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Pehr Lodhammar
UNMAS

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How Iraq Is Changing What We Do: Measuring Clearance in Urban Environments

by Pehr Lodhammar [UNMAS]

Iraq is changing what we think, say, and do about mine action. The terms, standards, and measurements used by the humanitarian mine action (HMA) community need to be revised as Daesh remains a destabilizing influence. While the Al Maedam district of Mosul fell to Iraqi Security Forces in a 'last battle' on 10 July 2017, the government declared an official end to the conflict in Iraq on 10 December 2017.

Whereas HMA followed the signing of the Dayton Peace Accords, HMA started in East Mosul while fighter jets were still bombing West Mosul. Although defeated, Daesh remains active. One year later, the same pop-up tactics used by Daesh to harass communities continue with reports of killings, kidnappings, and also to disrupt explosive ordnance clearance operations, leading to the need for 'day-of' adjustments to avoid potential new threats. Regrouping in parts of Kirkuk, Daquq, and Hawija, Daesh is now patrolling day and night, collecting taxes from locals.

The distinction for explosive hazard clearance, whether conducted as a peacekeeping or a humanitarian mission, is not trivial. When United Nations Mine Action Service (UNMAS) Iraq teams enter communities for the first time, they come as unknowns, sometimes seen as extensions of a peacekeeping mission or an occupying foreign power. Their first task is to overcome suspicion and gain the trust of the local community, street-by-street. Relying on community liaison officers fluent in the local language and experienced operators selected for their interpersonal skills, teams endure a time-consuming but necessary process. However, these efforts yield an important return: community sources that provide essential information for teams to locate, survey, and assess contaminated sites. The second task is to deliver clearance in a timely way so that stabilization can happen sooner rather than later.¹

During 2018, funding for the explosive hazard response will be focused in the five priority governorates identified by the government of Iraq: Ninewa, Kirkuk, Anbar, Salah al Din, and Diyala, in addition to the explosive hazard

activities supporting the five pillars of Iraq's Recovery and Development Framework (RDF), and as documented within the Recovery, Resilience Programme (RRP) that were both officially launched at the Kuwait conference in February 2018.

Context

Delays work for Daesh while urgency works for an economically thriving, politically-stable Iraq and for the Middle East region as a whole. Therein lies the strategic, geopolitical importance of explosive hazard clearance in Iraq today. International focus has shifted from the legacy of millions of landmines left from the Iran-Iraq War and two Gulf wars, a legacy that is now handled exclusively by Iraqi authorities, to the one-third of Iraq formerly occupied by Daesh. Roughly the equivalent of New York state, this region is home to more than 1.9 million internally displaced persons (IDP) who still live in camps. Clearance contributes to a safe home for all.

Producing stable communities is arguably the most important component of a shared Iraqi-international community soft power strategy to secure economic and social recovery.² Communities depend upon stabilization programs, all of which cannot begin until explosive hazards have been removed.

Adaptation

Initially, the comprehensive data collection phase that normally precedes explosive hazard clearance did not happen in Iraq for the following reasons:

1. The urgent need to clear key infrastructure so as to begin stabilization and humanitarian programs shifted government priorities.
2. The changing security conditions limited access to certain areas.
3. The time-consuming procedures for registration and accreditation of additional operators limited in-country resources.

Headlines as reported for 26 June 2018

- Official questions government's intention to strip militias of arms (The Baghdad Post)
- Terrorists linked to kidnapping incident on Kirkuk road arrested (NINA)
- Kurdish citizen killed in Islamic State attack in Kirkuk (Iraqi News)
- Booby-trap found in the district of Hawija (NINA)
- Kurdish official makes serious warnings on IS re-emergence in Khanaqin (Bas News)
- IS insurgents raid south of Daquq (Bas News/Iraq TradeLink)
- Two terrorists arrested in Sulaymaniyah (NINA)
- Iraqi security in ongoing operation against Islamic State in Diyala: Local politician (Kurdistan 24)
- Diyala Operations Command announced the destruction of the so-called Sharia court and Daesh caches in operation to hunt down terrorists (NINA/The Baghdad Post)
- Four Islamic State members arrested in joint operation, north of Diyala (Iraqi News)
- Ten ISIS guesthouses torched as operation in Hamrin Mountains continues (The Baghdad Post)
- Seven IMIS terrorists killed, wounded in ISIS attack in Samarra (The Baghdad Post)
- Terrorist infiltrated from Syrian territory into Iraqi territory arrested (NINA)

Figure 1. Daesh continue to be a destabilizing force and potential threat to operations.
Figure courtesy of United Nations Aid Mission to Iraq (UNAMI) Media Monitoring Report, June 26, 2018/CISR.

