

7.10 Combat-related threats and remnants of war

This chapter considers threats emanating from major armed conflict or ‘acts of terror’, including bombing, missiles and shelling, crossfire and sniper fire, improvised explosive devices (IEDs) and chemical, biological, radiological and nuclear (CBRN) weapons. It also includes a discussion of siege tactics and the dangers of ‘remnants of war’ such as landmines and unexploded ordnance (UXO). The chapter presents mitigation measures for organisations to consider, but for extreme environments involving major combat, the good practice guidance in this volume will not be sufficient, and cannot take the place of direct consultation with experts.

7.10.1 Core questions and considerations

The first issues to consider in active combat areas are whether the organisation is willing and has the capacity to operate under these conditions, and whether the benefits of doing so (i.e. programme criticality) outweigh the residual risks. Are there significant assistance and/or protection needs – and opportunities to meet them – that warrant the organisation’s presence? How many and what sort of staff will be required to effectively fulfil this function? What additional inputs – including training, equipment, specialised skills and insurance – will be needed to meet duty of care obligations?

The reality is that, in most areas of active combat, the humanitarian presence, especially of international organisations, will be far lower than in low-level conflict or non-conflict settings. Along with other civilians, humanitarians are at risk of collateral violence (and of direct targeting by armed actors), for which security risk management efforts can do little beyond avoiding the highest-risk locations and adopting sheltering protocols. For most organisations, the costs and capacities required to mitigate the risks to staff in major active armed conflicts are prohibitive, and those who choose to operate will often programme in safer areas and focus on displaced populations and adjacent needs.

The risk to organisations in combat settings is not always limited to collateral violence. There have been numerous instances of direct targeting of humanitarian actors and operations by national militaries as well as non-state armed groups. Organisations that are comfortable mitigating risks of collateral

violence will usually draw the line at operating where there is a high risk of direct targeting, and where efforts at acceptance and negotiated access are insufficient to mitigate these risks. In these circumstances informal, local volunteer groups and individuals – who have even less ability to protect themselves – are often the primary aid providers.¹¹⁷ This leads to another core question: if an organisation supports these ad hoc efforts through sub-grants or other means, how well is it helping to mitigate the risks of its partners?

Finally, even though only a small proportion of humanitarian organisations elect to work in the most extreme high-risk areas, coordination and communication in these contexts is more vital than ever. In these settings, organisations should endeavour to seek out, support and participate in collective action efforts on deconfliction, humanitarian access and advocacy for the protection and safe passage of aid.

7.10.2 General mitigation measures for combat zones

Organisations intending to operate in areas of active combat, where they may face direct or collateral violence from air strikes and/or heavy munitions (bombing, shelling, landmines or grenades, for example), should include the following general considerations in their security risk management planning.

Risk assessments and mitigation measures

Combat-related threats should be carefully considered in risk assessments. Specialist input may be required to identify and implement mitigation measures (examples are given below). Crisis management structures and up-to-date contingency plans are particularly important in areas of active conflict. Organisations benefit from having a system in place to monitor security levels and adapt security risk management measures when there is a transition from non-conflict to conflict (or vice versa), which might happen slowly or suddenly.¹¹⁸ The higher the risk, the greater the organisation's duty of care. This means that the most at-risk staff must be identified and provided with the highest level of security risk management support. Organisations should also consider how to support partners who may be implementing on their behalf in these contexts.

► See Chapter 3.5 on partnerships.

¹¹⁷ See GISF and Humanitarian Outcomes (2024) *State of practice: the evolution of security risk management in the humanitarian space* (https://humanitarianoutcomes.org/security_risk_mgmt_humanitarian_space_2024).

¹¹⁸ For a fuller discussion, see GISF and Humanitarian Outcomes (2024).

Location selection

The location of staff and assets is usually the first consideration, and should be informed by the risk assessment and context analysis. Offices, warehouses and residences should be sited away from obvious or likely military targets, such as airfields, barracks, fuel depots, official buildings or strategic points such as crossroads, railheads, power stations and radio and TV buildings. If the organisation is working in an area likely to come under fire, its facilities should be moved as far away as operational requirements permit. First and second fall-back locations can be identified in advance in case violence intensifies in, or spreads from, the target area.

