

AN INITIAL STUDY INTO MINE ACTION AND IMPROVISED EXPLOSIVE DEVICES



GICHD

GENEVA INTERNATIONAL CENTRE FOR HUMANITARIAN DEMINING

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FOR HUMANITARIAN DEMINING

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EXECUTIVE SUMMARY

Improvised explosive devices (IEDs) present significant risks to mine action (MA) operators and the programmes within which they work. Such risks can be managed through well-informed risk identification and assessment, the avoidance of some activities, and the procurement/development of the necessary skills, equipment and procedures to address others. Effective and reliable decision-making about every aspect of IEDs, at every level within a mine action programme (MAP), requires the support of a comprehensive, up-to-date and readily available information management system (IMS). In the absence of good information, and the capacity to analyse and interpret that information, MA actors run the risk of taking poor decisions, engaging in inappropriate activity, and putting their operational personnel at unacceptable (and avoidable) risk.

This study focuses primarily on improvised devices of the types that are currently encountered by MA organisations during humanitarian operations. The use of IEDs for terrorist purposes or as part of active conflict is not addressed in this study. While it is recognised that MA organisations may be present in places where there is a risk of terrorist attack, such events generally fall under the heading of security/law and order and are dealt with by military, security or police forces. The study draws especially on information relating to humanitarian IED disposal (IEDD) operations in northern Iraq, but it considers issues of importance to MA operators encountering improvised devices anywhere in the world.

Dealing with IEDs of any type is a serious undertaking that requires constant review and update of risk assessments and responses, and vigilance against complacency or assumption. Difficulties in defining the boundaries of appropriate operating envelopes for individual MA actors, and in assessing their level of preparedness for the demands of the tasks they face, means that there is uncertainty amongst managers, authorities and donors about much of the humanitarian IEDD work currently being undertaken.

Decisions about when it is appropriate for MA organisations to engage with IEDs, and about what types of IED they are equipped and competent to address, relate to the IEDD operating envelope. Only when there is a combination of an adequately secure environment (within which it is possible to operate in accordance with established humanitarian principles), and a type of IED for which the organisation has the necessary skills, equipment and procedures, is it appropriate to proceed.

The IEDs that MA actors encounter are, for the most part, deployed as landmines. They may also encounter improvised projectiles, command wire operated IEDs and abandoned demolition charges, although typically in smaller numbers. In the main, devices of these types are potentially suitable – from a technical perspective – for search and clearance action by MA actors, if they use appropriately competent personnel and equipment, applying normal land release principles and using modified technical procedures. IEDs used as landmines have similar impacts (direct and indirect) to those associated with mass-produced, industrially manufactured landmines and are susceptible to the same land release methodologies employed against any other type of landmine.

IEDs, even those locally manufactured in very large numbers, show more variations than industrially manufactured weapons. Different designs may be employed in different areas, and they change over time as lessons are learned during testing and as a result of observing the working practices and procedures of IEDD organisations. Any organisation engaged in IEDD operations needs access to an IMS capable of keeping up with changes in IED design and use, and with the ability to analyse data collected during IEDD operations to help keep operations safe, effective and efficient.

Uncertainty about the possibility of ISIS supporters remaining hidden for extended periods in areas that have been recently liberated, waiting to launch delayed attacks, adds to the challenges and risks facing MA actors. While military and security forces have suitable capacities for such specialist work, their resources are devoted to the support of current military operations. These likely situations imply daily assessment by MA actors.

Some MA operators have received requests to clear buildings. Tackling such tasks is a great deal more challenging and most MA actors are not equipped, in terms of personnel competence, suitable procedures or specialist tools, to engage in such activity. MA actors (operators and authorities) are mostly (and rightly) very wary of operations within buildings, although it is understood that there is pressure to respond to the humanitarian need.

IEDs in buildings are likely to create some differences in their impacts on affected communities compared with landmines and other forms of explosive remnant of war (ERW); in particular, they are likely to have more direct impact on women, girls and boys compared with landmines and IEDs used as landmines. IEDs in built-up areas bring increased uncertainty about aspects of land and property title and the possibility of claims for compensation in the event of damage to buildings arising from IEDD operations.

Determining the scope of appropriate, justified and necessary humanitarian IEDD activities requires a thorough, evidence-based approach to understanding the broader humanitarian context. Usual processes of strategic planning and results-based management (RBM) are wholly applicable and should be applied by authorities and operators working in IED-affected areas. Humanitarian IEDD operations should only be undertaken when there is a clear, verified humanitarian need, that cannot be addressed by other means.

Restrictions on information sharing increase risks at every level (strategic planning, tasking, prioritisation, technical understanding, personnel safety, etc.) and limits the ability of operators, managers and decision-makers to identify, assess, evaluate and mitigate risk. Consequences range from inefficiency, through ineffectiveness, to death and injury amongst operators and affected populations and unnecessary damage to valuable property.

In general terms some IEDs, under some circumstances, will be suitable for responses under the umbrella of the International Mine Action Standards (IMAS). Some adjustments to existing IMAS are likely to be necessary to clarify applicability and maintain donor, authority and operator confidence. IED types and circumstances that fall outside the appropriate remit of IMAS are likely to benefit from the development of suitable standards by actors working within the military and security sectors. The MA sector should have the opportunity to engage with non-IMAS IEDD standards in order to a) influence aspects relevant to MA and b) help avoid unintended consequences that could be unhelpful or inefficient in an MA context.

A primary area of uncertainty relates to the skills and knowledge required of IEDD operators. While there is discussion at the level of international standards about establishing competency requirements, there is a need, in the meantime, for authorities and operating organisations to document their approach to this question. Other aspects of IEDD operations can, and should, be managed using established quality management (QM) methods, in accordance with established standards.

MA has addressed similar questions of competence, suitability and appropriateness in the past, such as when the mine clearance sector first considered carrying out explosive ordnance disposal (EOD) on items of unexploded ordnance (UXO) encountered during operations. It is reasonable to expect that a similarly practical, pragmatic and effective result will be forthcoming when addressing the subject of MA engagement with IEDs.

Discussion of IEDs and IEDD continues to be susceptible to confusion caused by different usages and understandings of acronyms and terminology by different actors and interested sectors. Action to establish standard lexicons are timely and likely to help improve common understanding and discussion.

INTRODUCTION

IEDs AND HUMANITARIAN MINE ACTION

Improvised Explosive Devices (IEDs) are not an entirely new topic for the humanitarian mine action (MA) sector. Wholly or partly improvised weapons have been encountered by MA actors under a variety of different circumstances over the last 25 years, as regular military weapons have been adapted for uses other than those they were designed for, as improvised booby traps were combined with industrially manufactured landmines to target deminers, and as non-state actors (NSAs) of various types attempted to achieve their ends using whatever materials were available.

When modern humanitarian MA started, at the end of the 1980s, landmines were readily available within international arms markets, or were provided to governments and anti-government elements (AGEs) during a number of civil/internal conflicts linked to wider aspects of the cold war. Since then the anti-personnel mine ban treaty (APMBT) has both stigmatised the use of anti-personnel mines (APMs) and made it much harder to obtain them. The widespread prevalence of IEDs used as landmines in some modern conflicts partly reflects the success of the APMBT.

Military and security forces around the world have long experience of dealing with the improvised weapons used by terrorist groups. Many civilian populations, including amongst them the managers of MA organisations, have an awareness of such terrorist devices through their own experience of heightened security systems in their home cities, warning notices on public transport, images in news stories and attacks on their own countries and cities. Today's IED users are associated with conflicts that bring widespread insecurity, the readiness of some parties to attack civilian targets far removed from the country where the main conflict nominally takes place, and the use of news and social media to raise awareness of the conduct, practice and underlying hatreds associated with this type of fighting.

As a result, there is a temptation to see IEDs as something new to MA; something that demands a completely new and different set of responses from those previously adopted by MA. This study will suggest that such an attitude would be misplaced. IEDs are not exclusively used as terrorist bombs. They can also perform functions similar to those associated with landmines, mortars and other weapons normally associated with conventional warfare. There are differences in the nature and conduct of operations in northern Iraq today, compared to some MA operations elsewhere, but then there are also differences between MA in Afghanistan in 1991 and Bosnia in 2016, or between MA in Cambodia and that in Lebanon, or between dealing with individual unexploded mortar rounds on an old battlefield and processing a stockpile of abandoned surface-to-air missiles.

MA has always had to respond to new and changing circumstances; it has always had to take decisions about when it is safe and appropriate to engage with a humanitarian issue; and it has always had to decide how (and whether) to deal with different types of weapon, from the simplest to the most complex.

MINE ACTION SECTOR ENGAGEMENT WITH IEDs

The topic of how (and whether) to respond to IEDs has been one of concern to the MA sector for several years. Initial discussions tended towards a view that the issue was one that should not be addressed at all, in direct practical terms, by MA actors. While the situation was perceived to be one in which IEDs were predominantly used as offensive weapons, during ongoing conflicts, most actors accepted that view.

More recently, developing circumstances have prompted a change of attitude among a number of humanitarian actors, including international institutions, national authorities and operating organisations. This has been the case in parts of Iraq and the Kurdistan Regional Government (KRG) area, as ISIS has been driven out of areas previously under their control, leaving behind widespread IED contamination in rural and urban areas with a clear humanitarian impact. As a result, some aspects of the question of whether the humanitarian sector should engage with IEDs have been overtaken by events – mine action non-governmental organisations (NGOs) and commercial companies are already clearing IEDs.

THE STUDY

A good deal of uncertainty continues to surround the issue of humanitarian IED disposal (IEDD). The Geneva International Centre for Humanitarian Demining (GICHD) has received requests from national authorities and international institutions for support and advice as they decide how to respond to IED contamination. In the face of an overwhelming humanitarian imperative to take action, there is now a pressing need for the MA sector to agree on how it defines and describes IEDs and IEDD, how it determines the limits of justified and achievable operations and how it takes decisions about prioritisation and tasking of IEDD operations.

This study does not pretend to be able to answer every question, but it does aim to identify both underlying principles and some issues of detail, to assist informed discussion about the implications of IEDD for MA actors, and to provide guidance on relevant best practice.

The study draws on existing military experience and terminology, wherever it is appropriate to do so, but it is written from the perspective of mine action, considering the needs, constraints, capabilities (and gaps) facing an MA actor engaged in IEDD operations. It reflects:

- discussions with organisations involved in work in Iraq that brings them into contact with IEDs, or that are affected by the impact of IEDs;
- existing reference documentation;
- experience gained by military organisations; and
- aspects of existing MA standards, methodologies and approaches.

The study offers suggestions on appropriate practice, policies and limitations associated with mine action engagement in IEDD operations. It does not constitute formal direction on the subject, nor does it mirror any of the functions of a Technical Note for Mine Action (TNMA) or International Mine Action Standard (IMAS). Responsibility for the development of policies towards IEDD and appropriate practical procedures remains with individual operating organisations.

TERMINOLOGY

Language is powerful and enabling when used with precision; it has an equal potential to confuse and confound when it is used poorly. Shortcomings in available language bring problems at every level of discussions about IEDs, and generate a real risk that different actors have different assumptions and perceptions of what is meant by the many acronyms and terms. At the very least, such confusion results in inefficiency, but in the context of IEDs it may also lead to accidents, delays, reluctance to fund some activities that may in fact be appropriate, and the possibility of funding others that aren't.

The term IED is a broad one, much as explosive remnants of war (ERW), unexploded ordnance (UXO), or abandoned explosive ordnance (AXO) are broad terms – useful for general discussions, but often inappropriate, and sometimes positively unhelpful, when trying to address more focused questions. In the same way that it is normal to refer to an unexploded mortar round, or an unexploded grenade, so it is often useful to recognise and differentiate between an improvised landmine (ILM), an improvised mortar round and a suicide IED.

The importance of standard terminologies is well recognised in all professional activities. Military and security organisations have been addressing IEDs for several decades and have developed a wide lexicon of terminology, but one that reflects the perspectives and concerns of military and security organisations. While much of that terminology is transferable to MA, the fit is not an exact one, and different organisations, and the individuals within them, may draw on different personal histories, gained with different military and security forces, to overlay slightly different understandings on similar terms.

A number of attempts have been made to standardise terminology relating to improvised weapons, the most significant of which for this study are the *Coalition Joint Force C-IED EOD Defeat Course Lexicon version 1.4 dated 21 May 2016* and the *UNMAS Improvised Explosive Device Lexicon dated 18 July 2016*. In the mine action sector there is also IMAS 04.10 *Glossary of mine action terms, definitions and abbreviations*, a document that is updated whenever new terminology becomes significant for the sector, or when there is collective agreement that a definition needs adjustment to reflect changes in methodologies or understanding.

DEFINING AND DESCRIBING IEDs

Defining IEDs

The UNMAS Lexicon defines an IED as *“a device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals and designed to destroy, incapacitate, harass or distract. It may incorporate military stores, but is normally devised from non-military components”*¹.

The Oxford English Dictionary (OED) defines 'improvised' as *“Invented, created, or done spontaneously or on the spur of the moment, esp. as a result of necessity; impromptu; and made or created using whatever is available”*².

¹ United Nations Mine Action Service Improvised Explosive Device Lexicon, General Terms, Page 1.

² <http://www.oed.com/view/Entry/92883?redirectedFrom=improvised#eid>

It is clear that relatively few IEDs, of the sorts that mine action actors are mostly encountering in Iraq, have been created 'spontaneously or on the spur of the moment'. On the contrary, many are the result of careful design and development over time, and reflect a number of iterations as lessons are learnt from successful and unsuccessful operational use. Similarly, while the idea of IEDs being made of 'whatever is available' may sometimes be the case, on many others an extensive procurement network is used to obtain, transport and process components for use in a manufacturing system on an industrial scale. Other terms (that have been used in the military context) such as locally manufactured munition (LMM) may be more suitable than IED on some occasions.

Differentiating between types of IED

Within the umbrella term 'IED' there lies a wide variety of devices, of different sizes, purposes, construction, sophistication, complexity, life-span and emplacement (again much as with UXO and ERW). Existing military terminology classifies IEDs under five main categories:

- Time delay;
- Command;
- Victim operated;
- Projected; and
- Suicide.

The MA sector naturally focuses first on devices that fall under the heading of victim operated IED (VOIED), although they may encounter other types as well. VOIED is another broad term encompassing devices a lot like landmines, laid in open country, as well as the most complex devices, with multiple different switches, concealed in buildings, objects, possessions and vehicles.

The Iraqi Kurdistan Mine Action Authority (IKMAA) is clear that the need to be able to classify IEDs is very important for the regional programme, in much the same way that the classification of UXO and other ERW items is essential for determining explosive ordnance disposal (EOD) competency requirements, developing training programmes and procedures, and applying effective quality and safety management processes.³ A number of operating organisations highlighted the potential value of the term improvised landmine (ILM) to help differentiate between types of IED.⁴

Being able to describe and characterise weapons that are encountered during field operations is essential for a range of strategic, planning and technical decision-making processes. Mine action operations typically do so by identifying manufactured munitions by type and designation. Improvised, or partly improvised, weapons do not generally offer such a convenient shorthand means of identification. Lexicons offer other ways of identifying and capturing key aspects of the design and use of improvised weapons, and can be combined with more familiar terminology (mine, mortar, charge, etc.) to provide useful descriptions of what is found.

THE IEDD OPERATING ENVELOPE

The concept of the operating envelope is an important one. It helps characterise situations and identify when, where and what it is appropriate for organisations to go and do. For the purposes of this study the basic tool used to describe the operating envelope is the technical/contextual complexity chart (Figure 1).

Other approaches may be equally valid or useful; it is not suggested that this approach is uniquely suitable or should be adopted as the standard method, but it has been found to be helpful in providing a framework for discussion and analysis while preparing this study report. In this analysis the operating envelope reflects:

- The technical complexity of the IED; and
- The prevailing contextual complexity including the security situation.

³ Meeting with IKMAA 28th August 2016.

⁴ This point was raised by representatives from several NGOs during the study kick-off meeting at the iMMAP offices in Erbil – 29th August 2016.

Figure 1 illustrates the current perception of the extent of the operating envelope for different groups of actors working in northern Iraq.⁵

- Military, security and Peshmerga IED capabilities address the most complex technical devices under the most insecure conditions, including during active military operations;
- Commercially contracted service providers (Janus Global Operations (JGO) and Optima in Iraq) work in areas that continue to show some insecurity (such as the possibility of snipers, radio controlled IED (RCIED) initiators or indirect fire) and may deal with devices that present some higher technical challenges; and
- Mine action NGOs work in areas that are generally more secure, against IEDs that are relatively less complex (although still showing greater complexity than is common in traditional mine action).

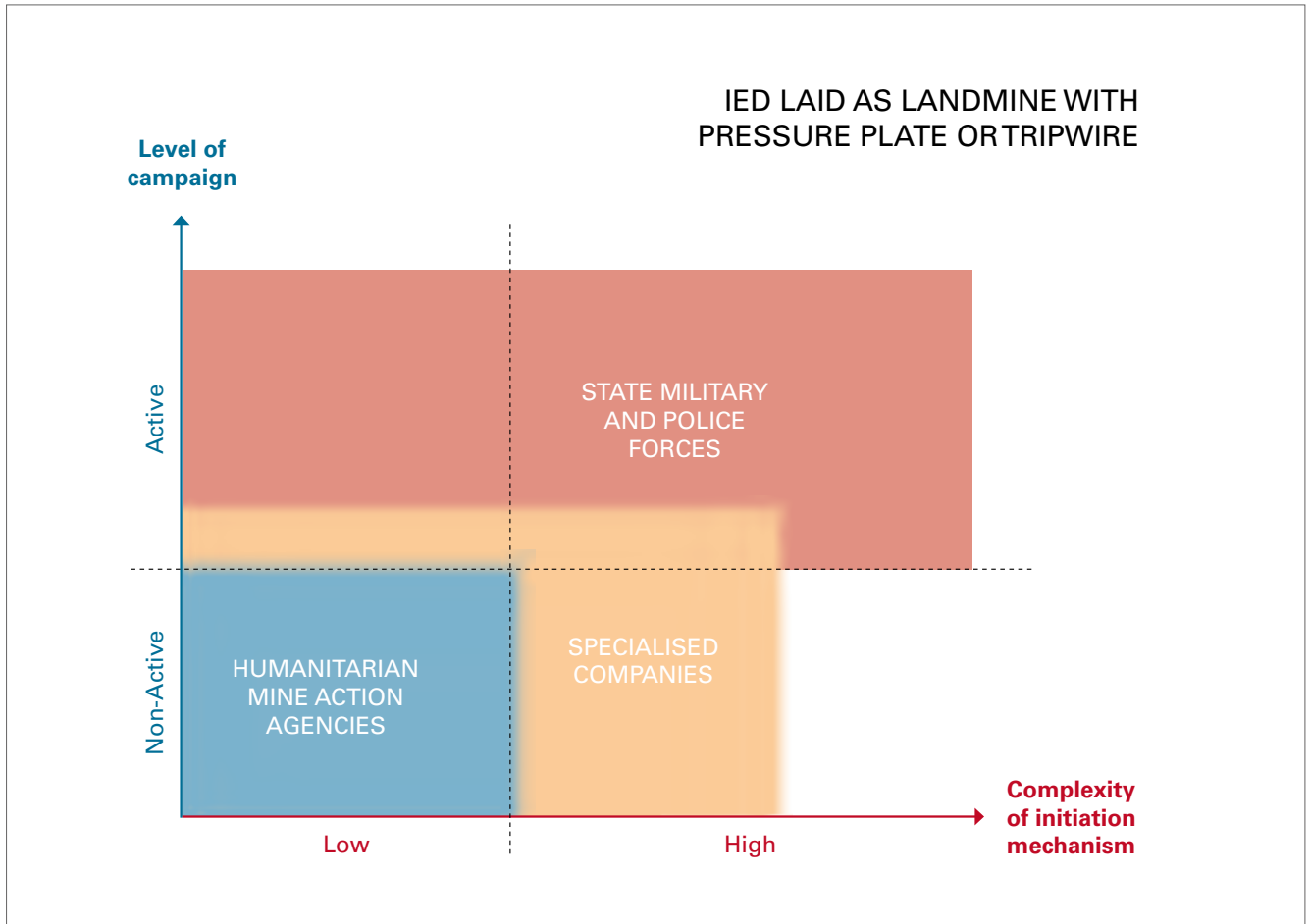


Figure 1. The technical/contextual complexity 'operating envelope' (illustrating the perceived spread of activities in northern Iraq at the time of the study team's visit) (image credit: GICHD).

While the diagram is essentially illustrative – boundaries between zones on the chart are blurred and will change with time – it does reflect some important aspects of IEDD operations. Different actors within one zone appear to accept different circumstances (Fondation Suisse de Déminage (FSD) appears to be prepared to work in closer proximity to front line areas than Mines Advisory Group (MAG) for instance).⁶ It is of note that currently no IEDD assets are available/ tasked to deal with the more complex IEDs (such as radio controlled examples) in more secure areas (the bottom right sector of the chart) – this may become a significant issue as built-up areas in Mosul are liberated.

A similar approach can be applied to placing landmine survey and clearance and EOD within an operating envelope. While the nature of IEDs and IEDD present some differences compared to other forms of land release and spot task EOD activity, there are underlying characteristics that can be considered from a similar perspective.

⁵ Without commenting, at this stage, on the validity of the perceptions of the division of tasks, nor on the extent to which operating organisations are fulfilling that potential.

⁶ Information provided by MAG and FSD during discussions with the study team in Erbil, August 2016.

Device and operational complexity

The technical challenge presented by an IED reflects a number of factors including:

- The number and type(s) of switches;
- The location and level of concealment of the device;
- The surrounding environment;
- The sophistication and quality of design and build;
- The intended target;
- The capability and competence of the group designing, building and using the devices;
- The time since the device was placed; and
- Association with other linked or connected devices.

Such an analysis is not unique to IEDs; a similar approach can be applied to the assessment of other forms of ERW including landmines and UXO . Complex devices do not only bring additional demands for personal competence and technical equipment, but typically demand an increasingly complex system of support – on site and within back-up elements. The simplest devices may be susceptible to a response similar to that found on a traditional mine action work site (although even here there is a need for command and control, communications, medical and transport support); the most complex may require a range of additional components, such as electronic counter measures (ECM), remotely controlled vehicles, and other specialist technical tools, to create an environment in which it is acceptable to deal with a suspect device.

Security, insecurity and contextual complexity

The other axis of the operating envelope reflects the situation at, and surrounding, the site of IEDD operations. At its lower end lie the most benign situations, where there is no conflict, where there is no expectation of ‘stay behind’ elements and where the local population are fully supportive of the IEDD work and operating organisations. At the upper end are those locations where military action is ongoing and where hostile elements are likely to attack individuals and organisations engaged in operations against IEDs. In the middle are a mix of circumstances associated with proximity to areas held by hostile elements, likelihood of stay behind attackers, the presence (and supportiveness) of local populations and the level of uncertainty about the stability of the situation.

Northern Iraq includes locations that sit at different points along almost the entire extent of the security spectrum. Few places are entirely benign, some are the scene of current (and anticipated) military engagement, but most fall somewhere in between. Criteria for assessing the insecurity axis on the operating envelope include:

- The proximity and density of hostile elements;
- The likely presence of ‘stay behind’ and ‘sleeper cells’;
- The presence and degree of support of the civil population and authorities;
- The presence of security elements (military, police) and their degree of control;
- The recent history and stability of the security situation; and
- Confidence in the security assessment.

