have become used to the presence of mines. Expatriates often assume that their interpreters or local drivers have a comprehensive knowledge of the hazards in the area but they may not. Therefore, it is important to ask as many questions as possible and, if you are in doubt, turn back.

Precautionary measures while driving:
- Follow previous tire tracks. Never drive where there are no previous vehicle tracks or on an unknown road.
- If following another vehicle, leave plenty of space between them and you.
- Avoid detours. Do not leave the road if a vehicle or obstacle bars the way. Rather than turn around, it is better to reverse to a known safe area.
- Avoid potholes, fresh earth spots, foreign objects and brush or grass in the road.
- Stay close to vehicles when stationary. Do not wander off the track or road. If you have to go to the toilet, either overcome your shyness, or ask your colleagues to look away.

To dispel a common misconception: traveling fast will not enable the vehicle to escape the blast of the explosion. A blast travels at several thousand meters per second. You cannot outrun this.

5.0 Response to land mine incidents

If the precautions described previously are taken then the risk of an incident will be greatly reduced. Therefore, know what precautions you can take - and take them! Unfortunately, despite taking the precautions you may still encounter an incident involving landmines and this section gives brief general guidelines on what might be done in an emergency. However, situations vary greatly and it is essential to identify relevant and reliable local sources of information regarding landmines and recommendations for dealing with a landmine incident.

If you do discover a land mine:

- NEVER attempt to dismantle a mine.
- Never touch it or try to move it.
- Do not try to detonate it by any means.

5.1 If you encounter a mine whilst walking

- STOP all movement immediately. Warn those that are with you to do the same by loudly shouting a clear warning such as: “STOP, I’m in a minefield”.
- Keep as calm as possible and prevent others from panicking.
- Do not rush over to a casualty to administer first aid since this is likely to increase the casualty list.
- Examine the immediate area where you are standing for any visual signs of mines or trip wires.
- If possible, radio for help, giving information on: time, location, identity of casualties, type of injuries, what assistance is required, suggested means of evacuation (if known).
- It is usually best to stay where you are and await help. Only consider sending for help if radio contact cannot be made or if you believe there is no other way help will be sent.
- If available, allow trained mine clearance personnel to clear a safe passage to safe ground.
- If you have to make your own escape then determine the nearest safe ground. This may be, for example, where you walked from such as a surfaced road or hard rock area.
- Visually identify a route to the safe ground. Retrace your steps precisely if the ground is soft enough to indicate your footprints.
- If there is no clear exit route the procedure is to look and feel for trip wires and then carefully prod for mines. This is a dangerous action to take but it may be necessary and it requires calmness and patience. It is important to ensure the area ahead is clear of trip wires before commencing prodding. A trip wire feeler is a flexible rod over 1 meter in length which will bend easily under the slightest pressure. This can be, for example, a long wire or blade of grass or stalk. The feeler is held in front just touching the ground whilst crouching or kneeling. The feeler is slowly raised at least 1.5 meters whilst keeping it parallel to the ground. Stop immediately it meets anything and identify the obstruction. Mark the location of any trip wire in the best way you can (cloth, twigs, stones) but do not tie anything to trip wires. Never attempt to touch or cut a trip wire. Look for an alternative route.
- Prodding should only commence if it has been ascertained that there are no trip wires ahead. A prodder can be a screwdriver, knife, pen or other item at least 11cm in length. The prodder is used to feel for objects buried just under the surface. It is held palm up at an angle of about 30 degrees to the ground. Gently push the prodder into the ground in a straight line. Repeat at intervals of a distance of two fingers apart for a width of about 1 meter. Move three fingers forward and repeat for another width of 1 meter.

- If an object is detected by the prodder then stop and carefully remove earth from the side of the object until it can be identified. If a mine is detected then let everyone know and mark it with whatever is available. Do not attempt to move or detonate a mine. Mines can become unstable and may be equipped with anti-handling devices. Prod a path around the mine.
- Continue alternately feeling for trip wires and then prodding until safe ground is reached or light fails at the end of the day. If it becomes dark then identify an area to rest during the night.
- If you are in a group then one person should take control and direct activities. Only one person should move at a time and there should be at least 20 meters between each person lying in a prone position on the stomach.
- When safely out of the mined area do not forget to mark the area with whatever is recognized locally as indicating landmines - crossed sticks, pile of rocks, etc.

5.2 If you encounter a mine whilst driving

- Stop the vehicle, if it has not already been hit by a mine.
- Remove hands from the steering wheel.
- Follow a similar procedure as given above for discovering a landmine whilst walking. It is usually best to stay where you are and shout or radio for help. Only consider movement if there is no chance of outside assistance.
- If you do have to leave the vehicle then exit by the back end, stepping to the ground only on the wheel tracks.
- If there are several occupants, leave one at a time and leave 20 m between each person.
- Follow the tracks out.
- If you cannot see any tracks then follow the procedure outlined in the previous section to feel and prod your way to safe ground.
- On exit, clearly mark the area as mined.

5.3 Casualty in a mine field

If someone is injured by a mine in a mine field then obtain de-mining and medical assistance as soon as possible. If aid is not immediately available then a decision must be made on a rescue. Only attempt a rescue if the casualty is still alive, if no specialist help is at hand and if the rescuer is not likely to become a casualty as well.

In the event of a mine casualty:

- Do not rush to the casualty.
- Clear a route to the casualty using the feel and prod method described above.
- Mark the route as it is cleared, identifying mines and trip wires encountered.
- Clear the area immediately around the casualty.
- Give first aid as necessary.
- Extract the casualty along the marked safe route. Ensure the path is wide enough to safely drag the victim, if necessary.
- Evacuate to the nearest medical facility at once.

5.4 After a land mine incident

Ideally, the incident should be reported as widely and as quickly as necessary to ensure everyone knows the location of the land mines. However, in an active war zone the disclosure of the location of land mines could possibly be interpreted as providing tactical information favoring a particular faction in the conflict. It is recommended, therefore, to establish within the NGO community how such information can be effectively disseminated in a sensitive way so that all parties are warned of the presence of mines whilst the origin of the course of information is protected as far as possible. See the module on "Security information management."

Once immediate medical assistance has been given to the injured, ensure that appropriate post-traumatic counseling is given to all those involved in the incident.

Glossary of terms

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