Recruitment and staffing

Ideally, humanitarian staff working in combat-affected areas, especially those with security responsibilities, will have both prior experience in comparable environments and specialised training in relevant areas of security risk management. They should ideally also demonstrate good judgement, the ability to work under pressure and mental resilience. Recruitment, always a challenge in humanitarian aid, is even more so for operations amid armed conflict. These settings require more investment both in security risk management and in staff care in general, including rest and recuperation (R&R) allowances and mental health support. To reduce stigma and encourage more staff to avail themselves of them, mental health services can be provided to all staff on an opt-out basis, rather than on request.

► See Chapter 5.4 for more on staff care.

Training

It is good practice to ensure staff are trained in SOPs and what to do in the event of a serious incident or increase in violence. Staff training in preparation for working in active combat areas should include situational awareness, first aid, use of personal protective equipment (PPE) and other relevant equipment, evacuation and sheltering procedures, what to do under fire and stress and psychological first aid.

► See Chapter 5.2 for more on training.

► See Chapter 5.5 for more on first aid.

Deconfliction

Deconfliction efforts – such as the Humanitarian Notification System for Deconfliction (HNS4D) – provide information on an organisation’s movements and static locations to military actors in an effort to avoid inadvertent strikes and collateral damage.

There may be cases where one or more armed actors are not participating in deconfliction, or are using the information for malign purposes. If the organisation knows that combatants are acting in bad faith and may be targeting humanitarians, a low-profile approach to locations and movements (including robust information security) may be advisable.

In cases where the organisation deems it safer to have a high profile and inform military actors of their presence, additional deconfliction measures could include painting the logo in bright colours on the roofs and walls of the organisation’s buildings, marking vehicles, using special licence plates or using thermal reflective material visible to drones, anti-tank weapons and other weapon systems that use thermal imaging cameras. An organisation’s flag may not be visible from a distance or on a windless day. It should not be assumed that all potential threat actors are familiar with a humanitarian organisation’s name and logo, or even that organisation’s purpose.

► See *Chapter 2.1 for more on deconfliction.*

Physical protection for sites

Mitigating the risks of active combat on organisational facilities (offices, residences and work sites) can be costly and may require specialist advice and support. Threats can include direct strikes or collateral damage from bombing, missiles or shelling, grenade attacks from outside the perimeter, armed raids and vehicle-borne explosives. In combat areas, facilities will usually require physical protection or fortification, and may need to be located close to appropriate shelter sites.

Fortification measures

Injuries in a blast event can be caused by primary fragmentation (pieces of the body or the casing of the explosive weapon) or secondary fragmentation (debris from the surrounding environment propelled by the blast wave, such as window glass). Despite their name, blast walls are designed to stop shrapnel and bullets – not necessarily the blast wave of a bomb. They can be made of concrete,

steel, sandbags, oil drums or boxes filled with earth, and are used to protect a building's doors and windows and the entrance route to a shelter.

Buffer rooms along the sides of a building may provide protection from blasts. Glass injuries can be reduced by applying fragmentation retention film, also known as shatter-resistant film or 'blast film', to the inside of the window. Note that fragmentation retention film applied to a window with double glazing is largely ineffective, as is fragmentation retention film applied to the outside of a window. Fragmentation retention film will also not stop shrapnel or bullets. While fragmentation retention film is designed to keep the glass together, it is not meant to keep it in its frame. In a large explosion, the entire windowpane could be propelled into the room. Keeping away from windows and having them open to prevent inward pressure are two simple mitigation measures. Securing or removing objects that may become hazardous projectiles, such as rubbish bins and flowerpots, can also help mitigate risks. While refitting buildings to withstand blast waves can be costly and time-consuming, reinforcing key areas like entrance lobbies, where a blast is more likely, may be a practical step.

Certain building characteristics can provide additional protection, although no one building will likely meet all requirements. Ideally, buildings should not connect directly to areas beyond the organisation's control, such as public roads. Main entrances should not be in direct line of fire from a space outside the organisation's control, and offices should be separated from warehouses or garages with vehicle access, and have their own security perimeter. A clearly defined outer perimeter with reduced access points can further secure the inner area of the site. Underground garages, which present significant risks in the event of a car bomb, may be best avoided, but if used access should be limited to staff. Vehicle access barriers may provide added protection. Parking and drop-off areas for visitors should be located outside the external perimeter.