The terms ‘permissive’, semi-permissive and non-permissive’ are used by some actors to describe the working environment, but as with other aspects of IED terminology with military roots, such terms may prove unwieldy when MA actors are trying to determine whether it is appropriate to enter an area or not. The US Department of Defense (DoD) defines a permissive environment as:

Operational environment in which host country military and law enforcement agencies have control as well as the intent and capability to assist operations that a unit intends to conduct.⁷

⁷ http://www.dtic.mil/doctrine/dod_dictionary/data/p/6126.html

And a non-permissive environment as:

An operational environment in which host government forces, whether opposed to or receptive to operations that a unit intends to conduct, do not have effective control of the territory and population in the intended operational area (Uncertain Environment); or an operational environment in which hostile forces have control as well as the intent and capability to oppose or react effectively to the operations a unit intends to conduct (Hostile Environment).⁸

Whatever the situation it is clear that even in many 'safe' or 'permissive' environments there could be dormant ISIS cells, and areas in relatively close proximity to ISIS areas could come under rocket fire. "The situation has to be assessed on a daily basis."⁹

Mine action operational actors (UN, national authorities, NGOs, commercial companies) have worked in parts of the world presenting circumstances lying at many points along the security/insecurity axis. They have had to take decisions about when it is appropriate to operate, when to stay at home, when to withdraw entirely from a country or region, and when it is appropriate to redeploy, throughout the decades of modern MA operations. The presence of IEDs within the environment is a factor to take into account in such decision-making, but it does not alter the basic approaches that mine action actors have always had to adopt to assess the safety and appropriateness of their operations.¹⁰

⁸ https://definedterm.com/non_permissive_environment

⁹ Statement from Coalition Military Forces C-IED team.

¹⁰ A relevant current example is South Sudan, where NGOs, commercial operators, UN elements and national authority personnel adapt their responses to the prevailing (and often rapidly changing) security circumstances. IEDs are not a significant threat in that country (at least as of 2016), but the sorts of decisions that MAMA managers must take are very similar to those faced by managers (often within the same MAMA organisations) in northern Iraq or Afghanistan where IEDs are present.

POLITICAL AND STRATEGIC CONTEXT IN NORTHERN IRAQ

NATURE OF THE CONFLICT

Conflict in northern Iraq (and the associated conflict in Syria) is widespread, fluid and complex. It is made up of different actions and attacks, from large scale, relatively traditional military campaigns, through smaller scale skirmishes to the suicide attacks and drone strikes that are a characteristic of many modern wars. In some areas territory is held and bound by front lines, in others there are no clear distinctions with population groups and individuals holding different sympathies and allegiances while living in close proximity to each other.

Some combatant elements are well known – Iraqi Army, Peshmerga , ISIS, but they operate within a much more complex environment, especially across the border in Syria, of state, non-state, military, paramilitary, security forces, international military supporters, and a number of religious and ethnic political or military groups. The exceptional complexity of the political and strategic environment is well known (if not always well understood). What is significant from the perspective of this study is that mine action actors are presented with an environment in which the operating envelope presents challenges along both the technical and contextual axes.¹¹ Operations take place in areas within the KRG zone and with the main part of Iraq, but also in the ‘grey areas’ – areas that formally fall under the control of one authority (in Baghdad or Erbil), but that are currently under the control of the other authority.

EXPLOSIVE HAZARDS AND CONTAMINATION

IEDs are not the only hazard associated with areas of current and previous conflict. A wide variety of more traditional weapon types are in use from air-dropped bombs, through artillery to small arms, adding to the legacy of UXO and AXO within the region. Liberation of areas from ISIS control results in finds of unexploded IEDs (such as demolition charges that failed to function) as well as abandoned IEDs, whether in place or in storage areas and local factories.

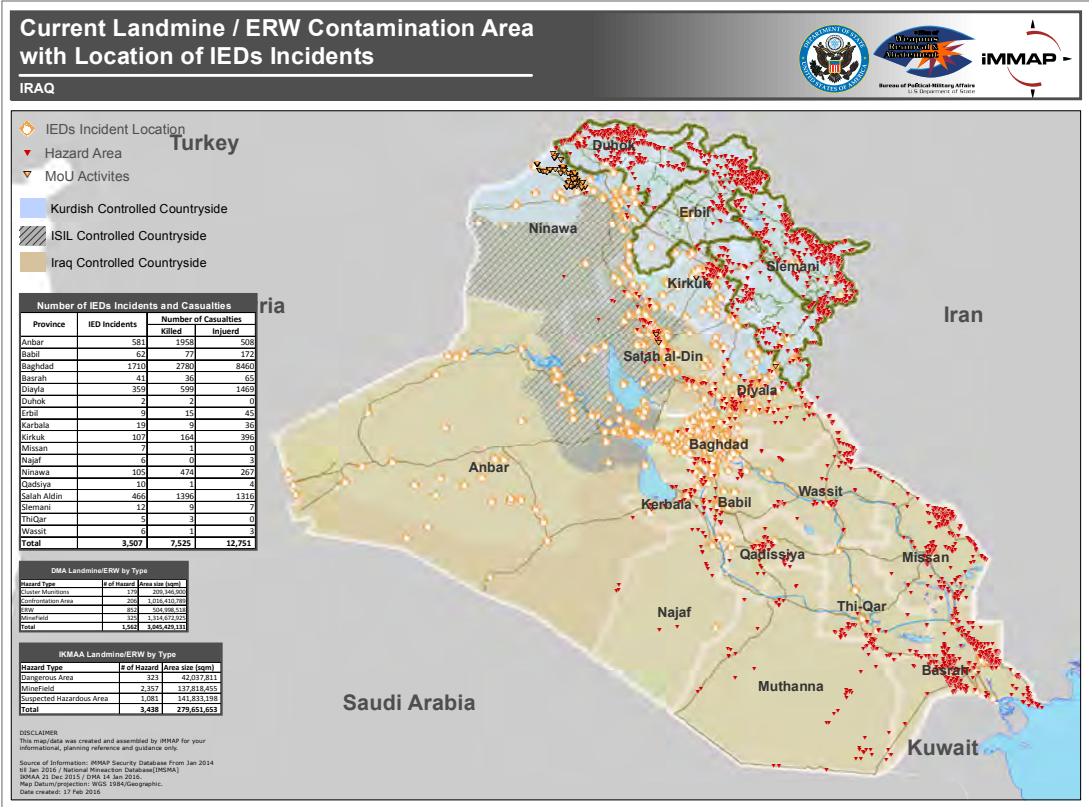


Figure 2. Landmine/ERW hazards and IED incident locations, January 2014 – January 2016 (image credit: IMMAP).

¹¹ This study makes no attempt to describe or analyse the political/military situation in northern Iraq. There are many other sources that do so. The day-to-day situation at specific locations is important to individual MAMA actors, as they go about their work, but it is not central to the themes and conclusions of this study.

Figure 2 highlights the extensive landmine and ERW legacy problem that still affects many parts of the country. One of the concerns expressed by MA actors is that the current focus on IEDs, while important in humanitarian terms, risks reducing donor and authority awareness of the substantial landmine and UXO problems that will remain, irrespective of what is done about IEDs. While most IEDs are likely to degrade and become non-functional over the space of several years, many landmines will continue to function as designed for several decades and more.

IEDD-INVOLVED ORGANISATIONS

Three main categories of organisation engage with IEDs in northern Iraq:

- Military and security forces;
- Commercial contractors; and
- Humanitarian mine action organisations (non-governmental and governmental).

Military and Security Forces

Peshmerga	Conduct IEDD and Counter-IED (C-IED) in support of Kurdish military action against ISIS. Deal with all types and categories of IED as necessary to provide pathways/ corridors for attacking military units. Conduct some post-combat IEDD; mostly at high value infrastructure locations.
Iraqi Army	Conduct IEDD and C-IED in support of Iraqi military action against ISIS. Deal with all types and categories of IED as necessary to provide pathways/ corridors for attacking military units.
Coalition Military Forces	Provide C-IED and IEDD training and support to the Peshmerga and Iraqi Army.

Commercial Contractors

Janus Global Operations	Contracted by PM/WRA to provide IEDD services in Ramadi. Tasked by UNDP.
Optima	Contracted by UNMAS (through UNOPS) to provide IEDD services in Fallujah.

MA organisations

DMA	National authority for mine action in Iraq.
IKMAA	National authority for mine action in KRG area. Coordination with Peshmerga. Coordination of MA IEDD operations. MA and IEDD operations using own teams.
MAG	IEDD (predominantly improvised landmines). Rubble processing with mechanical assets. Risk education (including IED aspects).
FSD	IEDD (predominantly improvised landmines).
HI	Victim assistance and (potentially) IEDD operations.
NPA	Preparing for engagement with IEDs in KRG area.
DDG	Risk education (including IED aspects) and (potentially) IEDD operations.

Further details on the various actors and their operations are provided in Annexes B and C.

COORDINATION AND TASKING OF IEDD RESPONSES

Coordination

A number of mechanisms are relevant to coordination between IEDD organisations including:

- Sub-cluster hosted by UNMAS (which may include IKMAA and/or the DMA, from time to time);
- PM/WRA implementers' meeting hosted by iMMAP (IKMAA and DMA attend);
- Ad hoc NGO meetings (with five implementing partners (IPs) and iMMAP);
- Other bilateral relations with authorities; and
- Protection cluster (feeding in through the sub-cluster), usually led by UNHCR and an NGO co-leader (International Rescue Committee (IRC)).

Coordination mechanisms were originally set up to deal with a refugee problem in the north of Iraq, but then developed from a 'sector' system to a 'cluster' system, as the internally displaced persons (IDP) dimension became more significant. Coordination between mine action actors working in the grey areas remains somewhat ad hoc, reflecting the fast moving and substantial scale of the humanitarian situation.

The Mosul area is expected to present significant coordination complications. Some parts will be taken by the Iraqi Army, some by militias. Areas will fall under Department for Mine Action (Iraq) (DMA) control, but it is likely that organisations conducting planning and some operational activity will not have been accredited by the DMA. The MoU for operations in the grey area addresses the issue of coordination between the DMA and IKMAA, but it does not cover acceptance of accreditation of an operating organisation by one body for work in areas under the other's control.

Coordination functions, including accreditation and tasking, are not standardised across affected areas and remain dependent on individual personalities, rather than common criteria and processes. The Peshmerga have made it clear that they can only operate as necessary to support attacks to liberate areas from ISIS. They recognise the need for follow-up work, but in the absence of spare resources of their own, have requested that NGOs address IEDs in areas behind front lines. The Peshmerga has started coordinating with IKMAA and continues to request additional international support to help them deal directly with IEDs. All parties recognise that the biggest gap is in being able to deal with houses suspected of containing IEDs.¹²

Planning and tasking

The designated tasking authority for the KRG region (including grey areas under Peshmerga control), is IKMAA. Mine action NGOs obtain accreditation from IKMAA to work in the region and generally maintain close contact with the authority through meetings, visits to work sites by IKMAA quality assurance (QA) teams, and routine administrative interaction. For operations coming under Baghdad control, the DMA is the designated authority, although in practice current tasking to non-military agencies dealing with IEDs often comes from UN Development Programme (UNDP).

Some organisations are accredited in one part of the country, but not in the other. Danish Demining Group (DDG) has been accredited to conduct clearance operations in Iraq for a decade, and is now accredited for risk education (RE) in 2015 and for EOD as of August 2016 in the KRG area. MAG and FSD are accredited under IKMAA, but not for grey areas under the control of the DMA.¹³

MAG was approached by UNDP to conduct an assessment of contamination levels in areas that had been held by the Peshmerga for several months, and in which people were returning to their homes. MAG carried out a rapid assessment and identified 164 locations in the crescent of land north of Sinjar Mountain. 142 were accessible through non-ISIS held areas. 105 of those were contaminated and/or contained collapsed buildings, many of which appeared to have been demolished by explosive means.¹⁴ iMMAP provides satellite imagery, MAG teams mark what they are finding and report back to iMMAP, who update the database of contamination, and then disseminate the results to technical teams and prioritisers/taskers.

Handicap International (HI) is working with IKMAA and the Peshmerga in grey areas, but has been waiting for several months for a task order to conduct non-technical survey (NTS) work 50 km further south (and falling outside IKMAA controlled areas), where it is assessed that there is a significant humanitarian need.

¹² Although the scale of this gap is still uncertain.

¹³ This issue is not IEDD- specific, but is of current importance because of the prevalence of improvised landmines in liberated areas.

¹⁴ MAG Ninewah Rapid Contamination Assessment, September 2015.

FSD 's first task in March 2016 resulted from a request from the Peshmerga to IKMAA for assistance in a region that had been liberated in September 2015. Land that farmers wanted to use for feeding sheep was contaminated and so no one had returned. IKMAA did not demand that FSD take up the task, but suggested that they take a look, see if it was worthwhile and, if so, proceed with it. Such an approach is common while there is so much uncertainty about what IED tasks are appropriate and achievable for MA actors. The sector where that first task was located was relatively quiet, but other more recent tasks have been in areas that offer greater potential security challenges, with ISIS two to four kilometres away and within line of sight of the task area. Ambushes against Peshmerga forces have influenced FSD decisions about which direction to approach task sites from.

IKMAA remains uncertain about the value of tasking mine action assets for house clearance (even if such capabilities are available). IKMAA staff have visited areas where houses, partially destroyed by air bombing or the effects of demolition charges and IEDs, are being checked. IKMAA is prepared to support the work, but has concerns about the risk of destroying houses while working on them. IKMAA policy is that dealing with an intact building should only be carried out at the owner's request, once the owner and national authority decide it is appropriate to proceed. If a suspect device is discovered by building processing teams (working through rubble), then a separate specialist team is called in to assess the situation and take any further action.¹⁵

In principle, tasking of mine action actors for tasks involving IEDs (predominantly used as landmines) should be no different from any other form of mine action tasking, but the lack of comprehensive information, combined with rapid and significant changes in the humanitarian and security situation bring considerable uncertainty to the tasking process. Uncertainty about the limits of capability of different MA actors within the operating envelope compounds the problem.

SUMMARY OF POLITICAL AND STRATEGIC ASPECTS AND MITIGATION OPTIONS

Aspect	Notes	Mitigation
Donor confidence	<p>Donors could lose confidence in MA IEDD if:</p> <ul style="list-style-type: none"> It is not clear to what extent IEDD is appropriate within MA There is uncertainty about the competence of MA actors to engage in IEDD against appropriate targets, under appropriate circumstances There are repeated accidents to staff engaged in IEDD Results do not appear to justify expenditure Activities appear to breach normal expectations of neutrality/independence 	<ul style="list-style-type: none"> Adjustment of IMAS (and NMAS) to ensure coverage of MA-appropriate IED-related activities Implementing partner (IP) application of QM as per IMAS 07.12, 07.30 & 07.40, including appropriate action to ensure the deployment of competent people with suitable equipment Application of RBM principles and practice Application of normal MA tasking/prioritisation processes Effective communication between IPs and donors Management of expectations between parties Improved accident investigation and response procedures
National authority confidence	<p>National authorities may lose confidence in MA IEDD if:</p> <ul style="list-style-type: none"> It is not clear that some aspects of IEDD justifiably and appropriately come under the umbrella of MA There is uncertainty about the competence of MA actors to engage in IEDD against appropriate targets, under appropriate circumstances 	<ul style="list-style-type: none"> Adjustment of IMAS to clarify applicability to MA IED-related activity Updates to NMAS to cover MA-appropriate aspects of IEDD Application of external QM as per IMAS 07.12, 07.30 and 07.40 Effective communication between IPs and authorities

¹⁵ Discussion with IKMAA senior staff, Erbil, 30th August 2016.

Aspect	Notes	Mitigation
MA collective and individual neutrality	<p>All MA actors are likely to wish to maintain a 'neutral' posture under most circumstances. On some occasions individual actors (NGO or commercial) may be prepared to adopt a posture more closely associated with one political/conflict party than another. Inadvertent loss of neutrality (real or perceived) may result in:</p> <ul style="list-style-type: none"> • MA workers becoming targets • MA actor organisations becoming targets • MA, collectively, becoming a target • Breach of stakeholder rules, regulations or expectations 	<ul style="list-style-type: none"> • Development and implementation of clear policies relating to activity in areas subject to, or close to, conflict • Application of structured risk management processes and systems • Use SOPs to reinforce compliance with neutrality/independence policies • Effective IMS including up-to-date, comprehensive non-technical information • Liaison with UN and other supra-national agencies about conflict situation • Effective communication with key stakeholders
Other mine and ERW legacy issues	<p>The current relatively high profile of IED and IEDD issues may reduce awareness of the continuing significance and impact of other ERW legacy issues.</p>	<ul style="list-style-type: none"> • Include legacy data in reporting to donors and authorities • Establish indicators within the IMS that relate to legacy issues • Maintain profile of legacy issues at Meetings of States Party (MSP)
Tasking	<p>Poor tasking may result in waste of time, money and resources, leading to a loss of donor, authority and other stakeholder confidence.</p>	<ul style="list-style-type: none"> • Apply strategic and risk management principles and practice to support understanding of the context, stakeholder needs and the intended results of tasks • Apply effective RBM principles and practice • Maintain an effective IMS including comprehensive, up-to-date non-technical data/information • Apply traditional MA approaches to prioritizing and tasking operational activity

AFFECTED COMMUNITY NEEDS AND EXPECTATIONS

IMPACTS, NEEDS AND EXPECTATIONS

Direct impacts

The impacts of IEDs present similarities and differences compared to those associated with landmines and UXO. The similarities arise from their use to deny access to areas or locations, to kill and maim, and to spread fear and uncertainty within populations. The differences arise primarily from the places where they may be found.

Landmines are usually associated with rural areas, or open patches of ground in amongst buildings. Unexploded ordnance may be widely spread, including in urban areas which have come under attack (such as Aleppo in Syria and many European cities that came under aerial bombardment during WWII). IEDs have a wider spread of influence. They are used in open country in much the same way as landmines, but they are also found inside and in amongst buildings, including private houses. They may be concealed inside the structure of a building, or inside household appliances, books, smaller possessions and vehicles. As such, IEDs have the potential to impact anyone in a family or society, even in their own homes.

Inevitably, as people try to return to liberated areas, they risk encountering IEDs. In areas where there are no security forces to prevent them entering villages and houses then 'lots of casualties' occur.¹⁶ Reports from Fallujah and Ramadi suggest that some people are trying to deal with the problem themselves, by trying to recruit unemployed deminers and entirely inexperienced individuals who are prepared to "have a go".¹⁷

Indirect impacts

Discussions with officials from the KRG Ministry of the Interior (MoI) highlighted the extent to which the indirect impacts of IEDs are severe and felt throughout society and government. The suspected presence of IEDs within liberated areas is the cause of widespread fear amongst IDPs and a major reason for their reluctance to leave IDP camps.

The camps themselves are costly to run and represent a significant drain on limited government financial resources. At the same time, while people remain in the camps they are not able to engage in economic activity, supporting themselves and their families, and generating tax revenue to help support government functions. The resumption of agricultural activity (in regions that offer exceptionally fertile conditions capable of generating high yields of arable produce) is delayed, increasing the need for external food support, and further reducing the scale of economic activity in the region.

The camps are uncomfortable, offering little protection from the extremely high summer temperatures (above 50°C on occasions) and the freezing conditions of winter. The longer people remain in camps the less confidence they have in any normalization of their lives in the future, and the more susceptible they are to radicalization – potentially sowing the seeds of further conflict in the future.

The indirect impacts of IEDs consist of a series of interlocking, and in many cases mutually reinforcing, vicious circles, adversely affecting social and economic aspects of communities and authorities, and by extension increasing the burden of need presented to international donors and institutions. As is so often the case with negative feedback loops of this type, well targeted action to address problems can have an equally powerful positive effect.

Widespread and horrific humanitarian situations increase demands that 'something must be done'. Experience from MA, and other emergency responses, suggests that 'the right things must be done', rather than just 'something'. Understanding the nature of the impacts and influences of IEDs (and of the nature and condition of IEDs themselves) is important to ensure that action carried out by MA actors is appropriate, effective and as efficient as it can be. Poor allocation of resources to tasks will not only reduce the extent to which elements of society can be freed from the effects of IEDs, but risks reducing donor confidence and potentially making future funding less likely.

¹⁶ Discussions with Coalition Military Forces, Erbil 30th August 2016.

¹⁷ Discussions with NPA, Erbil, 1st September 2016.

Needs and expectations

A basic principle of quality management is the concept of satisfying 'customer' needs, combined with a recognition that only if those needs are clearly understood and defined can quality be achieved. Satisfying expectations is often a very different thing – even when defined requirements have been achieved, 'customers' may still be dissatisfied.

The expectations of displaced people, as well as those who have remained in areas under ISIS occupation, are influenced by many different factors relating to the security situation, economic conditions, family circumstances and their confidence (or uncertainty) that the situation is unlikely to get worse again. When displaced people do decide they want to return home then their expectations are high – they want to be able to return to their homes confident in their safety and the safety of their families, and they would like to do so as soon as possible.

The scale of the IED problem, and the scale of the perception of the problem, are not yet well defined in northern Iraq. Large areas in the vicinity of previously occupied villages are contaminated with improvised landmines and a range of associated command wire/radio controlled IEDs. Villages themselves contain booby traps in some buildings as well as undetonated demolition charges and other forms of UXO resulting from bombardment before and during liberation.

At the very least it is clear that there is a widespread fear amongst displaced people. The number of potentially contaminated buildings is huge, and the number of people affected by fear of IEDs is also huge. The scale of the humanitarian IED response is small in comparison. It is inevitable that some form of prioritization will be implemented (either centrally or on an organisation-by-organisation basis). The needs and expectations of some people may be satisfied; the expectations of very many others will not.

Even where some humanitarian work is carried out it may only address part of the problem. Mine action NGOs are clear that they are limiting their operations to ILMs in open ground, with a very limited amount of rubble processing using mechanical systems. They may be able to clear land surrounding villages, as well as some open areas between buildings, but they have no expectation of being able to clear houses potentially containing booby traps. Peshmerga forces may, one day, be able to allocate some specialist resources to house clearance work, but they are unlikely to do so while there remains an operational demand for their employment in support of continuing action against ISIS. There is a risk that, when hostilities cease or significantly reduce, government budget constraints may result in demobilization of military assets rather than their redeployment to humanitarian tasks. One NGO made the point that "there is a coalition to defeat ISIS, not one to rebuild afterwards".

It is likely that there will be dissatisfaction amongst intended beneficiaries at the pace and scope of IED search and clearance operations. Some will decide they cannot wait. There will be accidents amongst returnees (as there already have been). MA authorities and operators will come under great pressure to respond, and may find themselves on the receiving end of considerable hostility from some communities.

Similar circumstances have arisen in many mine action programmes in the past, and proved to be equally hard to solve. Experience suggests that community liaison (CL) functions are especially important under these circumstances. Both MAG and DDG are currently engaged in active risk education programmes in Ninewah and Kirkuk provinces as part of the overall CL framework.¹⁸ It is important that such programmes facilitate the flow of information to, as well as from, affected communities to help manage expectations, as well as risk, and to encourage local support for humanitarian efforts as much as possible.

GENDER ASPECTS

While some actors are collecting sex and age disaggregated data (SADD) there is still little meaningful analysis relating to the impact of IEDs, especially in relation to IDPs and returnees.

Landmines generally have the potential for direct physical impact on people who access land for work, travel or recreation. They do not normally extend their potential to cause death or injury to houses, schools and other buildings. Landmines and explosive remnants of war typically kill or injure more adults than children and more males than females.¹⁹ The nature of IED contamination may result in a different spread of casualties across sexes and ages, as family members encounter devices in houses and local neighbourhoods, as they return from IDP camps. A key aspect of IED use in populated areas is that it means that they undoubtedly have a direct impact on women, girls and boys, as well as men.

¹⁸ As of 16th August 2016 a total of 389 RE interventions to 20,339 beneficiaries were recorded at locations in the 'grey area'. Data from iMMAP presentation August 2016.

¹⁹ *Landmine Monitor 2015: Casualties and Victim Assistance* – Mine/ERW casualties in 2014 Adults 61%, Children 39%: Male 88%, female 12%.

NGOs are working in villages that remain deserted as well as those where some members of the previous population have returned.²⁰ Displaced people are well aware of the risks associated with returning to their villages. Some limited data suggests that men return first to check the situation and secure property before other members of families join them.²¹ At the same time NGO staff members report seeing more women than expected in some liberated villages.²² Informal data suggests that the great majority (probably over 90%) of IED casualties are male.