Accordingly, the explosive hazard management community at large joined in support, with all operators assigned tasks from a common Funding Facility for Stabilization (FFS) list developed and managed by Iraqi authorities and the United Nations Development Programme (UNDP) to coordinate clearance of critical infrastructure to be followed by repair and reconstruction known as stabilization programs. Many teams, including those funded by UNMAS, have achieved significant results in a relatively short period of time; however, early successes came with an indirect cost and a predictable result (see Figure 2).

Without comprehensive data collection as a starting point, the extent of contamination one year later remains an unknown pending completion of a comprehensive, non-technical survey and assessment of the liberated areas. UNMAS Iraq will field NTS teams during the latter part of 2018 to conduct this survey. Meanwhile, explosive hazard management and operations continue on a daily basis (see Figure 2).

The absence of a comprehensive survey to assess and quantify contamination by type meant that UNMAS Iraq teams needed to integrate surveys into clearance tasks to record

concentration, dispersal, location, and type of hazards, so that information could be shared with the government of Iraq. This has led to a catch-up effort to upload data into a developing information management system for shared use and transfer to Iraq's Directorate of Mine Action (DMA).

Unique Environment

In conventional mine action, if operators have access to the surface, they most likely have access to the threat. Whether arrayed in a pattern to defend a military position or used in isolation, landmines typically target personnel or vehicles. Their known fit-for-purpose design, properties, and function make landmine clearance a surface or near-surface activity; procedures and standards evolved accordingly. Similarly, clearance of known explosive remnants of war (ERW)—e.g., large, air-dropped munitions—even when buried or submerged, differs mostly by proximity to the surface.

In legacy contamination areas, such as along the Iran-Iraq border, Iraqi authorities focus conventional clearance methods on threats posed by unknown amounts of ERW and

During the 12-month period ending June 2018, UNMAS Iraq teams assessed and cleared critical sites and conducted training in both urban and rural areas.

- More than 350 explosive devices from 30,000 sq m bordering a power grid serving 60,000 people and seven schools near Fallujah.
- Thirty-four IEDs weighing a total of 435 kg from a fuel station in Jadidah-enough to completely destroy the building, and kill or injure anyone within a 100-m radius.
- Forty-four IEDs from under or on the Fallujah 'New Bridge,' totaling 380-400 kg of homemade explosives. UNMAS divers found and safely removed two submerged IEDs from Fallujah's 'Iron Bridge.'
- Forty-four IEDs, 51 main charges, three items of unexploded ordnance, and 343 IED component parts from a 37,995 sq m asphalt factory in Fallujah.
- Forty-plus IEDs along a 50-m stretch of road which, due to earth compacted by rains, made search-find-remove-and-render-safe extremely hazardous for operators.
- From commencement of clearance operations in Mosul's Old City on 28 November 2017 through 31 May 2018, UNMAS teams completed 790 tasks resulting in the removal of approximately 33,500 explosive hazards, including 610 suicide belts.
- In the Al Maedam district alone, 491 explosive hazards, of which 232 were suicide belts, and of these, approximately 100 were removed from human remains.
- Conducted 70 surveys in Al-Anbar, Salah al-Din, and Ninewa governorates in support of high priority stabilization and humanitarian interventions.
- Removed 15,700 ERW and 900 IEDs, including 610 suicide belts in liberated areas.
- Conducted 750 clearance tasks enabling the UNDP and government to begin rehabilitation of critical infrastructures.
- Completed 10 joint assessment missions enabling the United Nations and humanitarian partners to deliver aid in liberated areas.
- Trained 170 police officers in first response techniques, including identification, marking, and reporting explosive hazards; and 20 U.N. security staff to safely respond to IED and explosive-hazard threats.
- Trained 1,600 UNDP cash-for-work employees, 800 government, and 300 U.N./NGO staff working in high-risk environments to recognize and behave safely in the presence of explosive hazards.
- Conducted risk education sessions attended by 147,000 people in schools, IDP camps, and other high-priority areas.

Figure 2. Critical sites cleared.

Figure courtesy of United Nations Mine Action Service Iraq/CISR.

landmines estimated to be in the millions. In liberated areas of Iraq, the mix of conventional threats with improvised explosive devices (IED) adds a three-dimensional aspect to clearance since the operator must contend not only with hazards on or below the surface but with IEDs placed in walls, ceilings, fixtures, etc.

In urban environments, the surface may be covered by massive amounts of debris. Contamination can include a mix of ammunition, air-dropped munitions, other ERW, suicide belts still attached to human remains, and IEDs placed by Daesh forces as they withdrew. An estimated 7 million tons of contaminated debris in West Mosul await clearance. While the

Iron Bridge, Fallujah

Reconstruction suspended in February 2018 due to suspected IEDs at or below waterline.