Perimeter measures

Speed control measures along access roads leading to entry points can help prevent vehicles from accelerating and ramming into the building. Measures might include specialised equipment or, alternatively, gravel-filled barrels or large concrete pots with flowers or shrubs, securely chained together. If the outer perimeter is close to the building, additional stand-off measures, such as concrete blocks or pots, can be erected to minimise the impact of an explosion.

The further from the building a blast occurs, the less impact it has. While a distance of 30 metres between the building and any blast would be desirable,

this is often not feasible. It is advisable for staff and visitor entrances, as well as parking areas, to be separate. Staff vehicles, even within secured perimeters, should be checked in case a vehicle has been secretly loaded with explosives to be detonated by remote control, or a suicide bomber has requisitioned the vehicle. Vehicles and visitors authorised to enter the building at the outer perimeter should be searched.

An unobstructed space of at least 10 metres between the outer and inner perimeter is recommended. Movement corridors within this space can be designated to control traffic, with any unauthorised movements outside these corridors prompting an immediate response from security personnel. Inside the building, spaces accessible to visitors should ideally remain separate from staff-only areas. Screening measures for visitors (and possibly also staff) at the entrance, including bag searches, are recommended. Ideally the entrance or lobby will be spacious enough to accommodate checks without directly connecting to other parts of the building, in case a blast occurs in this area. Important assets, such as central computer systems, should be located deeper within the building's restricted areas, and should not be easily identifiable.

Sheltering measures

While physical fortification can reduce the damage from near-misses, such as the effects of blasts and shrapnel, it is less effective against direct hits – no shelter, even a concrete bunker, can offer complete protection from all weapons. The best protection often lies in immediate action, such as taking shelter or, if there is no prior warning, hitting the ground to reduce exposure to fragmentation. Underground shelters, such as basements or parking garages, generally provide the safest options, with reinforced rooms on the ground floor being the next best alternative. Shelters should be large enough to accommodate everyone in the building, along with essential equipment, and close enough to be reached quickly. Organisations should set a time limit for reaching the shelter, around one or two minutes. Staff who cannot reach a shelter in that time from their usual place of work will need their own shelter nearer at hand. If the authorities have identified or constructed public shelters, staff need to know where these are.

Refuge trenches and foxholes can provide cover against mortar shells and strafing by low-flying planes or helicopters. They should be deep (2 metres), narrow and large enough for up to four people. A good construction is an L-shaped small trench, with two entry and exit points. The top can be protected with logs and two layers of sandbags. These also need maintenance: rain can cause entrances to crumble and flood the trench. Staff should watch out for

snakes or other dangerous animals, which may make nests in trenches or foxholes.

► *For more general good practice around site security, see Chapter 7.2.*

Personal protective equipment

PPE is often required in areas of active combat, though keep in mind that protective gear is not a solution in itself but rather one element of security planning.

The choice of PPE depends on the specific threats in the area, balancing protection with mobility and comfort. While higher levels offer more protection, they also tend to be heavier and more restrictive and users will require some initial instruction. Efforts should be made to ensure that the PPE provided fits well and is wearable by all necessary staff – sometimes the available PPE is not designed for women and sizing may be limited. Vest and helmet covers should identify the humanitarian organisation to distinguish the wearer from combatants. In most circumstances, PPE should not be worn without this visibility (unless the organisation is a particular target), lest its wearer is mistaken for a military actor.

Body armour (ballistic vests) comes in various types and with various protection levels. Protection levels are typically rated according to US National Institute of Justice (NIJ) standards.¹¹⁹ In the NIJ 0101.06 standard there are five protection levels, from IIA (lowest) to IV (highest). The jackets most commonly used by humanitarian aid workers operating in combat conditions are NIJ level IIIA soft armour vests, which protect against most handgun rounds, or level III plate carriers with hard armour inserts (front and side plates), which can protect against rifle rounds. Ballistic helmets (level III) protect against head injuries from bullets and fragmentation.

Armoured vehicles can provide good protection against some combat-related threats. Civilian armoured vehicles are constructed with reinforced materials like hardened steel, synthetic fibres and thick bullet-proof glass. The specific components used depend on the desired level of protection. They can offer protection from assaults and attacks, bullets and gunfire. Unless specifically designed as a mine-proof vehicle, they do not provide adequate protection from the blast and shrapnel of an anti-tank mine or a well-made roadside bomb. Armoured vehicles are significantly heavier than normal vehicles and very expensive. Given the additional weight and the resulting longer braking distance,

¹¹⁹ See <https://nij.ojp.gov/library/publications/understanding-nij-010106-armor-protection-levels>

special driver training is required. It can be difficult for non-experts to distinguish an armoured vehicle from a standard one. However, where it is known that an organisation is using armoured vehicles, this can affect how the organisation is perceived by the local population and armed actors; use should be in line with the organisation's security approaches in the context in question.