The limited SADD available (as at the time of writing this report) means that it is hard to gain a clear idea of the differences in direct impact associated with IEDs compared to landmines and general UXO. Risk is likely to be highest on first returning to areas where IEDs have either not been cleared at all, or where only limited clearance by military units has been carried out. The anticipated liberation of Mosul, with its population of over 1.5 million people, following an extended period of ISIS control, is likely to expose more people to the risk of IEDs than on any previous occasion.

ETHNIC AND RELIGIOUS DIVERSITY

In addition to gender dimensions that may be different from those associated with traditional MA programmes, the nature of the conflict in Iraq, Syria and the KRG area, means that ethnic and religious aspects of affected societies are an inescapable factor to consider. Anecdotal information suggests that ISIS tends to target property belonging to some ethnic groups (such as the Kurds and Yazidis) with a lower likelihood that property belonging to ethnic/religious groups more closely associated with ISIS would be booby trapped.

A number of sources describe villages associated with one predominant ethnic or religious group entirely flattened except for the mosque. It is not possible to reach a clear position on this topic, in the absence of supporting evidence, but the fact that such aspects may be significant raises points for consideration under the overall heading of non-technical survey (NTS), and the value that reliable data may have during later general risk assessment and prioritisation processes.

SUMMARY OF AFFECTED COMMUNITY ASPECTS AND MITIGATION OPTIONS

Aspect	Notes	Mitigation
Understanding affected community impacts & needs	<p>Understanding affected community impacts (arising from IEDs), needs and expectations is necessary to support effective RBM, QM, prioritization and tasking functions. Poor understanding may result in:</p> <ul style="list-style-type: none"> • Reduced community confidence • Reduced community cooperation • Inefficient prioritisation and tasking • Waste of time, money and resources • Reduced stakeholder confidence (including donors and authorities) 	<ul style="list-style-type: none"> • Application of strategic and risk management principles and practice to support understanding of the context, affected community impacts and needs • Application of effective RBM principles and practice • Collection of SADD • Appropriate focus on ethnic and religious aspects of the non-technical environment • Effective NTS, CL and RE to collect information relevant to understanding community aspects • Effective IM including indicators relating to stakeholder impact

²⁰ FSD in the grey areas around Daquq in Kirkuk Province is working almost entirely in currently deserted villages; MAG working around Sinjar in Ninewah Province is in areas where significant numbers of returnees are present.

²¹ MAG Ninewah Rapid Contamination Assessment September 2015 – 3.3.1 questionnaire participants by gender.

²² Meeting with Nina Seecharan, MAG Country Director at MAG offices Erbil, 1st September 2016.

Affected community confidence	<p>The presence (real or feared) of IEDs in liberated areas is a major barrier to the return of IDPs. Expectations amongst returnees are likely to be high. MA (and other resources) responding to IED contamination will not be able to satisfy all those expectations. Consequences may include:</p> <ul style="list-style-type: none"> • Reduced community cooperation • Reduced NTS effectiveness • Outright hostility towards MA actors 	<ul style="list-style-type: none"> • Effective communication (including through CL and RE) to manage stakeholder expectations • Implementation of effective NTS (as per IMAS 08.10) • Application of normal land release (LR) processes to cancel/reduce land wherever possible • Liaison with government, military, police and security actors
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TECHNICAL AND OPERATIONAL ASPECTS

CONSTRUCTION AND USE OF IEDs IN NORTHERN IRAQ

IEDs in areas addressed by Peshmerga units are overwhelmingly constructed and used by ISIS. In other parts of Iraq the current IED issue is predominantly an ISIS-created one, but IEDs have been used by other groups in the past. Some non-ISIS devices may remain in areas that have not previously been searched.

Construction

Local manufacture of IEDs of certain types (especially for use as landmines) is managed on a considerable scale across all regions under ISIS control. Peshmerga forces have found a number of factories capable of producing IEDs to a standard design in large numbers. People escaping from Mosul reported that there were so few jobs and many people were so poor under ISIS that they would work ‘making munitions’ for 15,000 Dinars a day (approx. US\$15) even if they didn’t support ISIS.²³ The nature of the manufacturing process is such that there is variation in build quality and consistency, but such cottage industries highlight the blurring of boundaries associated with use of the word ‘improvised’.

FSD report that most of the ILMs they encounter are similar, working to a common design, but with some variations suggesting that they are not all made in one place, but at a number of satellite manufacturing locations. Out of around 800 IEDs dealt with to date, only a handful have had switches that are not pressure plates or crush necklaces. Not one of the IEDs encountered would be regarded as hi-tech; no radio controlled IEDs (RCIEDs) for instance. On three or four occasions an abandoned command wire has been found, but they have been “relatively straightforward to deal with.”²⁴

The majority of devices found in northern Iraq use Chinese 9V batteries as the power source with detonators (mostly appearing to be from Indian manufacturers, although with some locally improvised) connected to detonating cord (also often of Indian manufacture), leading to a main charge made from home-made explosive (HME).

Janus Global Operations (JGO) report that around 95% of the devices they deal with are ILM, with a pressure plate switch and a 5-gallon container of HME. Some devices are obscured/concealed by being glued on grass. Many devices use the same blue tape to secure components to each other, and exhibit similar levels of rusting and deterioration (suggesting that they were all made around the same time). Any differences imply that the devices are from a different source. All such devices are ‘factory manufactured’. Very few devices contain any military ordnance.²⁵



Figure 3. ‘Crush necklace’ switch element (image credit: FSD).



Figure 4. 9V battery used to power improvised landmine pressure plate switch (image credit: FSD).

²³ Reported in *The Times* of London, 5th November 2016.

²⁴ Meeting with FSD technical staff, Erbil, 29th August 2016.

²⁵ Meeting with JGO technical staff, Erbil, 30th August 2016.

ISIS have developed the way they use IEDs in the region. 'At first they were visible and simple; it was possible to see them and how they were made'. Over time devices became more sophisticated and harder to see and assess. Today the Peshmerga see devices including:

- Mobile phones and other mechanisms for control from a distance;
- Timer switches started by movement in the vicinity of the device;
- Sound triggers within houses; and
- Circuit boards suggesting increasingly hi-tech designs (and possibly including measures to counter ECM).

The most advanced IEDs have been found in Mahmoud and Ghawar (south of Erbil). Whoever is making these devices "knows what they are doing, has experience, and an academic background".²⁶ Some recently found IEDs contain chemical products, have four different switch/trigger mechanisms and are easily put together. Analysis suggests they contain sulphuric acid and chlorine/mustard agents.

Use of IEDs

While specific tactics and methods vary, reflecting the flexible and irregular use of IEDs, some scenarios are more commonly encountered than others. Figure 5 illustrates the sort of mix of devices associated with a number of villages liberated from ISIS control and now within the grey area, under Peshmerga control.²⁷

A defensive berm (a low ridge of sand/earth) and ditch is constructed by ISIS forces between the village and the expected direction of Peshmerga attack. A large number of ILMs are placed in rows, typically two or three, either side of the defensive ditch, extending for many hundreds of metres in either direction and with the mines in a zig-zag pattern (Figure 6). Some ILMs are linked to other nearby devices to ensure simultaneous detonation.

Command wire IEDs (CWIEDs) are used on roads approaching the village from the Peshmerga threat direction, as well as at selected points along the defensive berm. CWIEDs are controlled from a command point within the village. RCIEDs may also be used on some occasions. Booby traps are placed in structures and houses to disrupt and delay attacking operations and to discourage population return. Some buildings may have been rigged for destruction with demolition charges that have failed to function or have been abandoned.

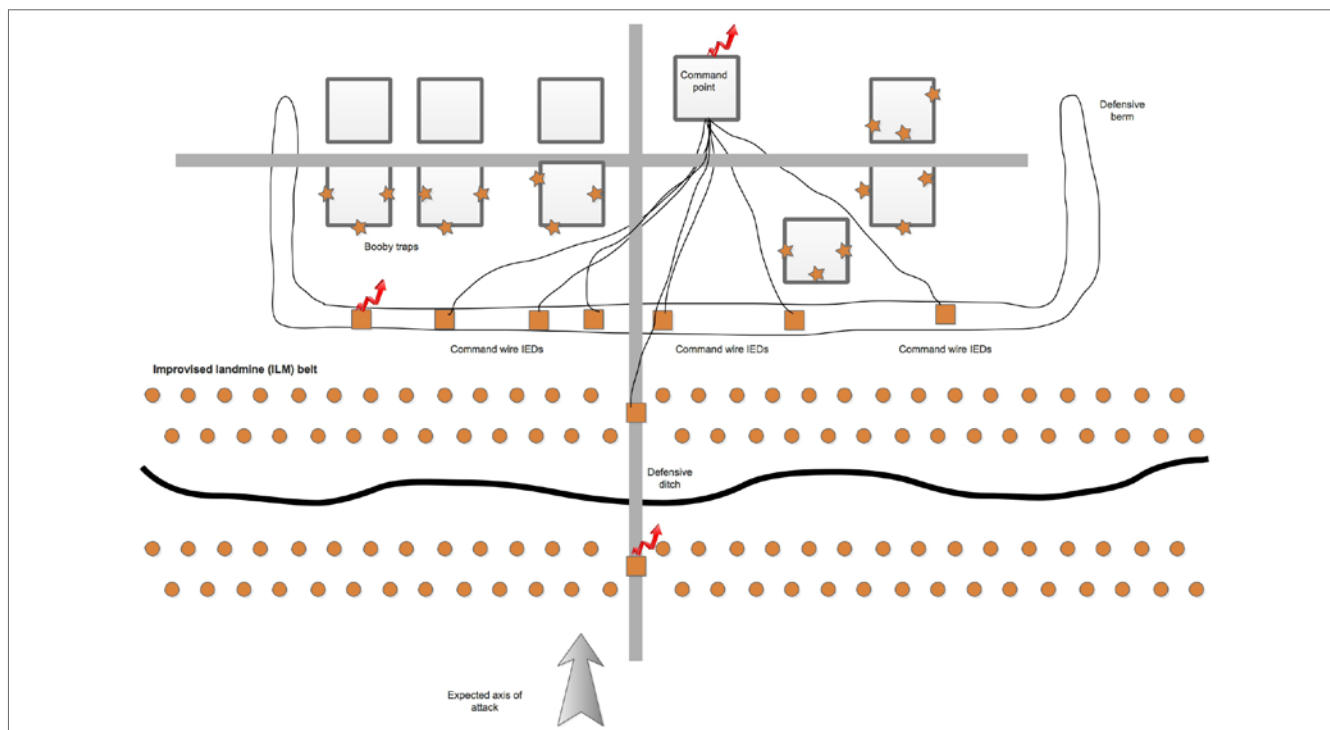


Figure 5. Illustrative situation in liberated village in the 'grey areas' - information provided by Coalition Forces C-IED training team, Erbil, August 2016 (image credit: GICHD).

²⁶ Statements from Peshmerga Senior Engineer Officer.

²⁷ Similar circumstances may be associated with some sites in areas under Iraqi Army control. The information used in this case was specific to the experience of Peshmerga units and coalition forces training elements.

At Tel-al-Arab three lines of ILM were present: the first close beside the defensive berm; the second 75 m out towards the expected direction of attack; the last 100 m out. A similar methodology is associated with every area that has been under ISIS control. It is cheap to manufacture ILMs in large numbers and "they are now regarded as the preferred defensive weapon for insurgents".²⁸

Peshmerga sources report that, "in the early days," it was normal to encounter one or two devices at a location; now it is normal to find fields of devices. At a task in Koalabuah area, a Peshmerga team was sent to destroy 'an IED', but as they investigated the surrounding situation they found, and ended up destroying, 31 devices. Some of the devices are self-contained (that is the switch, power source, initiator and main charge are all in one container). It is common to observe sympathetic detonation when one device is destroyed, even when they are not directly linked in any way.²⁹

Variations to the general situation reflect changing Peshmerga tactics and the experience of ISIS commanders and IED designers. An important factor dictating the situation found by IEDD operators (initially Peshmerga, but subsequently commercial and NGO teams) is the history of the site. Both how long ISIS occupied the site, and when they did so, influence the nature and extent of IED contamination. ISIS continues to place devices in houses and vehicles as well as using suicide bombers. The longer the time in place, the more opportunity for ISIS engineers to place IEDs in large numbers, to booby trap more structures and to conceal IEDs more thoroughly. The design of specific IEDs indicates when occupation took place - the more recent the occupation the more likely that the latest designs will be in place.

Even within a given time window of occupation there are variations in design and use of IEDs, reflecting the lack of overarching ISIS doctrines and policies on the construction and use of IEDs. It is clear that there is a degree of communication and cross-fertilisation of ideas between regions, centres and individual IED engineers, but there is also considerable variation, reflecting the preferences, skills and access to materials of different IED designers and users. In general, "everything DAESH do they do to overkill".³⁰

A number of operating organisations commented that ISIS had the opportunity to observe the Iraqi Army at work in Fallujah, and have had plenty of time to prepare in Mosul to make life very difficult for liberating forces, and those who follow on afterwards.



Figure 6. Marker flags showing the location of improvised landmines in multiple rows in northern Iraq (image credit: FSD).

²⁸ Meeting with JGO technical staff, Erbil, 30th August 2016.

²⁹ Discussion with Peshmerga senior Engineer Officer and Coalition Military Forces, Erbil, 30th August 2016.

³⁰ FSD comment during meeting with study team, Erbil, 29th August 2016.

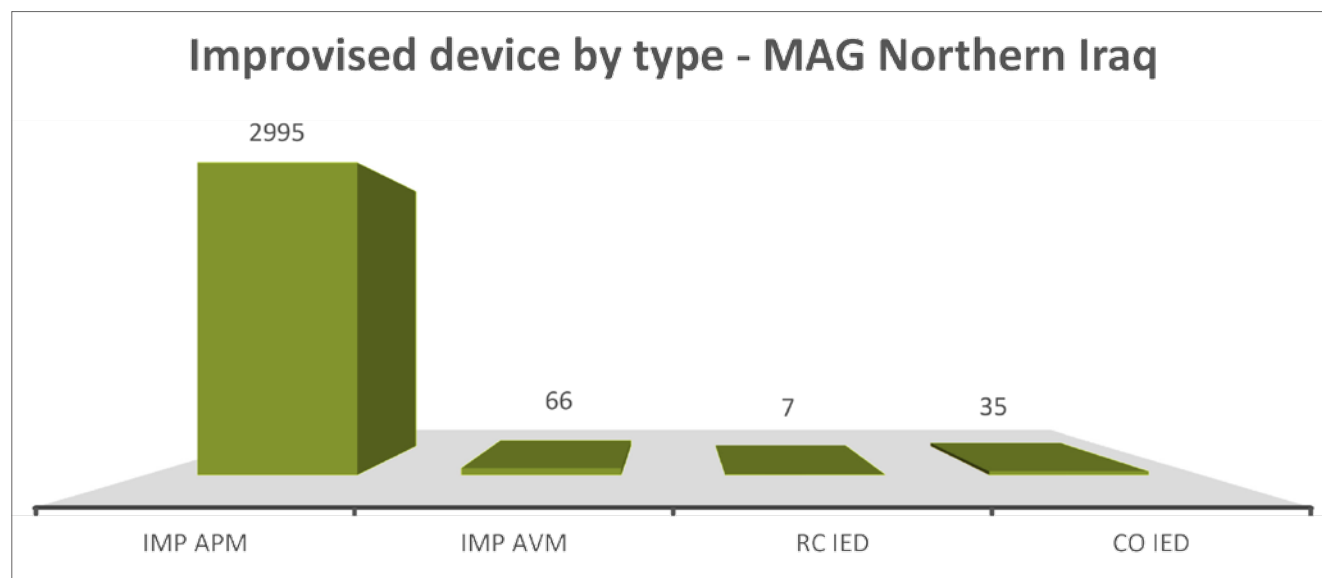


Figure 7. Improvised devices by type, as cleared by MAG in northern Iraq to October 2016 (image credit: GICHD).

Amongst the mine action actors interviewed for this study, there is a clear view that almost all devices they deal with are improvised landmines. MAG reports that over 96% of devices cleared to date in northern Iraq have been improvised anti-personnel landmines, and over 99% of improvised devices in north-eastern Syria.³¹ Other MA actors report similar ratios.³²

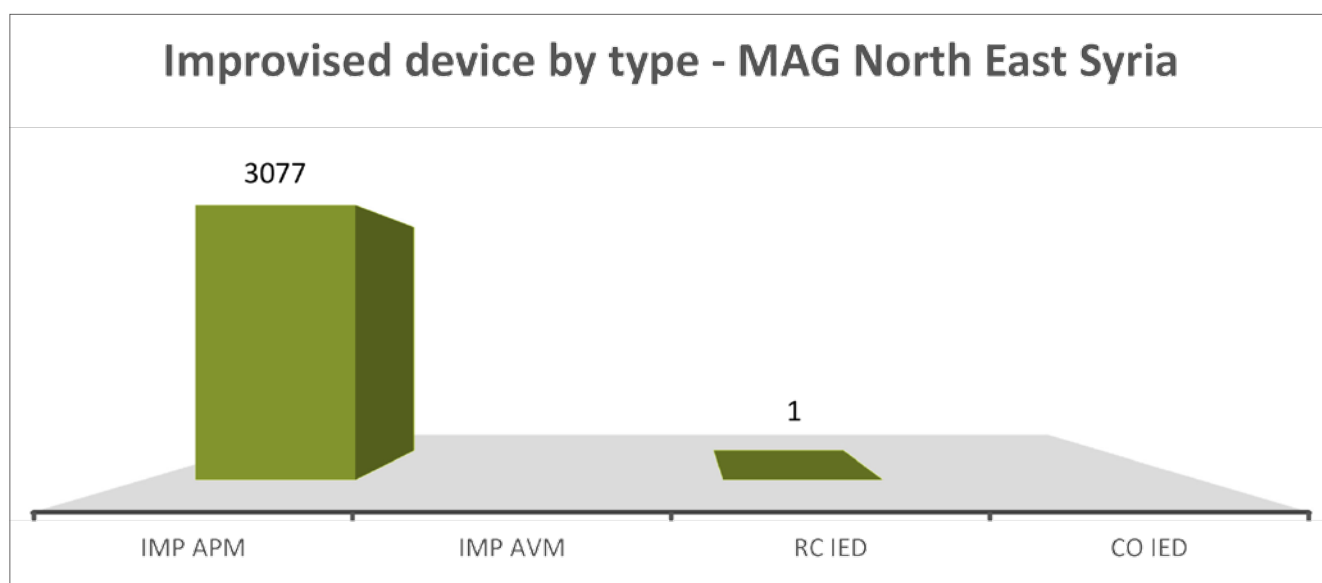


Figure 8. Improvised devices by type, as cleared by MAG in north eastern Syria to October 2016 (image credit: GICHD).

Most MA operations have taken place in open land outside villages. There is a general expectation that villages and towns will contain different types of IED, with a greater proportion of command operated and radio controlled devices. It is clear that such devices are present, but MAG reports that they have now been involved in survey and clearance around 'hundreds of liberated villages' and find that the number of non-landmine type devices remains low, with only around 3% of IEDs constituting booby traps.³³

³¹ Data from MAG presentation to IMAS Review Board sub-group meeting, UN New York, 18th October 2016.

³² For instance, Janus reports around 95% of improvised devices they have dealt with in Ramadi are improvised land mines.

³³ Meeting with MAG senior managers, New York, 19th October 2016.

HUMAN RESOURCES

Availability of IEDD operators

The availability of competent people in sufficient numbers to engage in humanitarian IEDD operations is a cause of widespread concern. Highly qualified and experienced people come from a military background, but they are not available in large numbers, those who are available may not wish to work in the circumstances of northern Iraq (or other similar places around the world), expectations of terms and conditions amongst those prepared to deploy are high, and the scale of the need is in any case likely to dwarf the scale of the response available from such sources.

It is clear that a competence solution that is based wholly on the availability of ex-military IEDD trained personnel is bound to fail – there just are not enough individuals to satisfy the need. But in much the same way that not every EOD operator needs to be able to cope with the most complex of UXO items, so not everyone employed in searching for, and disposing of, IEDs needs to be qualified to the highest standards. The question ‘if we don’t address IEDs who will?’ was raised several times during the study visit.³⁴ The key follow-on question is ‘what level of aptitude, skills and knowledge is required for what activities?’

As with other aspects of the IED issue, discussion of competence requirements is hampered by imprecise and limited vocabulary, combined with different understandings of terminology between organisations and even between individual commentators.

Personnel competence

Establishing and maintaining ‘competence’ is a quality management (QM) function. QM is about the satisfaction of requirements and maintaining competence is no different. Competence requirements should be dictated by the nature of the task that operators are required to address. In QM terms competence is often described in terms of aptitude, skills and knowledge. All three aspects are relevant to IEDD. The complexity axis of the operating envelope model indicates that some devices are less challenging to address than others, and by implication, require a narrower range of competence than others.

IED Group	Types potentially suitable for EOD 3+	Types requiring IEDD
Command operated	Command Wire (CWIED) ³⁵ Command pull	Radio controlled (RCIED)
Victim operated (VOIED)	Pressure plate (PPIED) Trip wire (TWIED) Crush necklace	Infrared passive Infrared active Anti-lift Tilt switch Pressure switch Light sensitive Magnetic Household switches

Figure 9. Illustrative competence separation matrix for EOD 3+ and IEDD qualified personnel. Note that EOD 3+ implies successful completion of specific-to-task training over and above that associated with the basic EOD level 3 standard (image credit: GICHD).

As with mine action there are occasions when it is convenient and appropriate to separate the search function from the disposal function – most deminers are trained to call over a supervisor to confirm and identify that a detected object is a mine or other hazardous object. Disposal is carried out after withdrawal of the search capacity. Competence to search for IEDs in open country is different from the competence necessary to search a house, and the competence necessary to search for a device is different from that needed to deal with it (by destroying it or rendering it safe for transport to a separate disposal location).

³⁴ Most forcefully by the Chief of Operations at IKMAA. As an arm of the KRG, IKMAA has no choice, but to respond to the pressing humanitarian need, while being constrained by a chronic shortage of funding, and recognizing that the safety of staff members remains a continuing imperative.

³⁵ With the proviso that the IEDD operator/team has control of both ends of the command wire.

Figure 9 offers an illustrative approach to associating different types of IED with different levels of competence in relation to command and victim operated IEDs. Other considerations that an operating organisation may take into account before determining its own approach include:

- Noting that an IED may have more than one type of switch associated with it;
- A time delay switch may be built into other switch types – for instance a pressure switch may start a time delay to detonation rather than just initiate an immediate detonation, to catch out the unwary operator; and
- Local (time and location) variations may heighten or reduce the complexity and competence requirements associated with different groups of IED and switch types.

Application of an approach along the lines shown in Figure 9 relies upon confidence that the types of IED that will be encountered can be predicted reliably, that changes in the situation will be picked up early, and that appropriate action to adjust competence levels (through new equipment, procedures and/or training as appropriate) will be taken to ensure continued operator safety and clearance quality. Two important implications arise from that assumption:

- Any IEDD response must include access to a higher level of competence able to assess the situation, make sense of new information and determine the level of operator competence required; and
- There must be access to an effective information management system (IMS) capable of flagging up changes in circumstances, identifying trends, monitoring performance and communicating information relevant to risk management at every level.

Even where it is assessed that circumstances are suitable for clearance by EOD 3+ operators, it is essential that organisations have the procedural systems and knowledge to:

- Understand where operations sit in the operating envelope;
- Ensure that operators are competent to conduct operations within clearly defined operating envelope limits;
- Stop operations, that may fall outside limits, in good time to allow further investigation by appropriately competent personnel, before lives are put at unacceptable risk;
- Interpret new experiences and information in terms of their IED risk and competence implications; and
- Review the overall situation (technical, operational and contextual) on an ongoing basis to ensure that activities remain within agreed operating envelope bounds.