- Total dive time underwater: 17 hours and 53 minutes
- April 8 - Dive team briefed
- April 9 - Dive 1 to check conditions:
 - › Water depth at 7.0 meters
 - › Current of 5 to 6 knots
 - › Visibility at 3 cm due to the current
 - › Divers adjust plan, hold onto the bridge structure continually or be swept away from the task, slowing progress
- April 9 - Dive 2
 - › Suspected main charge case was found and photographed
 - › Fingertip search established that no other hazards were present, i.e., battery pack detonator or pressure plate
- April 9 - Dive 3, suspected main charge (1) safely recovered
- April 10 - Dive 4, suspected main charge (2) safely recovered
- April 11 - Dives suspended, following holidays, resume
- April 14 - Dives continue: An AK47 assault rifle was located and recovered
- April 15 - Dives conclude, confirming no further hazards
- Area searched: 900 sq. m.
- Found:
 - › Two IEDs, 20 kg main charge cases, plastic, filled with homemade explosives (HME)
 - › One AK47 assault rifle

Figure 3. Case study: Iron Bridge, Fallujah.
Figure courtesy of United Nations Mine Action Service Iraq/CISR.

presence of IEDs in Mosul varies by district, five of Mosul's eight districts searched through June 2018 yielded 27,000 explosive hazards. Until battle damaged buildings are searched and debris is safely inspected, managed, and removed, there is no way to know the extent and level of the three-dimensional contamination.

In rural environments, IEDs arrayed in belts have substituted for landmines to defend combatant positions during conflict and continue to contaminate agricultural land.³ IEDs have also been used to deny villagers access to wells, schools, government offices, and virtually any other asset essential to livelihood.

If the HMA community considers the use of IEDs in Iraq as a fundamental change to explosive hazard clearance, what is a satisfactory term for an acceptable clearance standard for this **surface-and-above** threat? Whether debris from collapsed buildings or the space within a battle-damaged building, the problem deals with volume and certification, not just of cleared land but also of cleared space. The International Mine Action Standards (IMAS) do not have such a reference, but if experience in Iraq to date is an indicator of a need for

similar environments, IMAS may need such a reference and the development of a surface-and-above standard. The implications of such a standard would seem important for the HMA community for certification and for accountability purposes.⁴

For certification, cleared buildings, debris management, and disposal need standards. However, in an environment such as Iraq, the community may need to settle for something less than previously accepted standards. With debris and structural assets above ground, what if 100 percent clearance is not possible? What level of risk is acceptable? Compared to conventional clearance, what are the implications for time, cost, and the priority of tasks and commitment of resources?

The search conducted at Fallujah's Iron Bridge may serve as a case in point for an honest and open exchange of views. The impact of the open bridge measured in socioeconomic terms is arguably the real outcome of clearance and should be a measurement of success rather than the lingering perception that the operation cleared only two IEDs for

a week's effort. What matters is that the elimination of the threat led to the resumption of the rehabilitation work.

If all tasks on the stabilization list are deemed high value and there is no way to quantify cost-benefit, they must compete with one another on some basis for purposes of priority. But what is that basis? Since priority remains a matter for Iraqi authorities to decide, UNMAS Iraq's best response is to anticipate needs and quickly deploy clearance assets in the case of Fallujah's Iron Bridge case study (see Figure 3).

Eliminate Suspicion

Whether mine action ultimately returns cleared land or cleared space to communities, eliminating suspected threats and achieving security and safety should be a measure of success. Even if nothing is found, the suspicion of IEDs needs to be removed before rehabilitation can begin. While the problem of "who comes first" belongs to the government, the solution is partly a function of the HMA community and its ability to mobilize, deploy, and use resources efficiently based on an internationally agreed upon common value statement or model for determining socioeconomic gains, e.g., clearing Fallujah's Iron Bridge saves the community time and additional fuel costs attributable to detours.

Impact

This value statement should speak to the impact of mine action instead of the number of explosive hazards cleared. Although UNMAS Iraq teams typically clear enough explosive hazards in a given week to fill a 20-ft (6-m) container, such inventories are quantitative measures of explosive

hazard management, which understate the cost-benefit, value-added, and socio-economic outcomes associated with environments such as Iraq with its 1.9 million IDPs waiting to safely return home.

Consider the lesson learned by the Fallujah Iron Bridge experience: if the operation were measured in terms of contamination alone, the two IEDs destroyed during the week-long effort would seem costly in terms of efforts expended, yet more than commensurate when valued by the socio-economic impact. Effectively, this indicates that the mine action community should reevaluate its model for measuring outcome for nonconventional clearance.