► See *Chapter 4.2 for more on security approaches.*

Defensive driving training for evasive action

Courses are available to train drivers on how to respond if a vehicle comes under close fire. The decision of whether to speed away or stop will depend on where the fire is coming from and the intended target. Generally, there is more protection inside the vehicle than outside, and driving away from the area while staying as low as possible is usually the best option – but every situation will be different.

If caught in crossfire while outside on foot, staff should immediately seek cover behind a solid object, staying low and moving to safety by crouching in the case of small arms fire. If caught in an artillery bombardment, they should hit the ground and stay prone.

7.10.3 Combat weapons and tactics

The weapons used in major conflict range widely in their scale, severity and lethality, and the potential for exposure to one or more of them in an operational area may be beyond the risk threshold of many humanitarian aid organisations. The following sections of this chapter describe each of them in more detail, along with possible mitigation measures. In general, for organisations working in active conflict areas, some important areas to consider and invest in include:

- awareness and early warning capabilities;
- immediate access to appropriate shelter or cover;
- evacuation plans and sheltering protocols;
- availability of PPE; and
- threat-specific training and drills, including trauma first aid training.

Table 25 outlines the categories and features of typical combat weapons used in major conflict.

Table 25 Overview of combat weapons

Weapon	Description
Aerial bombing	Bombs dropped from overflying aircraft (airstrikes). Includes traditional air-dropped bombs and modern glide bombs, which can travel up to 60km to the target.
Missiles/rockets	Self-propelled explosive weapon that can be guided to a precise target (guided missile) or simply aimed on a trajectory (rocket).
Drones (UAVs)	Unmanned aerial vehicles that can carry explosive payloads. Also used for surveillance and targeting.
Projectiles/mortars (shelling)	Firing artillery shells over a high arced trajectory to hit targets at a distance. Sometimes described as artillery projectiles or mortars.
Rocket-propelled grenades (RPGs)	Shoulder-fired anti-tank grenades capable of destroying armoured vehicles and fortified positions at close range.
Improvised explosive devices (IEDs)	An explosive weapon that can be placed in a location, carried/worn or delivered by a vehicle. Can be triggered remotely or on contact.
Small arms	Handheld firearms e.g. rifles and handguns.
Mines	Concealed explosive devices designed to be detonated by the presence, proximity or contact of a person or vehicle.
Unexploded ordnance (UXO)	Bombs, shells, grenades or other munitions that have been fired, dropped or launched but failed to detonate.
White phosphorus	A toxic substance used for smokescreens that can be delivered by artillery shells, rockets and grenades.
Chemical, biological, radiological and nuclear (CBRN) weapons	Bombs and other weapons or tactics that use biological or chemical substances, radiation or nuclear explosions to cause death and/or toxic hazards.

Bombing from aerial platforms

When dealing with the threat of collateral violence from airstrikes, it is important to remember that high-risk locations are those anywhere in the proximity of high-value targets, where destruction would be militarily advantageous. Common targets of airstrikes include military installations, airfields, power stations, communication towers, bridges, key road junctions, transportation

systems and even, increasingly, hospitals. Weapons used for aerial bombing include missiles and drones.

Missiles vary in range, accuracy and speed, which can impact the effectiveness of alert systems and the time available to take shelter. Missiles have internal guidance systems that allow them to be directed or steered towards a specific target after launch.

- Ballistic missiles travel at hypersonic speeds during most of their flight, with intercontinental ballistic missiles (ICBMs) reaching targets in about 30 minutes. Their precision has improved significantly, with some modern systems achieving accuracy within tens of metres. They can carry very large payloads, often measured in thousands of kilograms, giving them immense destructive capacity.
- Cruise missiles typically fly lower and slower, with approach times measured in hours for long-range missions. While their warheads are generally smaller than ballistic missiles, modern cruise missiles can carry payloads of several hundred kilograms.
- Air-launched ballistic missiles, like Russia's Kinzhal, can achieve hypersonic speeds like ballistic missiles, resulting in short approach times, but can manoeuvre during flight. They typically carry payloads larger than cruise missiles, but smaller than traditional ballistic missiles.