MA actors in northern Iraq are addressing the competence requirement from two perspectives:

- Recruiting ex-military personnel with existing IEDD qualifications; and
- Deploying EOD 3+ personnel on tasks deemed to fall within acceptable limits.

Following a fatal accident earlier in the year, FSD now implements a semi-formal familiarisation training process for new IEDD personnel, followed by an evaluation conducted by senior FSD technical personnel, and a further assessment by IKMAA QA personnel. Only international personnel are authorised by FSD to engage in IEDD. For rural ILM clearance FSD's view is that good deminers are suitable for the task.³⁶

Employing personnel with recent IEDD experience may address many aspects of the competence requirement, but it will not address all of them on its own. There will always be additional knowledge relating to the operating organisation, its procedures and the situation at specific working locations that must be included – not only on first arriving in the theatre of operations, but on an ongoing basis thereafter. Effective training relies upon access to up-to-date, reliable information and the availability of competent trainers. FSD makes the point that in the past, in the MA context, there was an assumption that international staff were automatically accepted as expert on arrival, but that the same attitude (whether or not it was appropriate for MA) is not acceptable in an IED context.³⁷

Handicap International wanted to recruit IEDD staff, but found that they were hard to find and that they couldn't compete with commercial companies for the terms and conditions on offer. HI does not want to reduce the standard of competence if they reduce recruitment requirements, so are now looking at staff with combat engineer, high risk search and EOD level 3 experience, and are having more success. The intention is to build IEDD capacity in the region, using international staff as technical field managers (TFMs) and mentors, with national staff making up the main team strength. The HI approach reflects experience gained in Colombia (where there is significant use of IEDs as landmines) and includes a focus on update training at least several times per year. HI raised the possibility of sharing the most highly competent IEDD personnel between several MA organisations.³⁸

³⁶ Meeting with FSD technical personnel, Erbil, 29th August 2016.

³⁷ Meeting with FSD technical personnel, Erbil, 29th August 2016.

³⁸ Discussions with HI senior country staff, Erbil, 29th August 2016.

Enhancing the capability of existing MA staff is likely to be appropriate under some circumstances within clearly defined limits. It is especially important when doing so to ensure that specific-to-task training effectively fills competence gaps, relevant to the type of work that will be performed, and is delivered by trainers competent to do so.

In any operational situation, and especially so when IEDs are concerned, mission creep and competency drift must be guarded against. Mission creep occurs when an operator who has been trained on certain types of IED starts to deal with types that are slightly different, and then with others slightly different again, before finding themselves working in a part of the operating envelope distant from that for which they were trained. Competence drift occurs when, through repeated application of similar procedures to similar types of IED, complacency creeps in, basic principles are forgotten or overtaken by a gentle drift in procedural approaches, until some apparently slight difference in the situation results in a catastrophic accident.

Like any other aspect of MA, dealing with IEDs requires a system-based approach, recognizing the need for a variety of processes to combine together to ensure that an operator is ready and able to perform the job safely, effectively and efficiently. A competent operator can only perform to the required standard if supported by a competent organisation, including competent supervisors, advisers and trainers, using appropriate, well maintained equipment, and applying procedures that are suited to the task in hand. Underpinning the entire structure is the need for an IMS operating to a very high standard, reliably, continually and with constant analysis of new data about tasks and the performance of the organisation and its staff.

All the same principles apply (and should be implemented) to land release and EOD operations, but MA actors are perhaps less used to the need to define (and regularly review) competence limits and to be prepared to apply additional training on a frequent basis, as is required when dealing with IEDs.

EQUIPMENT

MA operators (NGO and commercial) in Iraq do not use disruptors, partly because of donor reluctance to agree to buy them, but also because, in areas under the control of the Iraqi Army, only the Iraqi Army is allowed to intentionally cause an explosion.³⁹ MA operators preparing to start work in ILM areas have said that they do not anticipate needing new equipment, so long as their work is restricted to that type of IED.

Most operators take the view that, when operating against IEDs containing large main charges (as is the case with most ILMs), there is no advantage gained from wearing personal protective equipment (PPE), but considerable disadvantage when working in very high ambient temperatures. Nevertheless, one donor has demanded that IEDD operators working on one project funded by that donor wear PPE.

Detectors have been identified as a key issue. "Locating and reaching the device is the critical point – usually final disposal is fairly straightforward."⁴⁰ Several operators have identified mechanical equipment as an attractive category of tool to have available; armoured plant units are in use by MAG to support processing of collapsed building rubble. The scale of the need for rubble processing, and the value of deploying armoured plant, is not yet entirely clear.

The subject of electronic counter measures (ECM) was raised on many occasions during the study visit and subsequent meetings. Experienced IEDD operators highlighted the need for ECM at any location where there is a threat of radio controlled (R/C) switches. Some MA operators address the risks of R/C switches through a wider assessment of context taking the view that, even if the R/C switch remains functional, if there is no one at the other end of the R/C link, then the risk is tolerable. What is clear is that suitable ECM equipment may be costly (informal estimates of over US\$ 100,000 per unit were provided by some qualified IEDD personnel, while some providers claim to offer suitable equipment for much lower prices), often subject to export restrictions, and must be adapted to the local situation (correct frequencies, etc.).

Wider counter-terrorist security controls mean that obtaining explosives for EOD demolition purposes has become very difficult, even in the KRG area, where MA organisations are accredited to conduct independent open detonation (OD) operations. In areas under control of the DMA and Iraqi Army, the restriction on initiation of intentional explosions to the Iraqi Army have always placed a constraint on the ease with which MA operators can destroy devices in situ.

Difficulties in obtaining explosives are one factor leading to the use of manual render safe procedures (RSPs) on many improvised landmines; another is the sheer number of devices. There is little doubt that the net effect is to increase the risks faced by operators. Easier access to explosives would give operators more options in dealing with devices, as would access to disruptors and suitable tools for remote conduct of RSPs.

³⁹ Disruptors are tools that use a small explosive charge to propel a slug of water at high velocity to separate the components of an IED. They are designed to reduce the likelihood that the device will detonate while being disrupted.

⁴⁰ Discussions with HI technical and project management staff, Erbil, 29th August 2016.

RISK MANAGEMENT AND OPERATING PROCEDURES

Threat/risk assessments

Risk assessment (RA) takes place through both formal and informal methods. Informally, all organisations maintain a degree of awareness of the types of devices they expect to encounter and of the local security circumstances surrounding operating locations.

In non-Kurdish parts of Iraq, a threat impact assessment (TIA) is carried out for each hazardous area/location in much the same way that a field-based NTS is carried out in any other land release process, but adapted to the specific circumstances and to avoid appearing to apply an NTS approach (which would raise questions about the authority of some agencies under their accreditation agreements).

Operating procedures

Standing Operating Procedures (SOPs) for work against ILMs in open fields represent adaptations of existing SOPs used in other MA clearance operations. FSD clears along lines of ILMs. If there is a space between rows they may or may not clear depending on the separation distance and local circumstances. In general, a 25 m fade out distance is applied from IED/ILM lines. The expectation is that either gaps will be filled in at a later date, or that additional non-technical information (such as evidence that intermediate land is used for agriculture) will allow eventual land release by cancellation or reduction.

FSD is approaching the work very conservatively, to such an extent that local deminers, especially those with many years of mine action experience, become frustrated.⁴¹ Site management is conducted along the same lines as for other MA activities. The number of ILMs encountered, as well as difficulties in obtaining explosives for OD operations, mean that both MAG and FSD are conducting manual RSPs. Concerns about ISIS becoming aware of the details of RSPs and SOPs mean that operators prefer to establish general technical SOPs, leaving the fine detail of how to approach individual devices to the operator's experience and assessment of the situation (an approach that is consistent with normal military/security force practice, but which may mean that quality management systems must adapt to accept that not all operational requirements are fully documented).

QUALITY MANAGEMENT

A number of MA actors expressed uncertainty about 'how to do QM on IEDD'. External quality management functions are carried out by IKMAA and mainly include observation of field activity. FSD receives IKMAA QA inspections at least weekly, and more commonly twice a week. IKMAA reviews site documentation, then observes field operations, checking working practices, safety separation distances, compliance with SOPs and the making safe of devices (observed from a distance using binoculars). Demolitions are generally carried out once a week and are also observed by IKMAA QA officers.⁴² External quality assessment officers continue to approach the work from a mine action perspective, but acknowledge that there is a need to learn about the details of IEDD work as well.⁴³

IKMAA identifies some differences in how handover processes work when dealing with an IED-contaminated area as opposed to one with 'normal' landmines. In a mined area the entire cleared area is handed over. For IED areas checks may be carried out in a buffer zone around the lines of ILMs, but the clearance team is only responsible for the specific area that has been fully cleared. There is not the capacity to fully search the area between ILM rows, so that on handover the areas between rows are effectively treated as 'no comment' zones.⁴⁴ It is expected that, at some later date, dogs or mechanical systems will be used to investigate areas between ILM rows.

The question of clearance quality standards and definitions was brought up by JGO, as well as other organisations, during subsequent meetings.⁴⁵ Clearance of an area contaminated with mines and/or UXO is well understood by the MA sector and is addressed through depth and minimum target specifications in NMAS, task orders and contracts. Achieving a similar level of clarity in relation to a potentially contaminated house or other structure, is not as well understood or defined.

⁴¹ Discussions with FSD, Erbil, 29th August 2016.

⁴² Discussions with FSD technical managers, Erbil, 29th August 2016.

⁴³ Discussions with MAG senior managers, Erbil, 29th August 2016.

⁴⁴ Discussions with IKMAA, Erbil, 28th August 2016.

⁴⁵ Including during the IMAS IEDD sub-group meeting in New York in October 2016.

RISK EDUCATION

In the same way that MA came to understand early on in its history that clearance was not the only means to mitigate the risks associated with landmines and unexploded ordnance, so it is clear that IEDD should only be one element of a coordinated, comprehensive and flexible response to the presence (real or suspected) of IEDs in an area. Risk education (RE) activity is already under way in liberated areas. The main implementers of RE activity in northern Iraq are MAG and DDG (Figure 10).

DDG makes the point that the nature of improvised weapons is that they vary and change and that there is little point showing pictures of IEDs that have been discovered if it is likely that other devices will look significantly different in the near future. The circumstances in northern Iraq (and elsewhere) are such that RE activities may:

- put providers of RE at risk (if they come to the attention of IED 'owners'); and
- put recipients of RE at risk if they report the presence of suspected IEDs (and come to the attention of the IEDs' owner as having done so).

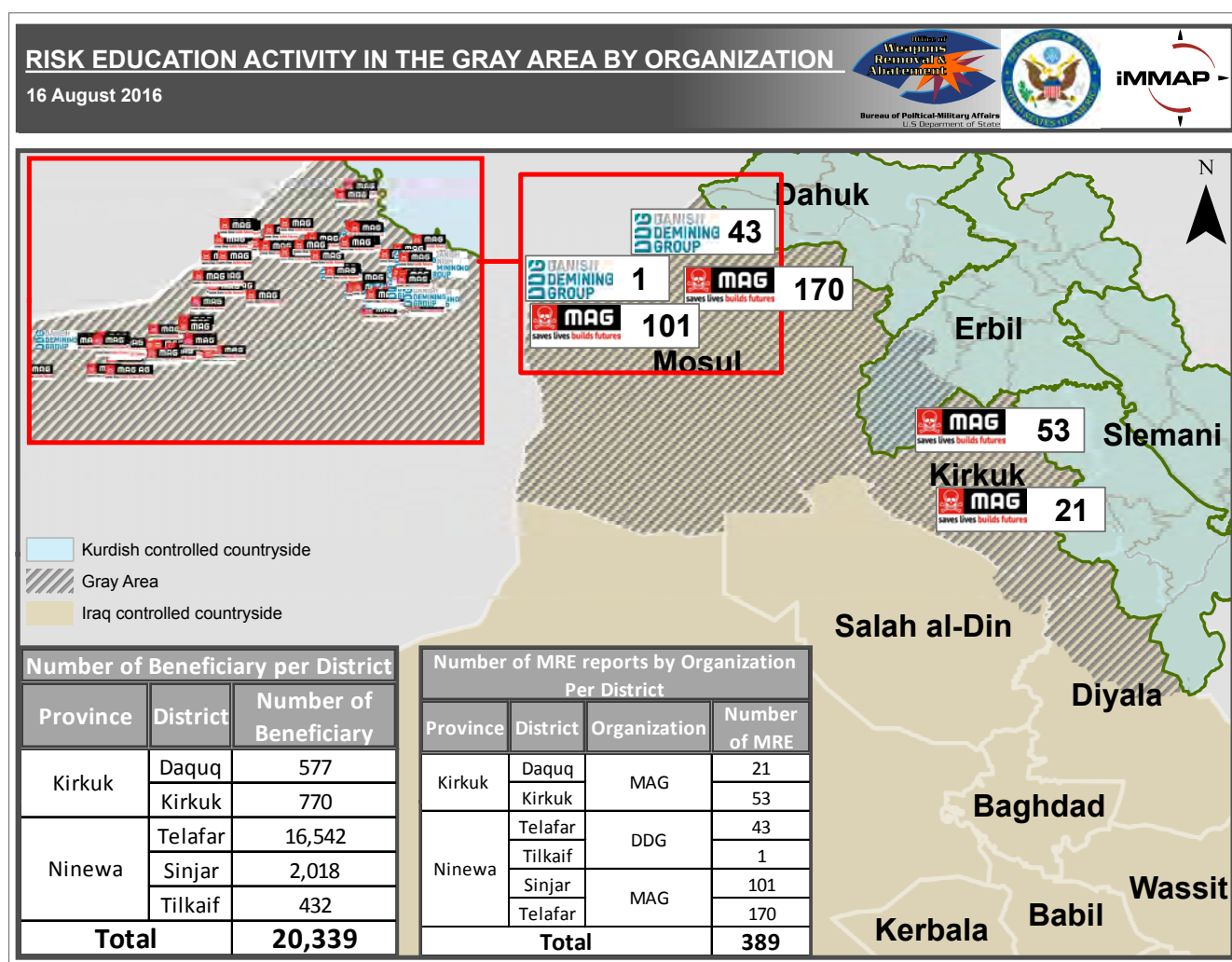


Figure 10. Risk education activities carried out by MAG and DDG, as at 16th August 2016, information provided by iMMAP (image credit: iMMAP).

To help navigate the complexities of surrounding circumstances and the implications for the content, delivery and suitability of RE, DDG has developed a decision process map (Figure 11), capturing overall policy about RE in IED environments and the main elements of any response.⁴⁶

⁴⁶ DDG presentation to IMAS Review Board sub-group meeting at UN New York, 18th October 2016.

INFORMATION MANAGEMENT

IEDD information management (IM) in northern Iraq relies upon use of existing information management systems for mine action (IMSMA), forms and procedures, as well as local responses, within individual organisations, and a mix of formal and informal information sharing through meetings and common-interest groups. MA actors report a number of shortcomings relating to IM, some of which are common to many mine action programmes, some of which reflect specific issues associated with IEDs and IEDD.

iMMAP is at the hub of formal information sharing systems, but political issues, in particular the separate nature of the DMA's and IKMAA's responsibilities, brings a degree of complexity to the system unusual in most mine action programmes. Some data cannot be shared, even when it is received, because of governmental restrictions. To make things even harder the DMA and IKMAA have different customized versions of IMSMA that do not make data sharing easy. iMMAP is party to an MoU with both the DMA and IKMAA covering information management aspects of work in the grey areas, and has designed IMSMA forms to work with both systems. Very little data is available from areas under ISIS control. iMMAP is keen to encourage Peshmerga representation at technical meetings to encourage more information sharing. Initially, reports from Janus were sent to the DMA, but they were not continuing on to iMMAP. After recent meetings in Baghdad information is now beginning to flow, including from Al Fahad, although it is not yet clear whether all reports are being received at iMMAP.⁴⁷

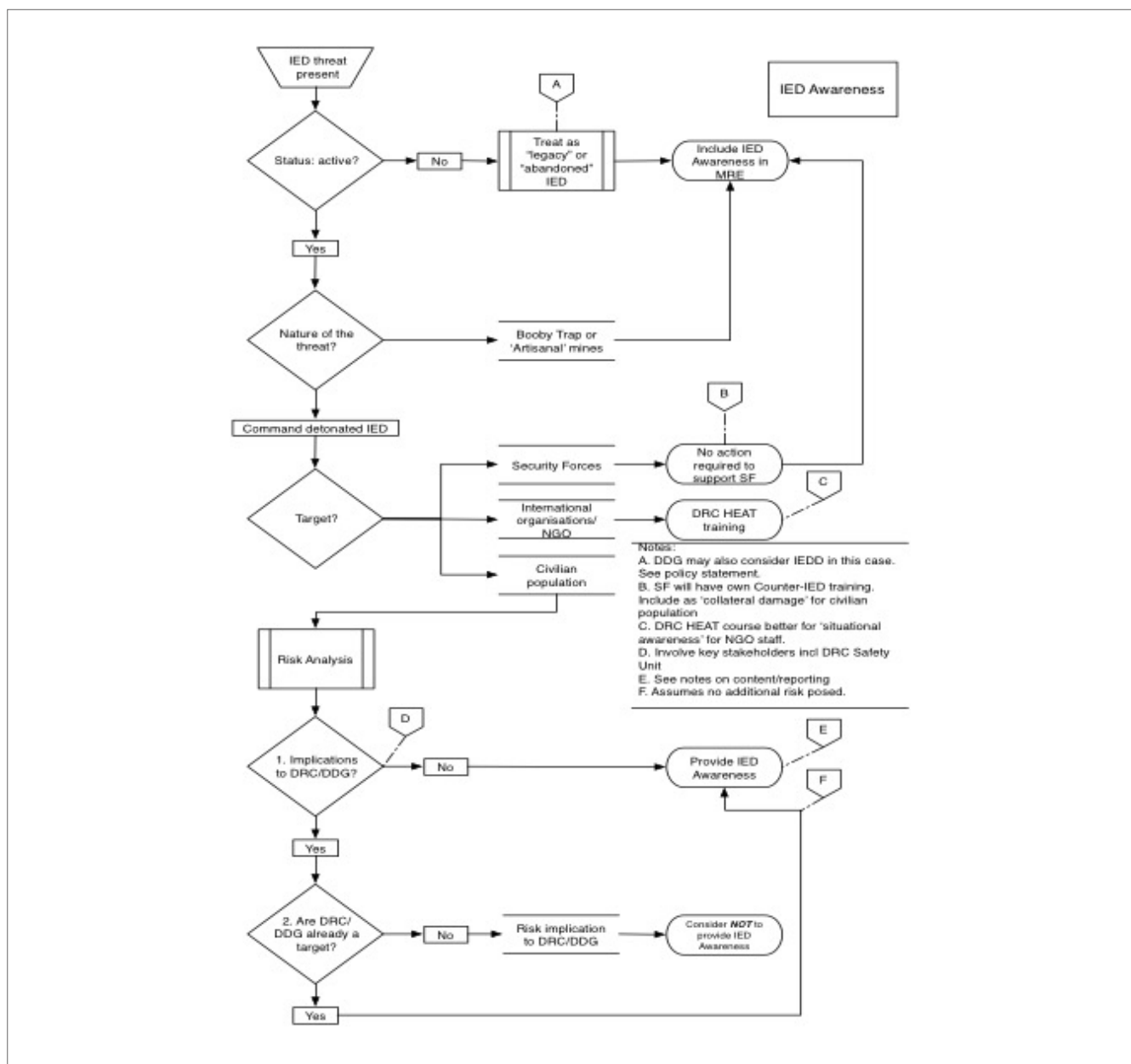


Figure 11. DDG IED risk education decision process map (image credit: DDG).

⁴⁷ Al Fahad is the locally accredited operating partner of JGO and Optima for work in Fallujah and Ramadi.

For the grey areas the NTS IMSMA form has been customized to include IEDs. Surveyors provide a spot location if an IED is visible, otherwise an area. Locations may be collected using GPS, sometimes on sketch maps. IEDs are generally simply recorded as 'homemade'. "In the absence of an IMAS it is not clear what category to put different devices in."⁴⁸ There is a clear understanding that more detail is required in reporting forms. Completion forms do not include detail about exactly what was found where. Quick data collection methods have been developed using a free App; a picture can be taken and coordinates are automatically recorded.

Several actors noted the difficulties arising from using IMSMA forms designed for use in a traditional mine action environment in one where IEDs are prevalent. The study team were told that "it would be better to start again with a clean sheet of paper" The MA sector in northern Iraq appears to be waiting until IMSMA forms have been adjusted before deciding what data needs to be collected. iMMAP is not sure that all problems arise from the structure of the forms themselves, but may also reflect issues to do with reporting mechanisms.

A technical working group (TWG) meets on a monthly basis and includes discussions about types of IED, working methodologies and other aspects such as proposed handover documents for IEDD operations (including who decides to destroy/damage houses if doing so is unavoidable during IEDD operations). iMMAP runs a daily security incidents database, has access to the legacy landmine impact survey (LIS), and UN Department of Safety and Security (UNDSS) data relating to security. iMMAP maintains up-to-date analysis of where most accidents happen each month, as well as a range of indicators relating to where organisations are working and what they are finding. iMMAP feeds into the Health Cluster, Protection Cluster, UNOCHA and, most recently, the Food Security Cluster.

A number of MA actors complain that information goes into the central IMSMA database, but relatively little comes out again. Similar situations have arisen in other mine action programmes, but the consequences of restricted information sharing in an IED environment is more serious. Individual mine action organisations engaged in IEDD have their own internal IM systems, but there is inconsistency over what data is collected, and how terminology is applied to the various devices that are discovered. Decisions about what should be collected reflect the preferences of individual technical specialists.

iMMAP records major accidents (such as those recently suffered by FSD and JGO), but minor accidents and near misses are not captured.

AGEING AND DEGRADATION OF IEDs

Opinions vary on the question of how quickly IED components are likely to deteriorate and fail, especially the 9V batteries that comprise the majority of IED power sources in the region. None of the actors spoken to for this study are collecting formal data on IED condition, and no testing regime is in place for recovered batteries.

It is likely that many IEDs will become non-functional (at least as designed) more quickly than is the case for landmines. In due course more information on this topic is likely to become important to support risk management, procedural developments and prioritization processes.⁴⁹

⁴⁸ Meeting with iMMAP Erbil, 28th August 2016.

⁴⁹ The GICHD study into ageing of IEDs in Colombia, in cooperation with DAICMA (the national authority), may be relevant in this respect.