Drones, or UAVs, are a low-cost alternative to missiles and air-dropped bombs. The Shahed 136 'kamikaze'-type drone carries a 40-kilogram payload and can fly up to 2,400 kilometres at around 100 kilometres per hour. It is designed for a one-way mission, crashing into its target, and effectively functioning like a cheap missile. Intelligence or information-collecting UAVs (or surveillance drones) are relatively small, navigated drones which may or may not carry explosive payloads. Some surveillance drones can be used to coordinate ballistic missile attacks. The presence of such drones can serve as a warning indicator.

Direct targeting of humanitarian actors, though possible, is less likely than the risk of collateral damage. The weapons used will have different approach times and some may be easier to intercept than others. Ukraine developed a country-wide app-based notification system in 2022 to provide air raid warnings with information about the type of incoming weapon. Organisational protocols can be put in place that direct staff to take shelter underground or in an interior room, depending on the type of strike.

Shelling/artillery fire from land-based platforms

Shelling from land-based platforms typically targets an opposition force's positions (such as bunkers and trenches) and movements. It is often used to disrupt supply lines, depots and logistics hubs. Basic distinctions can be made between random or saturation fire, predicted fire and observed fire.

- Random or saturation fire is highly inaccurate. It can be the result of the type of weapon used, such as multiple rocket launchers, which saturate an area with shells, or a deliberate tactic, such as an artillery barrage or so-called carpet-bombing.
- Predicted fire is less random. Aiming relies on map-based calculations, with no capacity to adjust to a specific target.
- Observed artillery fire or air attack means that drones or human observers on the ground watch where shells, rockets or bombs are landing, and relay directions to guide targeting for the firing crew. This type of fire can be very accurate and allows for following or switching targets.

Anti-armour weapons and RPGs are shoulder-fired weapons that launch rockets with explosive warheads. They are commonly used against armoured vehicles, fortifications and enemy personnel in direct line-of-sight. They are portable, versatile and easy to use. Avoidance – that is, remaining outside of their 200–500-metre range – is the best mitigation. If inside that range, minimising time spent in open areas and avoiding predictable patterns of movement can reduce the risk of being targeted, and armoured vehicles and fortified shelters can be critical mitigation measures.

Crossfire and sniper fire

Crossfire is a risk in the proximity of any small arms or artillery fire. Although most small arms fire is usually effective only up to 300 metres, some machine guns have an effective range of over 1,800 metres and bullets can travel up to 6 kilometres. Sniper fire is targeted, and certain sniper rifles can strike a target from a long distance (over 1 kilometre).

The best defence against crossfire and snipers is to reduce exposure by keeping staff out of range (which may be possible only when battle lines are relatively stable), and away from areas where small arms fire is being exchanged or snipers are operating. In sudden crossfire, when staff are not the target, they should get on the ground immediately and try to move to a safer place. When inside, they should stay away from windows and doorways and try to get at least two

walls between themselves and the bullets. This will also increase protection from ricocheting bullets.

These precautions also apply in the event of ‘celebratory fire’ such as can occur at parties or demonstrations, where injuries and fatalities from falling bullets are a serious risk.

Active shooter prevention and response

Active shooter incidents are a critical threat in certain contexts, with the potential for mass casualties and significant psychological impact on survivors. Humanitarian organisations are not immune to such threats, which can occur with little or no warning. Risk mitigation usually requires multiple layers of security, each designed to slow or block the shooter’s access to buildings or compounds. The innermost layer is typically a reinforced room.

Understanding the indicators of potential violence, implementing mitigation measures and having a well-rehearsed response plan can significantly reduce the risks associated with active shooter events. Training may include guidance on a ‘run, hide, tell’ strategy.

- **Run.** If there is a safe path, attempt to evacuate the area. Encourage others to leave with you, but do not let their indecision slow you down. Leave your belongings behind and keep your hands visible to armed responders.
- **Hide.** If evacuation is not possible, find a place to hide. This should be out of the shooter’s view, provide protection if shots are fired in your direction and, if possible, not restrict options for exit. Lock and/or barricade the doors, turn off lights and silence any phones. If an active shooter event is likely, construction of a reinforced safe room should be considered.
- **Tell.** Once safe to do so, emergency services (or other emergency contacts per organisational protocol) should be called and provided with as much information as possible. This includes the location of the shooter, a description of the shooter and their weapons, and the number of people at the location.