SUMMARY OF TECHNICAL AND OPERATIONAL ISSUES AND MITIGATION OPTIONS

Aspect	Notes	Mitigation
Operating envelope	<p>Operations outside an organisation's safe operating envelope (either inadvertently, or through inappropriate tasking, lack of risk management information, etc.) may place operators and support staff at unacceptable risk. Consequences may include:</p> <ul style="list-style-type: none"> Excessive and avoidable accidents/fatalities Reduced confidence and morale amongst tasking authorities, planners and operators Reduced donor confidence Compromise of an organisation's neutral status 	<ul style="list-style-type: none"> Develop and use a common lexicon to describe different types of IED Describe and assess contextual aspects including security/insecurity and situational complexity Use the operating envelope concept to discuss, agree and implement boundaries of competence and capability Maintain awareness of where in the operating envelope different activities, tasks and locations lie Assess competence, equipment, support and procedural requirements within the operating envelope
Information management	<p>Good IM underpins all management activity at every level. IM in an IED environment needs to work better and faster than in some traditional MA environments. Inadequate IM may result in:</p> <ul style="list-style-type: none"> Ineffective risk management Increased safety risk for operators and support staff Poor strategic planning Poor task selection and prioritisation Inefficient task planning and implementation Reduced results within affected populations 	<ul style="list-style-type: none"> Encourage a culture in which IEDD organisations and individuals are hungry for data of all types Reinforce awareness that collecting and reporting data is a primary part of any IEDD operator's job description Gather data about technical, contextual and strategic aspects of all operations Apply normal principles of NTS to all aspects of operations Collect, report and analyse SADD Do not wait for specialist forms to be generated by IMSMA operators; collect all relevant data now, using locally generated forms if necessary, holding data in spreadsheets or other convenient formats Share data through formal and informal channels with other stakeholders involved in responding to IED contamination Analyse data independently or collectively, even if formal mechanisms have not yet been established Encourage and support standardisation of terminology and data descriptions using agreed lexicons Encourage appropriate sharing of data by authorities, but do not stop collecting and reporting data just because some data authorities may appear to be IM 'black holes'

Aspect	Notes	Mitigation
Risk management	<p>Good risk management, informed by good IM, provides the fundamental structure of all management decision-making, at every level. Risk management requires: the identification and reduction of uncertainty; identification, analysis and evaluation of risks; as well as mitigation of risks through avoidance, removal of risk sources, reducing the likelihood or consequence of risk events, the sharing of risk, or the acceptance of tolerable risk. Poor risk management may lead to:</p> <ul style="list-style-type: none"> • Inefficiency • Ineffectiveness • Increased costs • Reduced safety and increased accidents • Delays • Reduced stakeholder confidence • Reduced stakeholder engagement, cooperation and support • Loss of organisational/programme credibility and reputation • Missed opportunities 	<ul style="list-style-type: none"> • Adopt structured risk management systems (as per ISO 31000) at all levels of strategic, operational, procedural and technical planning and operations • Drive IMS to deliver the information necessary to support effective risk management • Review all aspects of IEDD operations (from strategic to technical) from a risk management perspective • Identify all risk mitigation options; assess them, select the most appropriate • Avoid choosing the most obvious or first encountered option when choosing risk mitigation options • Be ready to apply multiple mitigation options in parallel • Remember that mitigating one risk can give rise to new risks • Take effective action to avoid complacency, habit-forming, mission-creep and competency slippage
Tasking	<p>Inappropriate tasking may lead to IPs engaging in unsuitable operations for which they are not fully prepared or competent. Tasking 'for the sake of doing something' may put operators at risk for little or no justification and undermine the credibility of IEDD operations with affected populations, donors and other important stakeholders.</p>	<ul style="list-style-type: none"> • Watch out for tasking on the basis that 'something must be done' or 'something must be seen to be done' • Maintain contextual/RBM awareness when considering the need, priority and justification of tasks • Consider suitability of combination of task and implementing partner in terms of operating envelope boundaries • Apply normal MA principles to task selection, prioritisation, planning and implementation

Aspect	Notes	Mitigation
Procedures	<p>SOPs are an important risk mitigation tool, but they must remain appropriate to the specific circumstances and technical details associated with operations. Changes in IED design and use, over time, and from one area to another, as well as the prevailing security situation, must be reflected in the SOPs applied by IEDD operators (and their supporting resources). Inflexible or slow to respond external approval systems, or poor internal improvement feedback processes, can lead to SOPs that are out of date, inappropriate and that may promote practice that has become unsafe or inefficient.</p>	<ul style="list-style-type: none"> • Apply structured risk management principles and practice to developing SOPs • Treat SOPs as risk mitigation tools • Ensure that NMAS and other applicable legislation give IPs freedom to update SOPs as necessary in response to changes in IEDD design and tactics • Look for all opportunities to deal with IEDs remotely; minimise manual/human interaction with devices • Review SOPs whenever there is a significant change in IED design, tactics or the surrounding circumstances • Ensure that changes in SOPs are reflected in update training to affected operators and other staff
Human resources	<p>Human resources remain at the centre of IEDD operations, even if sophisticated, remotely controlled assets are used. Not every person needs to be able to deal with every type of IED, but anyone dealing with an IED does need to be competent, and suitably supported/equipped to deal with that specific type of weapon, under the prevailing circumstances. Competence requirements should reflect the demands of operations within those parts of the operating envelope assessed as being appropriate and feasible for an IP to work in. Failure to specify competence requirements adequately can lead to:</p> <ul style="list-style-type: none"> • Unnecessary and unacceptable risk to operators • Reduced quality of land/site release • Inefficient operations • Poor quality information gathering to support future improvements • Loss of credibility and reputation with authorities, donors and other important stakeholders <p>Over-specifying competence requirements can be as unhelpful as under-specifying. Over-specification may lead to:</p> <ul style="list-style-type: none"> • Excessive cost demands that cannot be met • Donor disenchantment with the feasibility and sustainability of IEDD in general • Inability to assemble sufficient assets to deal with less demanding, but larger scale tasks 	<ul style="list-style-type: none"> • Define competence requirements on the basis of tasks that are the highest priority, and that yield the greatest benefits • Do not demand competences that relate to unusual or rare activities that do not form part of normal operations • In the absence of agreed standards, apply normal QM principles and practice (as per IMAS 07.12) to defining minimum competence requirements in relation to specific activities within the operating envelope • Develop competence standards (national and or international) along the same lines as for EOD • Consider sharing specialist IEDD competences between implementing organisations if suitable staff are hard to recruit or unusually costly • Develop training management plans that satisfy specified competence needs, in light of the level of aptitude, skills and knowledge of trainees prior to start of training • Ensure that instructors are competent to deliver specified training to the required standard • Use ongoing monitoring (as per IMAS 07.40) to check the effectiveness of selection and training of staff • Apply effective improvement processes in response to any evidence of real or potential shortfalls in personnel competence

Aspect	Notes	Mitigation
Equipment	IEDD operations may require equipment of the simplest kind, from tools familiar to traditional MA, to highly specialised, sophisticated and expensive items (such as ECM). Equipment specifications should reflect the demands of planned operations within clearly understood areas of the operating envelope. Equipment that is unavailable (for export restriction reasons for instance) or that is prohibitively expensive should not be specified. If no other means of addressing a particular task, or types of task, can be found then the implication is that the task is not one that can be conducted by MA assets.	<ul style="list-style-type: none"> • Identify equipment requirements based on defined scope of operations within operating envelope boundaries • Apply normal QM principles and practice (as per IMAS 07.12) to procurement of equipment for IEDD • Update supplier and price databases to ensure that operating organisations are aware of all options when considering appropriate responses to equipment requirements • Maintain awareness of the relationship between equipment availability, competence and the associated extent of the operating envelope • Consider all equipment options (including local manufacture) that can reduce the exposure of human operators to risk • Reflect new equipment aspects in training management plans • Do not over-specify equipment requirements • Do not engage in IEDD activity if essential equipment is not available
Quality management	Quality is 'the degree to which a service, product or output fulfils requirements'. Requirements for IEDD should be specified by authorities, customers, operating organisations and others as appropriate to the various processes and activities associated with IEDD. Where there is uncertainty about requirements, operators and other stakeholders should discuss, agree and document requirements. Many IEDD requirements are the same as, or similar to, those associated with traditional MA. In general terms, a QMS associated with IEDD need be little different from one associated with traditional MA activities. Many IPs will apply a QMS to embrace traditional MA and whatever aspects of IEDD appropriately fall within their operating envelope.	<ul style="list-style-type: none"> • Apply normal external QM principles and practice as per IMAS 07.12, 07.30 and 07.40 • Apply normal internal QM principles and practice as per IMAS 07.12, 07.30 and 07.40 • Apply normal MA clearance requirement definitions to the release of open land • Be aware of issues relating to defining clearance requirements in structures; engage in transparent discussions with tasking authorities; document decisions about clearance, handover and acceptance requirements • Identify aspects of IEDD accreditation and field monitoring that require additional detail and source specialist knowledge where necessary to define those aspects

Aspect	Notes	Mitigation
Learning and improvement	<p>Within any management system (IMS, QMS, Risk management, Strategic planning, RBM) learning and improvement feedback loops are an essential feature. IED situations typically exhibit variation and change over time and between locations. It is essential that learning and improvement processes are developed and implemented on a continual basis, drawing on comprehensive up-to-date IM, within an effective QMS. Management of any non-conformity, including accidents and near-misses, and of identified opportunities for improvement, must be managed effectively and speedily. Any failure to do so can result in:</p> <ul style="list-style-type: none"> • Operators, support staff and beneficiaries being placed at unnecessary risk • Inefficient and/or ineffective operations • Avoidable accidents 	<ul style="list-style-type: none"> • Place the utmost importance on the implementation of speedy and effective learning/improvement feedback loops (a normal part of an effective QMS) • Apply root cause analysis (RCA) processes in response to any accident or near miss • Apply IM of the highest order to understand the prevailing circumstances and conditions, including technical aspects of weapons encountered, and to understand and improve operational procedures and systems • Review and update IMAS 10.60 <i>Reporting and investigation of demining incidents</i> to encourage better analysis of root causes and implementation of effective corrective/improvement actions

LEGAL ISSUES

LANDTITLE AND LIABILITY ISSUES

Issues of land title have been of importance to the MA sector in the past, but the use of IEDs in urban areas, including inside residential properties, has brought the subject into sharper focus. A number of operating organisations have flagged up the significance of the question of who owns property when deciding how to respond to potential contamination.

MA actors are mostly dealing with IEDs used as improvised landmines in areas where blow in-situ options remain available (if adequate explosives can be obtained), or are working on buildings that have already collapsed.⁵⁰ Following combat, Peshmerga units clear intact, or relatively undamaged, high value structures such as power and water stations, as well as some residential property. Where property is privately owned attempts are made to contact owners before IEDD work starts in case a detonation occurs (as part of a planned demolition or as an inadvertent IED detonation). IKMAA reports a double agreement process. If the landlord/owner is present, then that person signs to confirm authority and agreement. If the owner is not present, then the local authority signs to confirm the need for the destruction (such as for public safety reasons).⁵¹

IKMAA illustrated the difficulties by describing a possible situation where the current 'owner' escaped with ISIS forces as they retreated. The house was destroyed, but that owner may return in future and go to court seeking compensation. Furthermore, the original owner might have been Kurdish, was displaced under the Saddam regime, and may now return and also seek compensation. Under such circumstances IKMAA sees the potential for an owner to pursue an NGO for compensation.

Peshmerga commanders are sensitive to the risk of compensation claims at a later date if an owner did not provide permission or could not be located. During periods of active hostility there is a general assumption that damage is inevitable (as is evident in any area that has been subject to fighting), but that after fighting finishes there is an increasing expectation that property will be protected and preserved as much as possible. The more time that passes after the end of the fighting the greater the expectation of protection and the greater the likelihood that an owner may seek compensation for damage.

PUBLIC AND EMPLOYEE SAFETY

MA actors have experience of managing public safety during search and clearance work. Operating in open countryside, clearing minefields outside villages and away from roads, usually offers an easier to control public safety situation than conducting an EOD spot task inside a populated town.

MA actors have always been aware of their responsibilities to their workers and the general public. It is normal to maintain suitable insurance cover providing compensation in the event of loss of life, injury or damage to property. Many MA actors also maintain insurance cover relating to the legal costs associated with defending themselves in court. The presence of IEDs does not alter underlying issues of liability, but it may influence some aspects of the risk environment including:

- by bringing MA actors into closer proximity with more valuable aspects of a potential private claimant's life and affairs; and
- by increasing the risk of death or injury to workers.

Many MA actors have engaged in clearance operations in the vicinity of operational civilian airports, and have gained experience of the public liaison requirements and wider thinking necessary when operating in such a complex environment. The main difference compared with traditional mine action is that the increased prevalence of IEDs in built-up areas is likely to make public safety issues a more common, and sometimes more challenging, requirement than has been the case for many organisations in the past.⁵²

⁵⁰ Such as MAG operations using mechanical systems to process rubble in Sinjar.

⁵¹ Meeting with IKMAA and iMMAP, Erbil, 28th August 2016.

⁵² Such as when large numbers of inquisitive local people want to see exactly what an IEDD operator is doing. Extensive and reliable support from local police is likely to be required under such circumstances.

COMPENSATION AND INSURANCE

The MA sector has experienced relatively few legal actions in relation to either worker or public injury. A number of factors have been significant:

- Most MA actors (although not all) have had a good safety record in relation to their own staff; and
- There have not always been easy routes available for potential claimants to take action.

One operating organisation raised the question of insurance cover, and the extent to which underwriters accept any extension of work that was previously under the umbrella of established mine action, extending into IEDD. Advice from the insurance industry is that, in addition to the differing level of risk presented by the technical specifics of the item in question and its stability – whether discharged/fired or not, whether past its shelf-life, etc. – another key area of concern for underwriters is the environment in which the work is being done. This often has a greater impact on the potential for actual insurance claims than the work itself.

At the moment, none of the differing types of work generate a particularly adverse claims experience when compared to the others. As a result, underwriters (within the insurance market at Lloyd's of London) do not generally differentiate (in terms of cost or policy terms) between traditional demining operations or clearance of more contemporary IEDs. Underwriters tend to focus more on each client (and that client's claims record) than differentiate between types of clearance work. Their view is that proper risk management by the client will ultimately be key to reducing the exposure any given client has to generating claims, and that those clients undertaking particularly dangerous operations, or working in a more 'cavalier' manner, will be found out by adverse claims experiences.⁵³

SUMMARY OF LEGAL RISKS AND MITIGATION OPTIONS

Aspect	Notes	Mitigation
Land and property title	<p>Uncertainty about ownership of property may reduce IEDD operator confidence about engaging in operations that could cause damage to structures. Poor decision-making/ uncertainty could result in:</p> <ul style="list-style-type: none"> • Claims for compensation against operators • 'defensive' task prioritisation • Increased costs • Delays to some operations • Increased insurance costs 	<ul style="list-style-type: none"> • Establishment of national policies relating to 'permission to work' on IEDD tasks where property damage may be a consequence • Liaison with local authorities • Appropriate efforts to identify and communicate with property owners • Local authority sign-off prior to work • Implementation of established handover/acceptance processes • Contractual/tasking indemnification (if appropriate)
Compensation	<p>MA actors may face claims for compensation arising from:</p> <ul style="list-style-type: none"> • damage to property • injuries to civilian population members (during or after IEDD operations) • injuries to IEDD workers 	<ul style="list-style-type: none"> • Apply structured risk management principles and practice to all aspects of planning and delivery of IEDD-related, planning, tasking, operations and supporting activities • Liaise with local military/police authorities to implement effective public safety measures during IEDD operations • Maintain appropriate liability insurance cover

⁵³ Information provided by Bridge Insurance Brokers Ltd, 30th September 2016.

Aspect	Notes	Mitigation
Insurance	The insurance sector currently treats IEDD (within an MA context) as a variation on existing themes of responding to explosive hazards; surrounding circumstances and the level of insecurity are more significant drivers of premium levels. That could change if individual organisations were to present multiple claims for injury/death of operators.	<ul style="list-style-type: none"> • Communicate with insurance providers • Apply structured risk management principles and practice to all aspects of planning and delivery of IEDD-related, planning, tasking, operations and supporting activities • Maintain awareness of prevailing circumstances and conditions and be ready to suspend operations if necessary

ECONOMIC AND FINANCIAL ASPECTS

ECONOMIC IMPACTS

The economic impacts of IEDs mirror many of those associated with landmines and ERW of the types encountered by MA organisations in mine action programmes around the world. The main differences are associated with the presence of IEDs in built-up areas. Landmines generally deny access to rural land, impacting on economic activities associated with access to that land, and create the well-understood direct impacts associated with victims. Unexploded ordnance has often been found in urban areas following fighting, but rarely with the victim-operated aspects associated with many IEDs. While UXO, especially submunitions, has given rise to victims amongst urban populations, they have rarely done so as part of a designed feature of the weapon. Victim operated IEDs do, of course, include a specific (and usually indiscriminate) design intent to be victim operated.

The nature of the impacts on victims (those directly killed or injured and their families) of landmines and UXO have been studied and, in many cases, quantified within various societies⁵⁴. It is unlikely that the nature and severity of impacts arising from IED accidents will be significantly different, but it is possible that there will be more victims within those communities most directly affected by warfare involving IEDs.

COMPARATIVE COST OF IEDD

There appears to be a general assumption that humanitarian IEDD costs more than traditional MA. This is certainly the case under some circumstances, but it is not clear that dealing with IEDs used as landmines in open land (the primary focus of current MA operations) need be substantially more costly than similar operations against industrially manufactured landmines.

As with other aspects of IEDs and IEDD, there needs to be more precise use of language to differentiate between circumstances before attempting to ascribe costs. The cost of operating in relatively insecure areas is mostly driven by the cost of security measures, and is not unique to IEDD operations, although the need for ECM and other specialist technologies is a particular feature of IEDD operations in insecure areas.⁵⁵

IEDD-specific additional costs could include:

- Specialist equipment, such as disrupters;
- Higher specialist personnel costs; and
- Larger team sizes compared to a normal EOD spot task.

The cost of dealing with a complex device in an insecure area is likely to be significantly higher than dealing with the same device in a safe area, when there is confidence that the device is abandoned. Unit costs (per device, task or asset) are likely to increase, relative to other forms of mine action, as operations against more technically complex devices, emplaced in more difficult ways, under more demanding insecurity circumstances are considered. The costs of dealing with relatively simple devices, under relatively safe conditions, may be similar to those associated with traditional land release operations.

IEDD FUNDING SOURCES

Humanitarian IEDD operations in Iraq are funded through channels familiar to MA:

- Donor grants to MA NGOs;
- National government funding to MA authorities (IKMAA and DMA);
- Commercial contracts (from PM/WRA and the UN) for humanitarian operations; and
- Commercial contracts to support commercial operations (such as for RPS working with oil and gas companies).

⁵⁴ For instance – *Caring for Landmine Victims*, International Committee of the Red Cross, 2005.

⁵⁵ MAG is content to deal with 'abandoned' or 'legacy' RC IEDs without the use of ECM on the basis of a risk assessment that provides adequate confidence that the task location is no longer active and that there is no one on the other end of the wire/link. The ability to QA risk management assessments and decisions may be an important mechanism to help maintain confidence in their validity.

Additionally, in the context of northern Iraq, there is national government funding of specialist military units for non-humanitarian, combat-related C-IED and IEDD. International governments provide military training and support assets to assist Iraqi Army and Peshmerga military units. The international military training teams have some interactions with MA actors.

ALLOCATION OF FUNDS

There is some evidence that funds that might previously have been allocated to legacy mine and UXO clearance operations are now being diverted towards IEDD projects. MAG reports that the overall level of funding for the organisation's mine action and IEDD work in northern Iraq and north-eastern Syria has increased, but that the proportion of funding on 'legacy' tasks has reduced from 80% in 2013/14 to around 50% in 2016.

SUMMARY OF ECONOMIC AND FINANCIAL RISKS AND MITIGATION OPTIONS

Aspect	Notes	Mitigation
Humanitarian costs	The cost of addressing humanitarian needs is increased when people cannot or will not return to their homes. The real or perceived presence of IEDs may be a significant factor in reducing IDP confidence about their home locations.	<ul style="list-style-type: none"> • Implement strategic planning processes in cooperation with high level humanitarian coordination focal points (clusters, sub-clusters, etc.) • Apply RBM principles and practice to identifying, prioritising and allocating MA IEDD tasks • Apply LR principles and practise to support release of as much high priority land as possible by the most efficient means • Implement effective RE and CL programmes
Allocation of funds	Poor allocation of funds to equipment, capacities and tasks may result in: <ul style="list-style-type: none"> • Waste of time, money and resources • Ineffective and/or inefficient operations • Reductions in the benefits provided to affected populations • Reduced results, outcomes and impacts from MA IEDD • a loss of donor confidence in the provision of support for MA IEDD 	<ul style="list-style-type: none"> • Apply RBM principles and practice to identifying, prioritising and allocating MA IEDD tasks • Apply structured risk management approaches to identifying the most beneficial, effective and efficient aspects of IEDD for MA actors to address • Capability development driven by clearly defined, relevant and appropriate requirements
Donor engagement	If some aspects of IEDD in the MA context are perceived to be inappropriate, excessively dangerous, poor value for money, or otherwise unjustified in MA terms, there is a risk that donors could disengage from the entire theme of IEDD activity.	<ul style="list-style-type: none"> • Use consistent language and terminology to describe IEDs and IEDD operations that justifiably fall within MA • Communicate boundaries within the operating envelope and demonstrate capacities and competence to operate within those boundaries • Apply transparent QM and risk management systems including appropriate learning and improvement processes

Aspect	Notes	Mitigation
Legacy aspects	The profile of IEDs and IEDD may be diverting funds away from pre-existing legacy issues that continue to have a significant, but more familiar, humanitarian impact. As and when the profile of IEDs and IEDD reduces (or itself becomes more familiar), there is no guarantee that attention, and funding, will be re-allocated to legacy issues.	<ul style="list-style-type: none"> • Avoid treating IEDs as a standalone issue • Clarify and reflect those aspects of IEDD that fall within the remit of MA and IMAS • Integrate IED and IEDD data into wider MA reporting including impacts

ENVIRONMENTAL ASPECTS

A number of potential pathways exist for IEDs to adversely affect the environment including:

- Component materials entering soil, air and ground water during manufacture;
- Toxic materials entering the human body during (forced/slave) manufacturing;
- Leaching of toxic materials out of poorly constructed buried IEDs into soil and water (especially when used in very large numbers);
- By delivering direct damage to buildings and infrastructure as part of a 'scorched earth' campaign during periods of defeat and retreat;
- Through the use of IEDs to achieve intentional contamination of the environment;⁵⁶
- As a result of intentional or accidental detonation during IEDD operations damaging infrastructure; and
- As indirect consequences of accidental damage to water and sewage treatment facilities and other infrastructure with direct environmental functions during IEDD operations.

Those pathways that fall under the control of ISIS and other similar groups are outside the scope of this study, other than to highlight their existence and recommend that post-liberation environmental risk assessments take them into account. Those that relate to IEDD are reflected to some extent in the current nervousness amongst some IEDD organisations about legal liability relating to property. The risk of unintended environmental consequences when IEDD action results in contamination of air, water or land, should be addressed through the same environmental risk assessment (ERA) and management processes that apply to normal MA, but:

- Most MA operators are not used to working on high value public health related infrastructure; and
- Existing MA environmental management systems (EMSs) are typically somewhat superficial, focusing on a limited number of common aspects associated with mine clearance work.

Liability relating to damage to privately owned property is a subject that merits careful attention, but the risk of wider environmental and public health consequences from poorly thought out IEDD actions at key public infrastructure locations would be of a higher order of magnitude.

In KRG controlled areas of northern Iraq in 2016 it appears that action on high value public infrastructure is carried out by Peshmerga units, but it may be that, as the situation improves, there will be hope or expectation of greater involvement of MA actors in addressing such requirements.

SUMMARY OF ENVIRONMENTAL RISKS AND MITIGATION OPTIONS

Aspect	Notes	Mitigation
Environmental impact	<p>IEDD operations can adversely impact the environment through:</p> <ul style="list-style-type: none"> • Emissions to air (OB/OD, as well as noise, ground shock, etc.) • Emissions to soil (leaching of IEDD toxic materials) • Emissions to water (leaching of toxic materials) • Damage to land, property and infrastructure • Intentional acts 	<ul style="list-style-type: none"> • Implementation by MA actors of effective environmental management systems (EMSs) • Consideration of environmental aspects at the strategic, tasking and planning levels • Effective community liaison

⁵⁶ Such as at the al-Mishraq chemical plant north of Qayyara, southeast of Mosul.

DISCUSSION

IEDD AS A LAND RELEASE PROCESS

The concept of land release applies to all areas where land is not used because of the presence (real or suspected) of explosive hazards. It includes survey and search methods, EOD spot task responses, battlefield area clearance (BAC) and landmine clearance, as well as, when appropriate, dealing with stockpiles and the consequences of stockpile explosions. It is not limited to rural land, but to any area where the presence of explosive hazards has an impact on an affected population.

The presence of IEDs (whether real or suspected) affects people in similar ways to any other sort of explosive hazard contamination. Principles of land release are applicable, including the release of suspected hazardous areas (SHAs) through cancellation, using non-technical information, reduction in light of information gained through technical interventions, and following clearance.

IEDs used as landmines in open country offer a situation that is effectively identical to that presented by industrially manufactured landmines. IEDs inside buildings present a different technical challenge, but pose similar problems to affected people as is the case when there is widespread submunition contamination in a built-up area.

It has been suggested that dealing with potentially contaminated properties demands the development of different 'clearance' standards, ranging from a quick look assessment through to full, intrusive (and expensive) clearance. The idea is that doing so would reflect, to some extent, the residual risk associated with the property when handed over. There are some clear parallels with the development of land release concepts. The first is that thinking along these lines is not new. In mine action it has long been clear that it is not possible to clear everywhere that might have mines or UXO – the money will never be available to do so, and it would, in any case, involve a lot of wasted time and effort. Various concepts of survey were developed over a period of many years, leading to the current application of NTS and TS and the associated categories of release – cancellation, reduction and clearance. There may be scope to adopt a similar approach to reflect different approaches to releasing structures from the possibility of IED contamination.

At the same time, it was recognised that clearing land is a three-dimensional problem, and that clearance should satisfy the demands of the intended follow-on land use. It is normal to define the depth to which clearance should take place and to accept that there may be the possibility of hazards remaining at a deeper depth. So clearing an area of landmines, submunitions and shallow UXO does not mean that a large unexploded bomb (UXB) is not still present. If the land use changes and justifies a search for UXB then it can be paid for at the time.

Similarly, when addressing an IED problem not everywhere will be contaminated. An analysis of non-technical and technical data is necessary to identify SHAs that can be ruled out (cancelled or reduced) or that justify their further identification as confirmed hazardous areas (CHAs). CHAs are typically fenced and marked to discourage people from entering them. The same may well happen with individual buildings or parts of towns and villages awaiting later IED clearance.

Decisions about when to devote clearance assets to an IED CHA can be driven by prioritisation processes along the same lines as are used for any mine action programme. Affected organisations (and in theory members of the public) are at liberty to buy-in clearance services if they do not wish to wait for humanitarian/governmental teams to be available – as is normal with energy, minerals and infrastructure corporations.

While some specific terminology may be useful, it is not clear that there is any need to develop new approaches to releasing structures, areas and locations contaminated by IEDs, rather than to continue using the same approaches adopted for other forms of mines and ERW. In Iraq, non-technical assessments of areas where IEDs may be present are called 'threat impact assessments' (TIAs), precisely to avoid calling them NTS. There are pragmatic reasons for doing so at the moment, but as a general principle the development of new language to describe the same processes would be better avoided.⁵⁷

⁵⁷ It is worth noting that NTS, as defined in IMAS, does not exclusively mean survey teams visiting villages to talk to people; it covers all aspects relating to the collection of data, from all sources, to support analysis and understanding of the nature and extent of contamination and its impacts on communities. How that data is collected (through desk top searches, field visits, interviews, database analysis, etc.) is dictated by the situation and the sources of data available. It is not clear that the IED environment in northern Iraq, or other affected countries and regions, demands anything different in terms of the non-technical response.

Land is released on the basis of 'all reasonable effort' to confirm or discount the presence of hazards. Dealing with landmines and other ERW is a well-practised process, working from a substantial body of experience, knowledge and information. It is not always as efficient as it could be, but it generally errs on the side of caution. Areas contaminated by IEDs, especially built-up areas, present a less well understood situation, but there is no reason to think that responding to them will not be susceptible to the same principles that work with other forms of explosive hazard. Doing so will require the collection and analysis of data to reduce uncertainty and to increase confidence in what constitutes 'all reasonable effort' when applied to areas containing IEDs.

INFORMATION MANAGEMENT AND RISK MANAGEMENT FOR IEDD

All management (including quality, safety and environmental management) is risk management in one form or another. Good risk management relies upon good information to support understanding, analysis and decision-making.

It is worth noting that military forces have spent billions of dollars over many years trying to collect and analyse data about IEDs in Afghanistan and Iraq to improve their ability to respond. Despite doing so casualties from IEDs continued. While the parallels between the military's engagement with IEDs and MAs are not exact, it is indicative that the level of effort that needs to be applied to IM in an IED context may be greater (and smarter) than that traditionally applied to landmines and general unexploded ordnance.

It is clear that responses to IEDs will be unsafe and inefficient in the absence of information management of the highest order. It is not yet clear that the scope and quality of IM relating to IEDs in northern Iraq meets the necessary standards. If action is not taken to improve IM, and the way in which it supports risk and quality management (and especially improvement processes), then it is inevitable that there will be more injuries and deaths to MA workers.

The subject of information management in relation to IEDs and IEDD raises difficult questions about how to balance the need to share information, to support safe and efficient IEDD operations, with justifiable concerns that users of IEDs may learn too much if they gain access to shared information about IEDD. To some extent this is an issue that has already been overtaken by events – Kurdish and Iraqi military IEDD teams have long been in the habit of posting videos of their IEDD operations on YouTube. There is little doubt that ISIS tactics and IED designs have already been influenced by information gathered from such sources. While that does not mean that MA actors should stop worrying about security of information, it does mean that legitimate information sharing needs should not be wholly subordinated to fears about security.

Fears about security, as obstacles to effective information sharing, often prove secondary to more established issues associated with MA databases – the tendency for some authorities to demand information, but to be reluctant (sometimes forbidden) to provide information back to those who most need it. This is certainly not an issue exclusively associated with IEDs and IEDD, but it is an issue that has more serious consequences in an IED environment, than is the case in traditional MA. In other mine action programmes poor IM, including limited dissemination of analysis results to operators and planners, leads to inefficiency and waste. When IEDs are present, additional consequences of reduced safety, and increased accidents, are almost certain to occur.

Addressing issues of inadequate information management requires the urgent attention and coordinated efforts of all MA actors:

- Authorities to find ways to share relevant information, including changing inappropriate information security policies and regulations;
- Database managers, to develop suitable data collection forms, analysis tools and indicators;
- Operating organisations to:
 - Demand and help define better analysis and dissemination of results;
 - Demonstrate appropriate internal procedures to control the distribution of potentially sensitive information;
 - Emphasise to field operators the importance of collecting data of all types;
 - Collect all relevant data relating to devices, tactics and surrounding circumstances; and
 - Coordinate to share information if formal mechanisms are unavailable or unsuitable.
- International institutions to maintain support to authorities and database managers to improve IM to adequate levels; and
- Donors to support demands for, and be prepared to fund, improved IM.

It is inevitable that some aspects of IM development will be slower than is desirable. Operating organisations cannot delay improvement in their own approach to information management just because other authorities are being slow. While it may be frustrating that data provided to some authorities appears to disappear without trace, that same data should be retained and used by operating organisations individually or in collaboration with other actors.

Effective risk management relies upon good information. IEDs and IEDD are entirely suitable for analysis and management using well established risk management methodologies. The MA sector has not been in the habit of carrying out structured risk management (using approaches commonly applied in other industries). When operating in IED environments, such as northern Iraq, failing to do so will lead to adverse consequences at every level, whether taking poor strategic policy decisions, misallocating priorities, tasks and funds, or allowing operators to apply inappropriate and potentially unsafe procedures. Failures may also represent fundamental breaches of mine action organisations' duty of care to their workers, with knock-on legal consequences in the event of court action following an accident.

All options should be considered when identifying and assessing risk mitigation options remembering that selected actions may:

- Avoid the risk (by not engaging in the hazardous activity);
- Remove the source of the risk;
- Reduce the likelihood and/or consequence of an adverse event;
- Share the risk; and/or
- Accept the risk.⁵⁸

Prioritisation and land release are both risk management methodologies – prioritisation is effectively a decision that mitigation at a site is, or is not, necessary now or in the near future. Land release similarly seeks to identify land that does not justify technical interventions, leaving only areas that do require the early and active efforts of survey and clearance resources.

IEDD AND RESULTS-BASED MANAGEMENT (RBM)

IEDD is primarily a technical and operational process susceptible to quality management, on the basis of underlying risk and information management principles and systems, but no process takes place in isolation, as the introduction to IMAS 07.12 makes clear. Surrounding any operational process is the wider environment of intended results, outcomes and impacts, managed through application of RBM systems and principles. IEDD decisions need to be taken within a well understood RBM context.

Although much of the focus of IEDD discussions is on the fine detail of what types of IED are suitable for search and clearance action by MA actors, and the specific procedures, competences and equipment that should be used, none of those discussions, and the associated decisions, should be undertaken without careful consideration of wider questions of what needs to be done and why.

Decisions about what equipment and competences are required for certain types of IEDD presuppose that such types of IEDD are a priority. There is no point spending large sums of money, and taking a great deal of time to select, recruit and train specialist IEDD operators, if it turns out that the greatest humanitarian impact is associated with completely different types of device. The only way to gain a clear understanding about which impacts on affected communities are the greatest, and which are likely to yield the greatest benefits when addressed, is through application of effective RBM methods, supported by reliable IM.

Results-based management provides the framework in which strategic and operational planners and prioritisers should analyse situations and take decisions about the capabilities and capacities they need. The cost of clearing an IED used as a landmine, laid in a large barrier minefield, in open country, is likely to be very much less (possibly orders of magnitude less), than the cost of clearing a sophisticated IED hidden in a building or domestic appliance.

It is clear that any action to expand the boundaries of an organisation's operating envelope will demand additional skills as well as equipment (in many cases) and, by extension, increased cost. There needs to be a very clear justification for such an expansion in capability, driven by the value, scale and relative priority of the benefits that should accrue from deploying that capability.

⁵⁸ And remembering the important principle that mitigating one risk may give rise to new risks.

LEARNING AND IMPROVEMENT

All effective management systems adopt a cyclical structure; one that ensures that experience and lessons learned during day-to-day activities, whether routine or out of the ordinary, positive or negative, are captured, analysed and used to improve future operations and decision-making.

The operational environment in northern Iraq is one that changes all the time. The business of IEDD is new to most MA actors, so every day of operations builds experience and knowledge. Over time, and from one area to another, device design and employment vary. The local political and security situation varies from place to place and from time to time.

In such an environment of constant change it is essential that feedback loops (that drive learning and improvement) work constantly, reliably and rapidly. It is not always clear that they are doing so. It is possible that some feedback loops are working reasonably well within individual organisations, although the study team saw evidence to suggest that, at least some of the time, they are not. At a wider programmatic level, it is equally important that there is collective learning and improvement. Difficulties with IM systems, restrictions on sharing of some information, and the distractions of doing a demanding job under demanding conditions, all conspire to reduce the effectiveness of learning and improvement processes.

One of the most significant occasions when improvement must take place comes when an accident occurs. It is inefficient, wasteful and fundamentally disrespectful to accident victims if the response to an accident is not thorough, objective, analytical and with wide distribution of the consequent recommendations for improvement. The study team had the opportunity to review one post-accident board of inquiry (BOI) report relating to an IEDD accident in northern Iraq. The document provided to the team was wholly inadequate, containing no meaningful root cause analysis, but rather presenting a number of guesses about what might have happened and making few recommendations for improvement.

The IEDD environment is an unforgiving one. Any shortcomings in the application of structured improvement/learning feedback loops within quality, safety and risk management systems will lead to further accidents, injuries and fatalities. Addressing such requirements lies within the authority and ability of individual MA organisations, supported by relevant authorities, is already covered by IMAS and is not dependent on decisions about the scope or terminology of IEDD in an MA context.

RELEVANT EXPERIENCE FROM MINE ACTION

Similarities

It is common in some quarters to view IEDD as a completely different subject to mine action, including EOD, offering utterly different challenges and requiring entirely new approaches. It is true that dealing with IEDs does offer some significantly different aspects, both in detail and at higher management and policy levels, but carrying out this study highlighted the extent to which almost all the basic concepts and principles of mine action remain applicable (although the detail of how they are applied may be different on some occasions). The key difference is that those principles, when applied to IEDs tend to be associated with events and activities that happen faster, more intensively, with greater consequences and exhibiting much more rapid change.

MA actors always have to consider the operating envelope (the scope of circumstances and activities) within which they are prepared to work, irrespective of the country or type of contamination they face. In traditional MA the choices they make nowadays are informed by experience gained, and lessons learned, over the last 25 years and more. Most activities, and the weapons that are encountered, are relatively well understood, have been addressed before and offer low levels of uncertainty to authorities, planners and operators. Even then there are dimensions that need careful consideration – an organisation and its operators comfortable with finding and destroying unexploded hand grenades and mortar bombs is not generally as well prepared to address a fuelled up rocket or missile. If they do encounter such a requirement, they stop, consider the situation, discuss whether other better able organisations should address the task or whether there is a justifiable need for them to do so themselves. If so, they seek out the right expertise, procure specialist equipment, plan the operation carefully and only carry out the work when they are properly prepared to do so.

When dealing with IEDs the situation is the same, but the circumstances are less well understood, the weapons may be less easy to define, the situation may change often and rapidly and may be associated with wider issues of insecurity and potential proximity to conflict. There may also be huge humanitarian pressure along the lines of ‘something must be done’. Situations where organisations are much less well prepared than they are used to, combined with extreme pressure to find a way to do something, bring a wide range of risks at strategic, operational and technical levels.

The closer IED operations are to traditional MA mine action (and some IEDD operations are very similar in many ways to traditional mine action) the lower the demands on information management, risk management, quality & safety management, and other features of the response. The further away from those circumstances operators choose to work (more insecure environments; more complex and challenging types of IED) the greater the demands and the more unforgiving the results of any failure or mistake. At this stage it is hard to quantify any relationship between increased challenges and increased management capability (and cost), but it is reasonable to say that the relationship is not a linear one – it is more likely to be exponential – a bit more challenge/capability implies a lot more ability/cost.

None of this means that MA should not become involved in aspects of IED contamination and response, but it does mean that there is a need for considered, reasoned, evidence-based, risk management thinking of a high order. Not every actor in mine action has demonstrated that level of strategic, planning and operational ‘thinking and doing’ ability in the past.

Early development of MA

Current circumstances present some parallels with the situation in the early 1990s as mine action established itself and took ownership of some (although not all) aspects of a discipline (mine clearance) that had previously been almost exclusively military. Today MA is taking ownership of some aspects of the IED issue. In the same way that MA never took ownership of all aspects of what was then known as mine clearance (in particular combat mine clearance), so it is clear that mine action will never take ownership of the entirety of responses to IEDs.

The initial incursion of (what is now known as) MA was initially greeted with the greatest suspicion and some hostility by military forces. The prevailing view was that this was a military issue, best addressed by specially trained military operators, and best left well alone by civilian amateurs. By the second half of the 1990s perceptions had shifted dramatically; it became common for those same military units to ask MA NGOs for opportunities to expose military personnel to the realities of large scale mine action – something that most military units had not done on a substantial scale since the end of World War II (WWII).

Much of the first several years of modern MA was taken up in acrimonious and sometimes interminable technical discussions about how, and whether, to move away from traditional military mine clearance procedures (three operators in a lane, lying on their stomachs for instance), through intermediate steps (two operators in a lane; one operator at the front of the lane, another sitting at the rear of the lane observing), until eventually procedures adapted to the humanitarian context (one operator working in the lane, in a position of comfort and ergonomic efficiency, with appropriate protective equipment), were adopted and widely accepted.

Should deminers do EOD ?

It is not often remembered that in the early 1990s there was an extended debate about whether ‘deminers’ should be allowed to engage in EOD. A number of individuals and organisations took the view that deminers should just clear mines. If they came across an item of UXO they should mark it, report it and leave it for a specialist explosive ordnance disposal team to arrive. There were suggestions that EOD was more complicated than demining and required a higher level of skill and knowledge than that required to deal with mines.

The counter-argument was that it made no sense to demine an area of land, but then leave it containing other explosive hazards. In the end it was decided that the basic principle should be that a team should be able to deal with any of the devices it encountered during clearance operations, up to certain limits of weapon size, type and contents. Eventually standards were established for EOD competence levels. Today that argument is generally forgotten and most modern mine action actors would be astonished to hear that it had ever been seriously considered. It is well understood that some types of weapon fall outside the competence of a team leader to deal with. If such weapons are encountered, whether in the ground or in stockpiles, they are reported and decisions are taken about how best to respond. If a response is necessary, then a specialist team is assembled and appropriate equipment and procedures applied.

Technical focus

Modern MA was dominated by a technical focus for several years. Programmes were established on the basis of guesses about needs and responses to estimates of how many people, machines and dogs could be funded based on donor willingness to provide funds.

After several years of operations, it became clear that a great deal of clearance work had taken place in areas where a) there weren't any mines and/or b) the cleared land had not been put to any productive use or occupation. Over the following decade various attempts were made to bring a more balanced and informed approach to prioritising, tasking and planning operations. The results of those attempts included:

- Greater emphasis on non-technical survey (including analysis of historical and operational data);
- Linking mine action and development (LMAD) and subsequently adoption of results-based management (RBM) approaches; and
- The concept and practice of land release.

There is some risk that current discussions about IEDD could fall into the same trap of starting the discussion from the 'sharp end' of technical operations, rather than approaching it from the perspective of impact and need, before identifying suitable responses and the technical implications of implementing those responses. It took MA many years to re-set its perspective.

MA also faced some distortion of strategic thinking on the basis of significant overestimates of the scale of the landmine problem.⁵⁹ The scale of the IED problem remains poorly defined, although evidence to date suggests that the largest numbers of devices are associated with mass-produced improvised landmines. Numbers of booby traps and command wire/radio controlled devices in urban areas should become clearer as more operations take place in liberated towns and villages, and as more data becomes available. Until such information does become available, it is hard to predict the relative levels of effort required to address different types of IED and the associated equipment, competence and cost implications.

IMPROVISED DEVICES FROM THE PERSPECTIVE OF THE FIVE PILLARS OF MINE ACTION

- **Advocacy:** Some types of improvised device fall under the umbrella of existing international humanitarian law (IHL). The Ottawa Treaty is clear that an improvised device used as a landmine falls under the terms of the treaty as much as one manufactured in an industrial facility. Other types of improvised device are covered by the Convention on Certain Conventional Weapons (CCW). The challenge to advocacy organisations is not so much the definition of weapon types, but the nature of the organisations using those weapons. Advocacy against landmines and cluster munitions has been strikingly successful when dealing with internationally recognised governments, but much harder to effect when dealing with entities that reject basic humanitarian principles as commonly understood by the international community.⁶⁰ Advocacy against victim operated IEDs appears to be wholly consistent with established mine action advocacy practice and policies.
- **Victim assistance (VA):** Victims of IEDs exhibit similar injuries and indirect effects on life chances, families and dependents to those resulting from landmines and other types of ERW. Established approaches to VA are likely to be wholly applicable and appropriate to assisting IED survivors and victims. HI is engaged in VA work in Iraq.
- **Risk education:** MA actors are already applying RE principles and practice in communities at risk from IEDs. MA RE principles, adapted as is normal practice to the specific threat faced by communities, appear to be suitable for IED affected areas and populations. DDG and MAG are engaged in risk education operations in northern Iraq.
- **Stockpiles:** Stockpiles of IED components are encountered by MA actors when working in liberated areas. They exhibit many of the same characteristics as have previously been associated with stockpiles of abandoned manufactured landmines.
- **Clearance:** Clearance of IEDs has attracted the most attention during recent discussions. As discussed elsewhere in this study, a proportion of IEDs naturally exhibit characteristics associated with landmine or UXO contamination and can be addressed through application of normal land release principles. There have been some attempts to adopt different terminology for some aspects of response to IEDs (threat impact assessments instead of NTS, for instance), but there appear to be few obvious differences associated with releasing an area from the threat of landmines/UXO and that of IEDs. Definitions of clearance requirements have been identified as an aspect requiring further attention. Ensuring clarity amongst stakeholders about what is required and whether it has been achieved is not unique to IEDs, but has been an important aspect of MA survey and clearance standards and operations from the earliest days of the modern industry.

⁵⁹ Initial estimates in Afghanistan were of 20 million landmines. Today, when the great majority of landmines have been found and dealt with, it appears that that total number will be in the hundreds of thousands.

⁶⁰ Although the Afghan Taliban did reportedly say that "landmines are against humanity and the holy religion of Islam".

STANDARDS, TECHNICAL NOTES AND GUIDES

Discussions are ongoing in a number of forums about the most appropriate standards response to the need to increase confidence amongst MA stakeholders in terms of the acceptable scope and practice of IEDD.

Some authorities and operators appear reluctant to take independent action before applicable standards are agreed and published. While there clearly are aspects of dealing with IEDs that are likely to benefit from further clarification within international and/or national standards, existing IMAS already address many fundamental issues relating to quality management and land release, that encompass 90% or more of the issues relevant to current day-to-day operations.

On the basis of this study key observations are:

- The great majority of the IEDD work being carried out by MA operators in northern Iraq is similar in many ways to traditional mine clearance work. As such, most aspects of operations (site management, medical support, quality management, land release, etc.) are already addressed by existing IMAS. MA operators generally agree with this observation, but there is uncertainty at authority level about the extent to which adoption of existing standards is acceptable.
- IMAS 01.10, the Guide for the application of IMAS, offers an opportunity to address some significant areas of uncertainty including:
 - Circumstances and situations that include the presence of IEDs when it is appropriate to apply IMAS;
 - The applicability of established QM approaches to IEDD (detailed in IMAS 07.12, 07.30 and 07.40);
 - The applicability of land release methods to locations and areas contaminated with IEDs (as detailed in IMAS 07.11, 08.10 and 08.20);
 - The fundamental importance of IM to establishing, supporting, managing and conducting IEDD operations in an MA context; and
 - The importance of adopting risk management and RBM perspectives within operational decision-making processes;
- If IMAS 01.10 does not provide enough flexibility to address some aspects of the application of IMAS to IEDD, then there may be value in an IEDD-specific IMAS that focuses on those improvised devices that are effectively variations on weapon categories already familiar to MA actors – most obviously ILMs. Such an IMAS would:
 - Give authorities confidence in the applicability of standards to specified types of weapons;
 - Reassure donors about the appropriateness of MA operations against some improvised devices, under some circumstances;
 - Highlight those aspects of existing IMAS that need to be applied to a high standard (sometimes higher than in traditional MA);
 - Address aspects specific to improvised weapons (with some cross-over to aspects already relevant to anti-lift and other improvised aspects of traditional MA);
 - Set out general considerations, in terms of personnel competence, equipment and procedures that would need to be addressed by any organisation considering clearance of potentially IED-contaminated structures;
 - Define minimum data collection and reporting requirements;
 - Encourage appropriate information sharing; and
 - Help identify those aspects of IEDD that are likely to remain outside the scope of MA organisations.
- IEDD aspects that are expected to fall outside the bounds of MA/IMAS (in relation to the complexity of devices and/or the nature of the surrounding circumstances) are already being addressed by authorities and agencies within the military/security sectors. As and when standards have been developed and are made available, MA operators should have the opportunity to adopt relevant sections and elements:
- IEDD competence requirements merit further investigation, definition and promulgation, either through enhancement of existing EOD competence levels, or through a parallel or bolt-on set of IEDD-specific documents; and
- The poor standard of the BOI report seen by the study team, suggests that a review and update of IMAS 10.60 Safety & Occupational health – reporting and investigation of demining incidents is appropriate.

TNMAAs may be a useful means of communicating some more detailed information about IEDD operations, such as criteria for assessing operating envelope boundaries, IED (and potentially other weapon types) risk assessments and technical aspects of IEDs encountered by MA operators.

Other documentation (such as guides) may be useful in encouraging greater confidence in competence requirements and capabilities, but the primary means of establishing fine technical detail is likely to remain individual organisations' SOPs.

CONCLUSIONS AND RECOMMENDATIONS

1. TERMINOLOGY

Conclusions

- 1.1. Discussions of IEDs and IEDD as they relate to MA continue to be hampered by different understandings of terminology and acronyms. Action to establish standardised lexicons by UNMAS are to be welcomed, but it may not be possible to achieve a complete match of military and humanitarian use of terminology (as is already the case with military and humanitarian mine clearance and EOD terminology).
- 1.2. The language of IEDs and IEDD has not yet been fully integrated with already existing humanitarian strategic planning, RBM and land release approaches. There is a continuing risk that some new terminology may be developed for use in an IED context when wholly appropriate terminology already exists in the MA sector.