Mines, improvised explosive devices and unexploded ordnance

Mines

Armed groups lay mines to defend their positions, disrupt enemy movements, deny the enemy access to certain routes and/or channel the enemy onto a certain route. They can also be placed around potential targets such as power pylons (transmission towers), water and electricity plants and rail junctions, to protect against sabotage and attack. Mines have been used in civilian and agricultural areas to cause general fear and dislocation. Once laid, mines can move a considerable distance as a result of flooding or landslides.

There are generally two categories: anti-tank mines and anti-personnel mines.

- **Anti-tank mines** are large and have substantial explosive power. They typically require a heavy weight or movement to activate, but this may not be the case if they are old and unstable, and they can cause almost total destruction to a non-armoured vehicle (including most civilian armoured vehicles, which are only protected against small arms).
- **Anti-personnel mines** are smaller. Some are designed to cause injury by removing a hand or foot. Others can do much more serious, even lethal, damage. Direct fragmentation devices are designed to scatter ball fragments to kill or wound up to 500 metres in a particular direction.

Case example: repeated mining

In 1995 an NGO vehicle hit an anti-tank mine on a road in Central Africa. The explosion killed two passengers and injured three others. During the night, new anti-personnel mines were planted around the wreckage. The next day, a local woman who had come to look stepped on one and lost her leg.

Mine awareness training for staff is an essential element of security risk management in areas where mines are being actively used or remain from previous conflicts. This includes:

- Staying vigilant and knowing what to look out for.
- Mine and UXO identification, marking and reporting.
- Avoidance techniques.
- What to do when in a mined area in a vehicle or on foot.
- Emergency response (in case of detonation and injury).

International specialist humanitarian demining organisations such as the HALO Trust and the Mines Advisory Group provide training and information. In the country itself, the main sources of general and locality-specific information include:

- The national mine action organisation or the local authorities and security forces.
- Demining organisations, and a central UN mine action centre.
- UN military observers or peacekeepers.
- Hospitals and health posts dealing with mine casualties.
- Local people.

Local knowledge is especially important. When venturing into a new area where there is active fighting or there has been fighting in the past, organisations can inquire about the history of fighting in the area; accidents – have vehicles, people or animals been hit by mines, and if so when and where?; where local people go and what areas they avoid; which roads or sections of roads have been used and to what extent; and how roads are used – do locals walk, use bicycles or vehicles? Anti-tank mines may not have been detonated and will remain a danger.

Local people often create their own warning signs to mark minefields – but these can be hard for outsiders to identify and can be ambiguous or unclear. Signs may be nothing more than a small heap of pebbles or two crossed branches lying at the start of a path. Local people can be asked what signs they use, and whether they have a common system – if everybody does it their own way, there is no common signal. Demining operations mark identified fields in different ways in different countries but usually the signs are clear enough. The colour red is normally used in markings. It is important to remember that signs may have fallen down or become obscured.

Improvised explosive devices

IEDs can be used to target military vehicles, sites or personnel, as well as civilians. They are also commonly used to deny access to areas or routes. They can be detonated by remote control, time-delayed or triggered by the victim. Devices commonly triggered by the victim, such as stepping on a pressure plate or pulling a trip wire, require cautious movement restrictions. Time-delayed devices typically target a pattern of activity or are delayed in order to allow the perpetrator to escape. Remote-controlled or command detonation devices can be more exact. Often IEDs are planted by a retreating force to complicate the reoccupation of an area. When used as booby traps, they are hidden or disguised: a door or window of a house can be booby trapped, as can a well, a dead body or an innocent-looking household item like a toy. A common tactic involves striking a target, then hitting the same location soon afterwards to target rescuers and bystanders who arrive to help the injured. It is important to understand how IEDs are being used so that the organisation can adjust its SOPs accordingly.

Unexploded ordnance

UXO refers to material that was intended to explode on impact but failed to do so. Artillery and mortar shells, and even small arms ammunition, can remain explosive and become increasingly unstable over time. Bombs and shells may have buried themselves deep in the ground, presenting a continuing danger, for instance to farmers and builders. Destroyed or abandoned military or militarised vehicles and buildings used by armed groups may contain UXO, as well as volatile fuels and chemical residues. UXO may pose a much greater threat than landmines because their dispersion may be more random and unpredictable, and because the munitions themselves are likely to be unstable. A particular risk are cluster munitions delivered by artillery shells or from a plane. In mid-air, the containers break up and then distribute a multitude of bomblets that can saturate a whole area.

Essential guidance for staff – mines and UXOs

When dealing with mines and UXOs, advice to staff should be: do not touch, do not approach, mark if possible, report.

UXOs are generally visible, although they can be partly or even wholly buried. They should be presumed unstable and not touched. Staff should mark their position and inform the authorities.

Any object large enough can be improvised/booby-trapped to carry explosives. The object that is booby-trapped is generally visible – but not the explosive linked to it. Anything in an uncleared area can potentially be booby-trapped, so staff in the area should not enter empty buildings or ruins, and should not pick anything up or open shutters or doors.

Mines are generally not visible. In an area where mines have been used, staff should not travel on any road that has not been confirmed cleared. If a mine is seen, the location should be marked and the authorities informed.

Untrained people should never handle mines and UXOs. A standard HEAT course does not count as training in this regard.

Chemical, biological, radiological and nuclear threats

To date, humanitarian organisations have had little direct experience of CBRN threats. In reality, no humanitarian organisation is currently equipped to protect its staff – much less local civilians – in the event of a catastrophic CBRN event. Most of the organisations that have taken the decision to operate in major conflict zones have decided that the likelihood of an occurrence is low enough to accept the risk. However, the risk is never absent in any major conflict setting, so it is important to assess and discuss the risk, and consider mitigation measures.

Chemical weapons were deployed several times in the Syrian civil war (starting in 2012) and in Ukraine (starting in 2022), where the additional risk of deliberate or accidental nuclear events was frequently discussed among humanitarian organisations operating there. Risks can include the following:

- Industrial accidents, such as a fire or explosion at a chemical plant or storage facility, an accident at a nuclear power plant or a leak from a biological containment facility. Such incidents can release toxic substances into the environment, posing immediate and long-term health risks to the population and responders.
- Accidents during transport of CBRN agents for industrial or military purposes.
- Hazards like earthquakes or tsunamis can damage industrial plants or military storage facilities, potentially leading to the release of CBRN materials.

- Collateral damage to industrial plants, hospitals (radiology departments) or research, manufacturing and military facilities as a result of conflict.
- Direct attacks by armed forces releasing chemical or biological agents to cause mass casualties or other groups using CBRN materials to create weapons such as ‘dirty bombs’ (radioactive dispersal devices).

Individuals can be exposed to CBRN hazards in various ways, including inhalation, physical contact (between people or with objects) and consumption of contaminated food or water.

For risk mitigation purposes, key questions to consider include who the most at-risk staff would be (such as medical personnel), whether there are expert-informed SOPs that can be adopted (such as the use and nature of PPE), what contingency plans can be put in place (such as withdrawal, evacuation and emergency medical support) and whether specialist training is advisable for the most at-risk staff, such as how to reduce exposure if contamination is suspected. Any security risk management measures must be informed by specialists.

White phosphorous

White phosphorus is used in a combat zone to provide a smokescreen. It clouds very quickly, not only obstructing visual contact but also scrambling infrared radiation, thereby interfering with infrared optics and weapon-tracking systems, such as those used by guided weapons like anti-tank missiles. It can be delivered by small smoke grenades, tank cannons and mortars or other artillery. On explosion, burning particles spray outward, followed closely by streamers of white smoke, which then coalesce into a very white cloud.

While its stated use may not be as a ‘chemical weapon’, white phosphorous is nonetheless a toxic chemical that, when used in populated areas, has harmful effects on people. The burning particles stick to skin and can produce serious burns. Particles continue burning until completely consumed or until they are deprived of oxygen. In addition, phosphorus can be absorbed into the body through the burned areas and cause liver, kidney and heart damage or even organ failure. Phosphorus particles can also be orally ingested. Inhalation of the smoke is hazardous and will irritate the eyes, nose and respiratory tract, but does not pose the same lethal threat as burns and ingestion.

Further information

General research

GISF and Humanitarian Outcomes (2024) *State of practice: the evolution of security risk management in the humanitarian space* (https://humanitarianoutcomes.org/security_risk_mgmt_humanitarian_space_2024).

Armed conflict risk mitigation

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