Recommendations

- Standardise terminology relating to IEDs and IEDD wherever possible. The UNMAS IED lexicon, as well as IMAS 04.10, should be used as the basis for MA discussions relating to IEDs and IEDD, and for the classification of IEDs and their key characteristics
- Avoid developing new terminology to describe methods, processes and tools that are already adequately addressed in MA terminology

2. GENERAL APPROACH

Conclusions

- 2.1. IEDs are not entirely new, or different from other types of weapon encountered by MA; mine action actors have encountered wholly or partly improvised devices throughout the last 25 years. The circumstances in which IEDs are encountered may include areas where conflict has only recently concluded and where there may be lingering hostility from some elements; such circumstances are challenging and need to be handled carefully, but they are not substantially different from those found in a number of previous mine action programmes. MA actors have access to the knowledge, experience and ability to assess situations relating to IEDs, take decisions about what is, and what is not, appropriate to do.
- 2.2. Humanitarian IEDD applies many of the same principles and concepts that humanitarian mine action (MA) does, but with important operational and technical differences: IEDD demands a higher standard of application of information management (IM), risk management (RM), quality management (QM) (including identifying, planning and implementing appropriate and effective training, equipment, procedural and procurement responses), occupational health and safety management (OHSM), results-based management (RBM), operations management and strategic thinking than has often been necessary in traditional MA.
- 2.3. MA actors still show some shortfalls in application of those approaches to dealing with landmines and relatively straight-forward UXO; the consequences of such shortfalls in a traditional MA context are mostly limited to inefficiency and waste of time and money (although there may also be safety implications). The IED context, particularly in a potentially insecure environment, is much more unforgiving; similar shortfalls result in immediate safety consequences including death and injury to operators, as well as potentially wasting time and money.
- 2.4. Current discussions about IEDs and MA show some parallels with the situation in the early 1990s as the humanitarian sector took ownership of some (although not all) aspects of a discipline (mine clearance) that had previously been almost exclusively military. Similar issues arose when MA teams first started engaging in EOD. In every case, despite initial uncertainty, discussion led to a pragmatic and appropriate conclusion whereby MA actors deal with those weapons that have a humanitarian impact, under political and security circumstances that are acceptable, and which can be safely and effectively dealt with by technical teams. Weapons and situations that fall outside acceptable technical and circumstantial boundaries are dealt with on a case-by-case basis, through bought-in specialist services, specially developed in-house capabilities, or by allocation to other agencies with the necessary capabilities.

Recommendations

- Address IEDs under all five pillars of mine action Start from the assumption that existing MA methods and approaches including strategic planning, RBM, land release, QM and IM are applicable to almost all aspects of humanitarian IEDD
- Adopt an enhanced approach to all normal aspects of information, risk and quality management
- When assessing what IEDD activity is appropriate (considering circumstances, competence and equipment aspects), adopt a similar approach to that used when assessing complex EOD tasks

3. STRATEGY/POLICY

Conclusions

- 3.1. There is uncertainty at donor level about the scope of IEDD that is suitable and appropriate for funding, and the standards to which MA actors are engaged in IEDD operate. National authorities have similar concerns about how to define the scope of MA IEDD, how to ensure the competence of operating organisations and what standards to apply.
- 3.2. MA actors continue to be wary of engaging in operations that appear to compromise their declared neutral and independent status. At the same time, it is clear that ISIS are unlikely to see international organisations as anything other than potential targets. ISIS does not appear to have launched any direct attacks to date on MA actors.
- 3.3. There is a risk that discussions about IEDs and IEDD within the MA context are dominated by consideration of narrow technical detail, rather than starting from a strategic/RBM perspective, identifying humanitarian needs, assessing the additional MA capabilities necessary to address those needs, and only then focusing on the practical, technical, competence and logistic implications. There is an associated, and opposite, risk that important technical aspects can become lost to sight beneath broader strategic, economic and humanitarian considerations. An appropriate balance, remaining aware of interactions between, and implications of, needs and responses at different levels needs to be maintained within operating organisations and authorities at every management level.
- 3.4. Operations by MA actors in areas where there is an overwhelming and urgent humanitarian imperative may come under great pressure that 'something must be done'. MA actors may find it hard to balance the demands of an effective risk-based approach to operational decision-making with the pressure to help people in dire circumstances when other IEDD resources are unavailable or dedicated to other priorities.
- 3.5. The current high profile of IEDs has the potential to reduce awareness of other pre-existing landmine and ERW legacy issues.

Recommendations

- Use strategic planning and RBM methods to develop as up-to-date and accurate as possible an understanding of the humanitarian context, to establish the most significant humanitarian impacts and needs relating to the presence of IEDs
- Use RBM methods to provide a framework for decisions about IEDD policy, priorities and practice. Always question why a task is necessary, not just how to do it
- Apply non-technical methods to identifying, collecting and analysing all data relevant to understanding the overall context
- Be wary of assumptions made on the basis of limited data, or pressure to take action for the sake of being seen to do something;
- Define the capabilities necessary to satisfy the main humanitarian needs, rather than look for needs that happen to align with possible/existing capabilities
- Adopt a realistic and pragmatic approach – if skills or equipment necessary to develop certain capabilities are unlikely to be available then look for alternative approaches that are feasible, or accept that some capabilities may not be available
- If the necessary capabilities are not available, then be prepared to reject tasks for which operators are not currently prepared/competent
- Conduct further studies into improved use of the operating envelope tool in IEDD, EOD and land release contexts

4. IMPACTS, NEEDS AND AFFECTED PEOPLE

Conclusions

- 4.1. The impacts of IEDs on affected populations are not yet well understood in either absolute or proportional terms. There is a risk that IEDD operations may be poorly selected, defined and prioritised if tasking decisions are not informed by RBM analysis. The scale of response to IEDs is likely to fall well short of the scale of the need/demand (as has often been the case in mine action programmes). Stakeholder expectations (amongst local authorities and affected communities) will be hard to satisfy in many cases. Inefficiencies in prioritisation and tasking processes may lead to stakeholder dissatisfaction and consequent disaffection and hostility towards MA actors.
- 4.2. Gender and diversity (G&D) aspects of IEDs and IEDD in the KRG region (and elsewhere) have not yet been explored in a structured way; landmines and general ERW typically have a direct impact on those who access land for work, travel or leisure, with an indirect impact on families, communities and economies. IEDs placed in houses and local infrastructure have a direct impact on all members of a family or community, irrespective of age, gender, ethnicity or other personal characteristics.
- 4.3. There appear to be relationships between the ethnic and religious history of villages and zones with towns and cities and the likelihood that ISIS have used IEDs in residential properties. It is not clear that NTS systems are capturing relevant data to facilitate analysis.

Recommendations

- Use RE and CL functions to assist with understanding of, and management of, affected people's needs and expectations
- Select, prioritise and allocate tasks that make a difference to affected people, rather than to keep available assets busy;
- Collect sex and age disaggregated data (SADD)
- Use NTS methods to improve understanding of ethnic and religious factors relating to the likelihood of IED use within inhabited areas and properties

5. TECHNICAL/OPERATIONAL

Conclusions

- 5.1. The IEDD 'operating envelope' can be considered in terms of a) the technical challenge presented by different IEDs and the tactics with which they are employed and b) the security environment within which operations against IEDs are carried out.
- 5.2. MA actors encounter large numbers of IEDs used as landmines; they are not the only type, but it is important to develop and maintain capabilities to respond to what is being encountered, not what might theoretically be encountered.
- 5.3. In the Kurdistan Regional Government (KRG) area:
 - MA actors are, for the main part, addressing activities that have parallels with traditional MA (open field clearance of belts of improvised landmines and some limited mechanical processing of rubble from collapsed buildings);
 - Commercial operators are working in parts of the operating envelope that most humanitarian agencies would be uncomfortable about, including recently liberated areas where there may be a higher risk of attacks by 'stay behind' units, and against booby-trap IEDs in buildings; and
 - Military/Peshmerga units work in the most challenging circumstances against the most challenging devices, including during ongoing fighting.
- 5.4. Responding to the problems presented by IEDs includes many aspects that can be addressed by MA actors (although with some additional equipment, training and procedural responses), but determining the boundaries of appropriate MA activities for individual organisations, operating in different areas, under a range of circumstances, and in light of the inconsistencies and changing nature of IEDs, remains a difficult and evolving task.

- 5.5. Some activities carried out by MA actors are closer to the boundary of the humanitarian operating envelope than others; very careful consideration is required before 'pushing the envelope' especially in terms of the competence of field operators, supervisors and managers.
- 5.6. MA actors are generally avoiding the clearance of houses and other buildings suspected to contain IEDs. Traditional mine action equipment is inadequate for house clearance, which would require a range of specialist equipment (to locate/counter electronic elements of IEDs) and procedures, as well as a level of skill, knowledge and operational support generally unavailable outside military and security organisations (and in relatively short supply even within those agencies).
- 5.7. IEDD operations demand some different/additional equipment and competences (skills, aptitude and knowledge) from those associated with traditional mine action. Operating organisations need to ensure a mix of personnel, equipment and procedures, appropriate to the operational/threat circumstances and conditions they expect to encounter.

Recommendations

- Apply established land release approaches to IEDD operations; adapt approaches, rather than developing new ones, if circumstances justify doing so
- Drive IM systems to support an up-to-date understanding of weapon types and tactics within different operating areas and over time
- Ensure that IEDD personnel recognise the collection of data (technical and non-technical) as a basic and constant part of their job function
- Use the UNMAS IED lexicon as the basis for characterising different devices; collect and record data about every device that is found to support meaningful statistical analysis, trend identification, etc.
- Gather data relating to the ageing/degradation of IEDs; ensure that analysis of data feeds into risk management decision-making processes
- Conduct further research into the ageing and degradation of improvised devices, including the establishment of test areas for non-energetic components such as batteries

6. HUMAN RESOURCES

Conclusions

- 6.1. MA actors are finding it hard to identify, recruit and deploy personnel with existing IEDD experience and qualifications.
- 6.2. There is uncertainty about the competence requirements associated with different IED types and working circumstances. There is no recognised set of requirements (comparable to those associated with EOD levels) to help MA actors recruit, train and monitor IEDD search and clearance staff. Advice from IED-experienced sources is inconsistent, placing different emphasis on operations in different parts of the operating envelope.
- 6.3. MA actors require competent operations managers and technical trainers, supported by an effective IMS, as well as field operators.
- 6.4. Personnel competence is primarily a QM issue, closely associated with risk management, relying upon a clear definition of required capability. MA actors may be able to establish such requirements in relation to some IEDD operations (such as those that exhibit close parallels with traditional land release work), but require further guidance in relation to more complex devices in more difficult circumstances (such as those associated with booby-trapped buildings).

Recommendations

- Assess competence and equipment requirements in response to specific capability requirements. In the absence of IMAS or other standards, document analysis and definition of requirements, as well as of training and procurement responses to satisfying agreed requirements
- Avoid trying to make everyone an expert; establish competence requirements appropriate to different jobs within the operating organisation (as deminers have different requirements from supervisors who have different requirements from operations managers)
- Consider sharing advisers/trainers with specialist technical knowledge, as well as specialist equipment, between MA operating organisations

7. INFORMATION MANAGEMENT

Conclusions

- 7.1. IED circumstances and conditions change quickly and often; operators need to be able to respond equally quickly if they are to remain safe, effective and efficient; doing so demands IM of the very highest order; evidence from the study mission suggests there are some gaps in the IM approach to addressing IEDs at the operational level (relating to the types of data collected, analysis and validation of that data, reporting and dissemination); there are also likely to be IM gaps at the strategic and prioritisation levels.
- 7.2. Security forces represent an important source of information about technical, tactical, social and geographical aspects of IED use. Establishing effective methods for information sharing with relevant military, police and security organisations will have a direct positive effect on planning, prioritisation safety, quality, efficiency and RBM aspects of humanitarian responses to IEDs.

Recommendations

- Maintain a constant focus on IM in relation to all aspects of IEDs and IEDD operations
- Adapt existing IMSs to the needs of IEDD rather than developing separate IMSs
- Specify data collection requirements on the basis of what is needed to understand the situation, task, threat and performance of IEDD operations; don't wait for IMSMA forms to catch up; find ways to manage information to support safe, effective and efficient operations
- Maintain pressure on authorities and database owners to analyse data and share results
- Establish informal information sharing networks if formal mechanisms are inadequate (while continuing to support improvements in formal mechanisms)
- Do not wait for formal IM systems to be developed before collecting and analysing data
- Establish linkages with military and security organisations to gain access to relevant non-technical and technical information and to encourage good practice (such as the recording/marketing of areas and buildings that have been subject to search and IEDD).

8. RISK MANAGEMENT

Conclusions

- 8.1. The study team did not see evidence of widespread and comprehensive application of structured risk management thinking and processes to IED situation analysis and IEDD development. Informal risk management takes place in respect of some aspects of IEDD, but not in a consistent or fully evidence-based way, and not at every level of policy, planning and operations. Risk management practice is entirely applicable to all aspects of IEDD planning and operations and would provide a helpful structure for authorities, planners and operators to reach common understanding of the challenges they face and the responses they choose to apply.
- 8.2. It is not clear that decisions to conduct manual RSPs against large numbers of IEDs used as landmines have been taken into consideration of the normal hierarchy of safety risk mitigation measures. Further efforts to find alternative methods that reduce direct personnel exposure to IED risk are desirable.
- 8.3. Decisions about equipment, procedures and competence requirements need to be based on an effective risk management approach, identifying and describing relevant risks, assessing and evaluating them, and establishing the mitigation measures necessary to bring risk to a tolerable level (normally one that is as low as reasonably practicable - ALARP).

Recommendations

- Apply structured RM approaches to all aspects of understanding IEDs and IEDD. Maintain awareness of different risk mitigation options (avoiding, removing risk source, reducing likelihood and/or consequence, sharing risk, etc.) at all times. Review risk mitigation measures on a continual basis. Document all risk assessment, evaluation, mitigation and review in relation to IEDD
- Treat the prevailing security situation and the technical challenges of different IED types as separate (but related) issues. Develop technical capabilities appropriate to the types of IED associated with the tasks that deliver the greatest humanitarian impact. Enable technical action through appropriate risk management measures in response to the prevailing security situation

- Consider opportunities to manage risk by delaying tasks, until the security situation improves (when the possibility of stay behind elements has reduced to a tolerable level), or IEDs are more likely to have become non-functional (as batteries lose power, etc.)
- Always question whether better, safer options may be available for IEDD. Avoid exposing IEDD operators and support staff to risk unless a) the risk has already been mitigated to an acceptable level b) no other practicable technical method is available within an acceptable timescale and/or c) the importance of the task justifies it

9. QUALITY MANAGEMENT

Conclusions

- 9.1. Established MA QM approaches are wholly applicable to IEDD operations; specific detail needs to be agreed in relation to IEDD operator competence and building clearance requirements.
- 9.2. The ability to manage improvement/learning cycles quickly and effectively is central to IEDD; accidents and near-misses represent nonconformities of the greatest significance reflected in the additional, formal attention they receive through boards of inquiry (BOIs); an open, honest and transparent approach to investigating accidents involving IEDs is essential to avoid further accidents; evidence seen by the study team suggests there are significant weaknesses in the conduct of accident inquiries by some MA actors.

Recommendations

- Apply existing QM approaches to all relevant aspects of IEDD. Existing IMAS requirements for internal and external QM systems and monitoring address the great majority of IEDD operations. Task-specific quality requirements should be documented in task orders, as is normal in MA. Additional or unusual aspects, such as when checking buildings, should be discussed, agreed and recorded by key stakeholders
- The absence of an IEDD-specific IMAS does not prevent the application of normal QM processes, but reinforces the need for operators, authorities and donors, as appropriate, to record their analysis of requirements and methods to satisfy those requirements

10. LEGAL/LIABILITY

Conclusions

- 10.1. There is considerable uncertainty, at national authority level, and amongst some operating organisations about the liability implications of IEDD operations in residential properties.
- 10.2. In some cases, searching and clearing large numbers of houses may prove unjustifiably costly; in others IEDD operations may result in inadvertent or unavoidable damage to privately owned buildings; decisions to demolish buildings may give rise to complex and hard to define legal/liability issues.
- 10.3. Shortcomings in application of structured risk management approaches to the development of IEDD procedures and the selection and training of IEDD staff may leave MA actors exposed in the event of court action following accidents.

Recommendations

- Include legal and liability issues in structured risk management processes and procedures
- Document key decisions with potential legal/liability implications
- Obtain counter-signatures from relevant authorities before engaging in any activity that may bring legal/liability consequences

11. ECONOMIC, FINANCIAL AND ENVIRONMENTAL

Conclusions

- 11.1. The real or feared presence of IEDs in liberated towns and villages presents both a direct hazard to returning people and a reason for them to stay in IDP camps where conditions are poor and where they may be susceptible to radicalisation. Populations remaining in IDP camps represent an additional burden on government budgets and their continued economic inactivity reduces government tax revenues.

- 11.2. In the absence of reliable strategic/RBM analysis of IEDD needs there is a risk that funds will be inefficiently allocated, raising costs and reducing the benefits that accrue from humanitarian IEDD action.
- 11.3. A failure to demonstrate appropriate, effective and efficient use of funds could lead to donor disenchantment and disengagement from some aspects of IEDD.
- 11.4. IEDs may impact the environment through toxic materials entering soil and water sources, during manufacture of the weapons or while emplaced in the ground.

Recommendations

- Apply RBM processes and procedures to ensure clear understanding of economic and financial context of IEDD operations
- Apply effective environmental management procedures (in accordance with IMAS 10.70) to IEDD planning and operations

12. STANDARDS

Conclusions

- 12.1. Existing IMAS address many aspects of an operational response to IEDs.
- 12.2. There may be merit in developing a new IMAS to a) highlight the applicability of other available IMAS and b) to address any gaps in the standard system specific to IEDs; other action could be addressed through updating IMAS 01.10.
- 12.3. Strengthening of IMAS 10.60 Safety & Occupational health – reporting and investigation of demining incidents would support efforts to improve IEDD accident investigations.
- 12.4. Technical aspects specific to IEDs are likely to be best addressed using technical notes and standing operating procedures (SOPs).
- 12.5. Standards relating to IEDD that fall outside expected MA/IMAS boundaries are being developed by authorities and actors in the military/security sector.

Recommendations

- Review and update IMAS 01.10 to provide clear guidance on the applicability of IMAS to humanitarian IEDD
- Review other IMAS to identify adjustments to clarify applicability and ease application to situations where IEDs may be present
- Consider the value of an IEDD-specific IMAS, highlighting relevant aspects of IMAS and their application in an IED environment
- Review and improve IMAS 10.60 to include more focus on the analysis of data and conduct of root cause analysis to identify effective corrective/improvement actions
- Review and develop as appropriate additional guidance on competence requirements through:
 - Adjustments to existing EOD level specifications for those IEDs that can be treated along similar lines to landmines and some UXO
 - IEDD specific specifications for those types of IED that require fundamentally different operational planning, support and practice
- Identify standards in other sectors (security, military, etc.) that may be suitable under circumstances that fall outside those addressed by IMAS

SELECTED REFERENCES AND BIBLIOGRAPHY

- UNMAS Improvised Explosive Device Lexicon, dated 18 July 2016
- Coalition Joint Force C-IED EOD Defeat Course Lexicon version 1.4, dated 21 May 2016
- IMAS 04.10 Glossary of mine action terms, definitions and abbreviations, Ed.2 Amendment 7
- History of Landmines, Mike Croll, Pen and Sword Books, 1998, ISBN 0-85052-628-0
- Caring for Landmine Victims, International Committee of the Red Cross, 2005
- MAG Ninewah Rapid Contamination Assessment, September 2015
- ISO 31000 Risk management – Principles and guidelines – First Edition, 2009
- Countering the threat posed by improvised explosive devices; Report of the Secretary General of the United Nations; 25 July 2016

LIST OF ACRONYMS

AGE

Anti-Government Element

ALARP

As low as reasonably practicable

APM

Anti-Personnel Mine

APMBT

Anti-Personnel Mine Ban Treaty

AXO

Abandoned Explosive Ordnance

BAC

Battlefield Area Clearance

BOI

Board of Inquiry

CCW

Convention on Certain
Conventional Weapons

CHA

Confirmed Hazardous Area

C-IED

Counter IED

CL

Community Liaison

CNIED

Crush necklace IED

CP

Contact point

CWIED

Command Wire IED

DAESH

Transliteration of Arabic acronym
for IS, ISIS, ISIL, etc.

DCA

DanChurchAid

DDG

Danish Deming Group

DF

Direct fire

DMA

Department for Mine Action (Iraq)

DoD

Department of Defense (US)

ECM

Electronic Counter Measures

EF

Enemy forces

EFP

Explosively Formed Projectile

EMS

Environmental Management
System

ERA

Environmental Risk Assessment

EOD

Explosive Ordnance Disposal

ERW

Explosive Remnant of War

FF

Friendly forces

FSD

Fondation Suisse de Déminage/
Swiss Foundation for Mine Action

FP

Firing Point

G&D

Gender and diversity

GICHD

Geneva International Centre for
Humanitarian Demining

HI

Handicap International

HME

Home-made explosive

IDF

Indirect fire

IDP

Internally Displaced Persons

IED

Improvised Explosive Device

IEDD

IED Disposal

IHL

International Humanitarian Law

IKMAA

Iraqi Kurdistan Mine Action
Authority

ILM

Improvised Landmine

IM

Information Management

iMMAP

Information Management and
Mine Action Programme

IMS

Information Management System

IMAS

International Mine Action
Standards

IMSMA

International management system
for mine action

IP

Implementing Partner

IR

Infra-red

IRC

International Rescue Committee

IS

Islamic State

ISIL

Islamic State in Iraq and the
Levant

ISIS

Islamic State in Iraq and Syria

JGO

Janus Global Operations

KRG

Kurdistan Regional Government

LIS

Landmine Impact Survey

LMAD

Linking Mine Action and
Development

LMM

Locally Manufactured Munition

LOS

Line of sight

LR

Land Release

MA

Mine action

MAG

Mines Advisory Group

MAP

Mine Action Programme

MFA

Norwegian Ministry of Foreign Affairs

MOI

Ministry of the Interior

MoU

Memorandum of Understanding

MRE

Mine risk education

NGO

Non-governmental organisation

NMAS

National Mine Action Standards

NPA

Norwegian People's Aid

NSA

Non-state actor

NTS

Non-Technical Survey

OB/OD

Open Burning/Open Detonation

OHSM

Occupational health and safety management

PPE

Personal protective equipment

PPIED

Pressure Plate IED

PRIG

Projected Recoilless Improvised Grenade

QA

Quality Assurance

QM

Quality Management

QMS

Quality Management System

RA

Risk Assessment

RBM

Results-based management

R/C

Radio Controlled

RCA

Root cause analysis

RCIED

Radio Controlled IED

RE

Risk Education

RM

Risk Management

RPS

RPS Explosives Engineering Services

RSP

Render Safe Procedure

SADD

Sex and Age Disaggregated Data

SHA

Suspected Hazardous Area

SIED

Suicide IED

SOPs

Standing Operating Procedures

SVBIED

Suicide Vehicle Borne IED

TFM

Technical Field Manager

TIA

Threat Impact Assessment

TNMA

Technical Note for Mine Action

TS

Technical Survey

TWG

Technical working group

TWIED

Tripwire IED

UNDP

UN Development Programme

UNDSS

UN Department of Safety and Security

UNHCR

UN High Commission for Refugees

UNMAS

UN Mine Action Service

UNOCHA

UN Office for Coordination of Humanitarian Affairs

UNOPS

UN Office for Project Services

UXB

Unexploded Bomb

UXO

Unexploded Ordnance

VA

Victim Assistance

VOIED

Victim Operated IED

PM/WRA

Political Military/Weapons Reduction and Abatement (US State Department)

WWII

World War II

ANNEX A - A GENERAL OVERVIEW OF IEDs

There have been various methods of classifying types of IED over the last 50 years. Recent work by UNMAS to develop a standard lexicon of IEDs and IEDD reflects the types, categories and description adopted by military and humanitarian operators and authorities in a number of IED-affected countries. The UNMAS lexicon defines an IED as:

A device placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals and designed to destroy, incapacitate, harass or distract. It may incorporate military stores, but is normally devised from non-military components. Refers to a type of IED incident that involves a complete functioning device.

IEDs may be 'one-off' devices, they may be fabricated to a common, repeated general design, or they may be locally manufactured in large numbers to a standard design. An IED usually consists of the following components:

Power source – battery, spring, chemical, electricity main supply etc.



IED Power source consisting of multiple batteries (of different sizes)



9V Battery used as IED power source in Kurdistan (image credit: FSD).

Switch – there can be 2 switches, a safe to arm switch and a firing switch, though a single firing switch can also be used. Switches can be anything – two pieces of wire twisted together, two pieces of wire which are separate, watches, clocks, tripwires, pressure plates, radios, mobile phones, light switches, micro-switches, infra-red passive devices, infra-red active devices, light sensitive, match onto safety fuse etc.



Pressure plate IED switch – Kurdistan (image credit: FSD).



Light sensitive IED switch



Tripwire pull switch – Kurdistan (image credit: FSD).



Pressure release switch – Kurdistan (image credit: FSD).

Initiator – for a high explosive device, a detonator of some sort, normally military, commercial or home-made. For low explosive, a match onto safety fuse, a modified flash bulb, a modified light bulb etc.



Electric detonator used as IED initiator



Improvised initiator Kurdistan (image credit: FSD).

Main charge – for high explosive, military bulk explosive, military HE ordnance, commercial bulk explosive, home-made explosive (HME) etc. For low explosive, black powder, propellant, home-made explosive and so on.

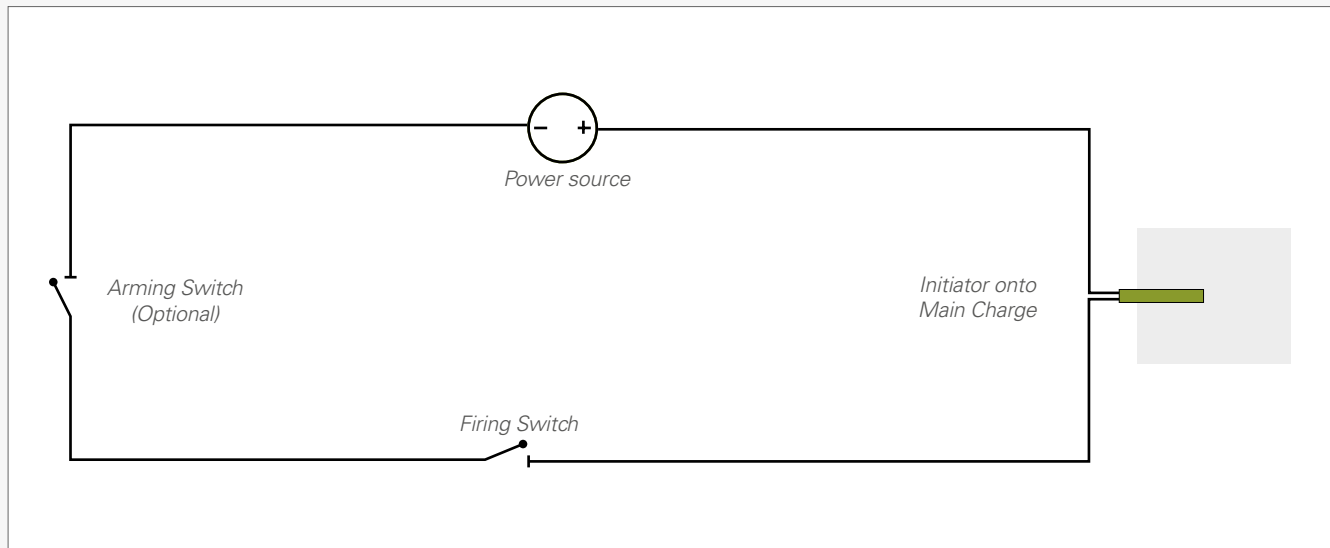


IED main charges in plastic containers – Kurdistan (image credit: FSD).



Locally manufactured metal cased IED main charges - Syria

Container – the item which houses the main charge or entire device.



Schematic layout of an IED (image credit: GICHD).

There are 5 main groups of IEDs:

Time IEDs: designed to function after a pre-determined time delay, set by the user once the device has been constructed, emplaced and armed. Time initiation switches can utilise electronic, mechanical, igniferous⁶¹ or chemical means of initiation. Electronic timers have the potential to facilitate very long delays between emplacement and initiation, possibly up to several months, and are only limited by the discharge rate of the power source employed. Mechanical timers tend to give a shorter delay between emplacement and initiation, more likely to be measured in hours rather than days or longer. Igniferous methods of initiation normally employ a type of burning fuse, and the delay between emplacement and initiation is normally measured in minutes. Time devices are normally used by enemy forces (EF) to target patterns set by friendly forces (FF), or pre-determined events which occur within a known period of time.

Command IEDs: designed to function at the command of the user, ensuring it functions at the optimum moment of attack in order to maximize the targeted effect. Command devices can be initiated by a physical link (command wire or command pull) or by radio controlled (R/C) transmitters and receivers. The range of RC devices depends on the type of transmitter and receiver used. In order for an attack using a command device to be effective, the user, in most instances, needs a clear line of sight (LOS) from the firing point (FP) to the contact point (CP). This enables the user to choose the optimum moment of initiation, by ensuring that the target is in the immediate vicinity of the device, thus maximising device effect. However, it should be noted that this is not always the case, and 'dickers' may be used in this process. A 'dicker' is someone who watches the IED and is in contact with the firer, and can tell the firer to attack.

Victim operated IEDs: designed to function due to an action by the intended target. They can be, for example, target pressure, pressure release, pull, anti-lift and infra-red (IR) signature. Victim operated devices are often indiscriminate, and therefore their emplacement can deny an area to all forces (including those on the same side as the user), and civilian communities.

Projected IEDs: can be used in the direct fire (DF) or indirect fire (IDF) role to deliver a projected main charge to a target. The most common types of main charges used are rockets and mortars, both conventional and improvised. Methods of initiation for projected devices are normally time or command, but can also be victim operated.

Suicide IEDs: suicide devices are carried to target, either by vehicle (SVBIED) or on foot (SIED), by the perpetrator. Upon reaching the target, the perpetrator initiates the device. Suicide devices are normally initiated at the command of the perpetrator carrying/driving the device. However, it is not uncommon for these devices to have multiple firing switches, including R/C and time back-up.

⁶¹ Igniferous means 'produces fire' and usually relates to safety fuse, lit at one end, and burning at a known rate until it reaches the initiator at the other end; the longer the fuse the longer the delay time.

CLASSIFICATION OF IEDs

The following table shows which types of IED come under which group.

Group	Type of IED	Comments
Time	Electronic Mechanical Igniferous Chemical	Can be target specific OR random in crowded area
Command (if both ends of command wire or pull wire are secured and wire is fully searched and confirmed as the same one could be dealt with by EOD level 3+ personnel)	Command wire (CWIED)	Firer within line of sight or can use a dicker
	Command pull	Firer has to be close to target
Command (not suitable for disposal by non-IEDD personnel)	Radio controlled (RCIED)	Radio or phone, garage door opener and similar Firer within line of sight or can use a dicker
Victim operated (simple, non-modified versions of these can be dealt with by EOD level 3+ personnel)	Pressure plate (PIED)	Can be classed as improvised landmine Can be modified if patterns set, to delay disposal, to target unwary operator
	Tripwire (TWIED)	Can be classed as improvised booby trap Can be modified if patterns set, to delay disposal, to target unwary operator
	Crush necklace initiated IED (CNIED)	Can again be classed as improvised landmine, albeit with a different type of pressure initiated switch Can be modified if patterns set, to delay disposal, to target unwary operator
Victim operated (not suitable for disposal by non-IEDD personnel) This list is not exhaustive. Switches only limited by EF imagination	Infra-red passive	Area burglar alarm, motion sensor
	Infra-red active	Burglar alarm for doors, windows etc.
	Anti-lift	Under any item, micro-switch
	Tilt switch	Under vehicle, in container etc. – mercury tilt switch, home-made tilt switch
	Pressure switch	Under carpets, car tyre etc. Micro-switch, improvised matchbook and similar
	Light sensitive	Detect change in light levels
	Magnetic	Detect change in magnetic field, metallic items
	Motion sensitive	Detect ground tremors
	Household switches	

Group	Type of IED	Comments
Projected	Recoilless (projected recoilless improvised grenade (PRIG))	Shoulder launched, firing point detected by counterweight
	Improvised hand grenade	Thrown. Can have standard grenade type initiation (i.e. safety fuse to detonator) or improvised (e.g. micro-switch held in closed position by glass etc.)
	Mortar (normally allocated model numbers for similar bombs)	Can be any calibre
	Rocket (improvised types normally allocated model numbers for similar rockets)	Can be home-made or military rocket fired by improvised launch system
	Explosively formed projectile (EFP)	Refers to main charge type but can be classed as projected
Suicide	Vehicle borne (SVBIED)	Usually hand-activated switch by person in car, often with back up time or R/C switch
	Person borne (SIED)	Usually hand activated switch by person carrying IED, often with back up time or R/C switch

ANNEX B - AN OVERVIEW OF IEDD OPERATORS AND OPERATIONS IN NORTHERN IRAQ

MILITARY AND SECURITY FORCES

Peshmerga

Initial encounter with IEDs at a given location is generally experienced by Peshmerga units (and Iraqi Army units in the south), including EOD teams. They address IEDs to the extent necessary to support ongoing military action – breaching fields of ILMs, dealing with devices impeding the movement of troops and clearing structures required for immediate military functions.

The Peshmerga work in conflict areas, face very different circumstances to the NGOs and have to deal with very different problems. Peshmerga teams had little specific knowledge when first faced with IEDs, were aware of that lack of knowledge, recognised that they did not understand how the devices were constructed, but relied upon general experience with explosives and weapons, as well as the courage of their operators, to find and destroy IEDs.

The Peshmerga's primary function is to make roads and access routes safe and to be ready to provide support during attacks on ISIS. Teams have to be very responsive and able to operate quickly so that areas can be taken from ISIS in as short a time as possible. One consequence is that the Peshmerga Engineer Regiment has suffered many casualties. The Peshmerga's own tactics have been seen to influence ISIS IED tactics, particularly in terms of adopting unexpected attack routes into villages in open country.

The Peshmerga Engineers may be called on to operate anywhere along a 1,000 km front line with ISIS. That means that they need large numbers of trained staff, and trainers to train operators, but the reality is that they do not have the resources necessary for the scale of the task.⁶² The Peshmerga aim to clear houses of IEDs, rather than destroying them. Doing so already represents a major economic challenge, one that is likely to become larger as time goes on and more areas are liberated. Once the immediate conflict is over and ISIS forces have been ejected, their focus is not primarily on reconstruction or public safety, but on moving on to support the next military engagement. Peshmerga units do typically clear key infrastructure, such as power stations and public water supplies, but they do not have resources in sufficient numbers to engage in wider reconstruction/humanitarian clearance operations. Iraqi Army units perform similar functions in areas under their control.⁶³

Coalition Military Forces

More than 150 specialist military trainers, from a number of nations (but mostly the UK), within the Coalition Forces, provide training and support to Peshmerga C-IED and IEDD teams. All IED courses carried out in the KRG area are sanctioned by the military HQ in Baghdad (Operation Inherent Resolve) to ensure the same programme of instruction across the whole of Iraq and Kurdistan. A centralised hub produces all training directives and has a set of terminology used in all locations in Arabic, to help ensure that one standard is being met. The primary aim of the courses is manoeuvre support – clearing villages and roads, with less focus on areas clearance. The preference is to mark areas and carry on with the battle.

Training courses focus on three main types of IED: time; command; and victim operated. Once the Peshmerga have moved through an area, time and command IEDs become less significant as a threat, so the residual threat facing villages is primarily one of VOIED.⁶⁴

⁶² Discussions with Peshmerga senior Engineer Officer and Coalition Military Forces, Erbil, 30th August 2016.

⁶³ The Iraqi Army are reported to have suffered hundreds of casualties during IEDD operations.

⁶⁴ Discussion with Coalition Military Forces, Erbil, 30th August 2016.

Commercial contractors

Commercial contracts have been issued for the provision of specialist IEDD services in Fallujah and Ramadi. Janus Global Operations (JGO) work in Ramadi; Optima in Fallujah.⁶⁵ No commercial contracts have been issued for areas in the KRG region.

JGO teams focus on VOIEDs in permissive areas. JGO managers assess a range of criteria relating to the security situation, but one important one is for there to be a functioning police force in place. If the police are not comfortable going into an area, then JGO will not do so. There have been occasions when tasks have been refused, despite a positive security assessment from the tasking agency (UNDP), because local police will not accompany the IED team. JGO teams will not operate in areas other than permissive without a heavy security presence. Even in semi-permissive environments, where ISIS forces have been removed or are 'under control', and that may have been quiet for three or four months, there remains a chance of indirect fire (from mortars or rockets) or sniper attacks.⁶⁶

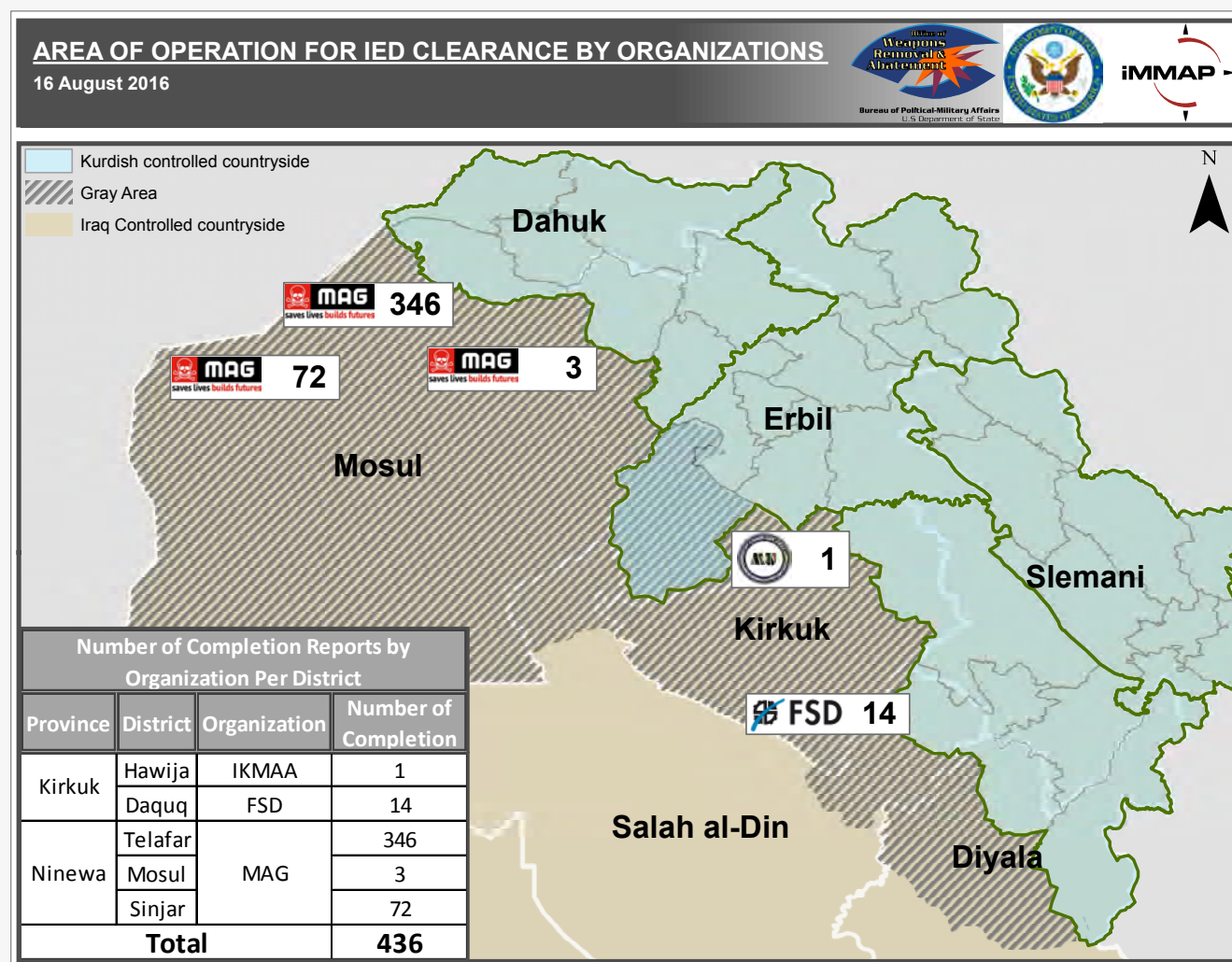


Figure 12. MA organisation operating areas, and number of task completions, as at August 16th 2016. information provided by iMMAP (image credit: iMMAP).

Operations are associated with specific tasks – water treatment plants for instance – so most work is spot task in nature. When possible information is collected from police and military units to find out what has already been done and by whom. Areas already dealt with are a lower priority; the focus is on areas where the Army has not already been. The majority of devices discovered are VOIEDs, although some abandoned command wire devices have been found.

⁶⁵ Janus Global Operations previously known as Sterling Global Operations.

⁶⁶ Discussions with JGO senior field managers, Erbil, 30th August 2016.

JGO managers take the view that “you need to understand your limitations and never approach a device that falls outside your capabilities.” Situations where there is a live IED can give rise to ‘something must be done’ pressure. “JGO apply a cool-out period with stringent pre-planning before taking action.”⁶⁷ One implication is that stakeholder expectations (including those of donors) should not be set too high. JGO have been told they are going too slow on occasions, but the company points out that there is no data against which performance can be compared. JGO expects to be involved in work in Mosul, following its liberation (as well as into other liberated areas in Iraq). JGO receives its assignments from UNDP, rather than UNMAS.

MA organisations

In the Kurdish regions, a number of MA NGOs engage with the IED issue: initially MAG and FSD, as well as IKMAA, but with DDG, HI and NPA in the process of preparing to start operations in due course.

OVERALL ORGANISATIONS' ACTIVITIES IN THE GRAY AREA						
Organisation name	Number of entered hazards	Number of entered completion reports	Number of destroyed devices per completion reports	Number of entered NTS reports	Number of entered MRE reports	Number of beneficiaries
Danish Demining Group (DDG)	0	0	0	0	44	12,742
RPS	6	0	0	0	0	0
FSD	14	14	194	4	0	0
Handicap International (France)	48	0	0	50	0	0
IKMAA	1	1	98	0	0	0
Mines Advisory Group	441	421	2,409	0	345	7,597
Total	510	436	2,701	54	389	20,339

Table 1. MA actors activity levels in grey areas (to August 2016), information provided by iMMAP

IKMAA

IKMAA (Iraqi Kurdistan Mine Action Authority) has both a coordinating role in respect of IEDs and conducts some field operations using its own staff. IKMAA is suffering from delays and shortfalls in government budget disbursement, but is under pressure to support the various needs to help displaced people return to their homes and support the regional government as it seeks to push ISIS back. Following an accident in 2015 when four IKMAA staff members died while conducting a house clearance, IKMAA now applies a policy of open area IEDD work only.

MAG

MAG (Mines Advisory Group) is the largest mine action organisation in northern Iraq. The programme addresses contamination from previous hostilities ('legacy contamination') as well as humanitarian response to the current conflict. Around 26% of current capacity conducts legacy contamination clearance relating to the pre-existing landmine and UXO problem.

The current humanitarian response operations started in 2015 with risk education, followed by a scale-up of survey and clearance capacity in 2016. The majority of devices cleared to date in area where active hostilities have ceased have been improvised landmines in open areas. MAG uses both manual and mechanical assets for technical survey and clearance of improvised landmines. MAG has also worked in and around villages to address victim operated and abandoned devices, and has conducted mechanical processing of rubble in Sinjar.

⁶⁷ Discussions with JGO senior field managers, Erbil, 30th August 2016.

Prioritisation approaches are evolving as new areas become accessible and the scale of humanitarian need is defined. A key difference from previous interventions is that there is not a clear divide between conflict and post-conflict. MAG has put in place an approach that meets humanitarian need in areas where active hostilities have ceased. MAG has consistently stressed the importance of clarity around terminology used to discuss IED and landmine issues, as well as the need for contextual assessment and the importance of a clear separating humanitarian action from military and security objectives.

FSD

FSD (Fondation Suisse de Déminage) is the other main practical IEDD operator within the MA sector, although its operations are on a lesser scale than MAG's. The organisation also does not have the legacy of more than 20 years of operations in the KRG area. Initial tasks were managed close together, to ensure easy access between sites for international staff, and contained targets that were relatively straightforward while being challenging enough to put in practice what had been taught. FSD is now at a stage where it is feasible to split teams and send them to separated tasks.

FSD recognises that it cannot offer a complete solution (addressing buildings as well as open ground) to a community. When teams leave an area the surroundings are clear, but not buildings. Community liaison (CL) communication channels are important, but, because of proximity to front line areas, people are not living in villages now. Political tensions in liberated areas compound questions about who will return and when.

FSD recognises the need to clear buildings and aspires to doing so (although they haven't done so to date). Many buildings are collapsed, so FSD would like to use machines to move debris, spread it, check it, deal with suspicious items, and continue until building foundations have been reached.

DDG

DDG 's (Danish Demining Group) position is similar to that of MAG , in terms of acceptable tasking. The organisation is happy to be involved in clearance of ILM , particularly in rural areas, but is less inclined to respond in urban zones, and is not set up to deal with mitigation of rubble, collapsed buildings, etc.

HI

The HI (Handicap International) team have first-hand experience of dealing with IEDs, including ILMs , in Colombia . HI has been engaged in victim assistance (VA) and risk education (RE). The organisation takes the view that 'anything to do with weapons affecting civilians should be tackled by MA operators, irrespective of the type of weapon'. If there is a need to release land, then there is a need to deal with the whole problem.

HI intends to engage in field IEDD operations. It wants to proceed cautiously, starting in open areas, then dealing with spaces between buildings, and then, when confident, working inside houses. House clearance requires more time, higher levels of competence and costs more money. The ability to establish such operations implies that donors will need to accept longer term commitments, to allow enough time to develop suitable capacities. HI is engaged in recruiting international staff and developing SOPs.

NPA

NPA (Norwegian People's Aid) is responding to a request from the Norwegian Ministry of Foreign Affairs to look into operations against ILMs. Non-mine action elements of NPA are focusing on the relief side of humanitarian interventions, with particular emphasis on isolated and hard to reach groups.

NPA have carried out an initial assessment looking at areas in the KRG region liberated from ISIS. On the basis of MAG's operations and the scale of the need, NPA has been accredited and as of January 2017 they have started manual clearance operations south-east of Mosul.

Within 2017 NPA will expand with ESD teams as well as NTS teams and conduct assessments on the use of machines and dogs for future operations with a view to restoring safe access for IDPs.

The need for NPA's Conflict Preparedness and Protection (CPP) programming has been assessed as a vital component to returnees' safety and will be implemented in 2017.

ANNEX C - PARTICIPATING ORGANISATIONS

ORGANISATIONS THAT WERE INTERVIEWED OR CONTRIBUTED TO THE STUDY

Government and Military

Directorate for Mine Action (DMA) (Government of Iraq)
Ministry of Interior (Kurdish Regional Government)
Peshmerga
Iraqi Kurdistan Mine Action Agency (IKMAA)
British Army

Non-governmental organisations (NGOs)

Norwegian People's Aid (NPA)
Handicap International (HI)
Danish Demining Group (DDG)
DanChurchAid (DCA)
Mines Advisory Group (MAG)

Commercial organisations

Janus Global Operations (JGO)
Optima
Bridge Insurance Brokers



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