Inevitably, limited resources delay stabilization and humanitarian tasks in post-conflict environments. Similarly, UNMAS surveyed and assessed clearance needs for two textile factories in western Mosul used by Daesh to manufacture ammunition. The buildings were believed hit by two 500–1000 lb (226.8–453.6 kg) airdrop weapons, one of which exploded when delivered.⁵ Clearance will require intensive manual operations since the building structures could be severely damaged by the use of mechanical assets. When operational, the factory employs approximately 6,500 staff—mostly women—producing textiles largely for export.

In rural areas, the devastation may appear less, but the net effect is the same: denial of the means of production and loss of livelihoods. IEDs arrayed in a traditional minefield pattern are known to contaminate some agricultural land; similarly, individual IEDs contaminate key infrastructure, such as the village well in Al Bokald near West Mosul.

Al-Shifa Hospital, Al Maedam district

- Used by Daesh as a treatment center and for ammunition and IED manufacturing
- August–September 2017: Phase 1 clearance of accessible areas: 653 explosive hazards and 10 kg of IEDs removed
- April 2018: Phase 2 clearance of previously inaccessible areas begins using newly arrived armored heavy equipment and manual methods to remove
 - » 4 kg of improvised explosives
 - » 85 explosive hazards
 - » 48 small arms ammunition (SAA)
 - » 12,350 kg of de-bulleted SAA (Daesh propellant harvesting)
 - » 29,945 m³ of rubble and debris
- May 2018: Clearance complete
- June 2018: Site reverts to UNDP and reconstruction begins

Figure 4. Case study: Al-Shifa Hospital, Al Maedam district, West Mosul.
Figure courtesy of United Nations Mine Action Service Iraq/CISR.

Following clearance, the now-repaired Al Qasoor Water Treatment Plant in East Mosul again supplies clean and safe water to more than 300,000 people across 34 service areas. In Ninewa province, following clearance, the land registry office offers access deeds to validate land claims of residents seeking return. Following clearance of the fuel station in Al Jadidah, 20 employees pump fuel for more than 300 vehicles daily after a three-year hiatus. Following clearance and repairs to the Fallujah Iron Bridge, travel time for some residents to the only maternity hospital in a 50 km (31.1 mi) radius will be reduced from two hours to five minutes. Moreover, the asphalt factory reopened after four years and will employ 65 workers when operating at full capacity.



Al-Shifa Hospital: before and after.
Image courtesy of Google Earth.

Difficult Choices

Looking back with perfect hindsight does not solve the problem for government decision makers responsible for determining task priority. The model to predict socioeconomic benefits is not new but the application of such thinking to mine action probably is.⁶ The problem comes with the value judgment made between a large workforce employed by the Mosul textile factory previously mentioned and a small agricultural community dependent upon land contaminated with an IED belt. While the decision on where to prioritize clearance does not belong to the HMA community, standardizing the mine action variables involved in efficiently delivering clearance can influence this decision beginning with operational and security reasons. The anticipation of needs, operational flexibility, and response is key for the HMA community. However, in terms of clearance, Iraq's working environment is unique in a number of ways:

- Narrow, cluttered streets increase clearance time in urban environments, whereas relatively open spaces in some outlying neighborhoods and rural areas may take less time.
- Travel time to and from sites and checkpoints effectively limit teams' access to sites. For example, there are 14 checkpoints between the UNMAS Iraq base in Erbil and contamination sites in Betu, Kirkuk, and Naweji, extensively reducing clearance time to half a day of work.
- Heavy contamination linked to human remains causes a stop-start-stop sequence to clearance, whether manual or mechanical. Mechanical operations stop-start-stop for each new discovery to allow government authorities to recover, identify, and return the remains for a proper burial.
- Deteriorating security conditions influence operations.

Clearance teams use diversionary routes to avoid predictability, adding time to mission planning and execution. Armored vehicles located close to operations may limit access to certain areas entirely.

- Specialized and highly-trained operators, as with the Fallujah Iron Bridge divers who deployed in record time, may lead to the government reprioritizing clearance based on asset availability.

Quality Assurance

Complexity of design, manufacture, and quantity of IEDs creates a mix of threats and a unique operating environment for clearance teams in Iraq. IEDs vary significantly by manufacturing methods. IEDs have been found in artificial rocks, in air conditioning units, and under hanging garments triggered by an infrared device. Components can include repurposed common objects such as plastic tubing, washing machine timers, and syringes. In one of two bomb factories located within the Al-Shifa Hospital complex, UNMAS teams found more than 150,000 electronic components intended for use in IED manufacture (see Figure 4).

The combination of scarce resources and/or inadequate clearance, as well as IDPs eager to return home inevitably lead to cleared areas being recontaminated. For example, when returnees collect explosive hazards from their land and homes and deposit these in an already cleared street, this leads to recontamination and creates problems in terms of mapping, recording, and managing data.

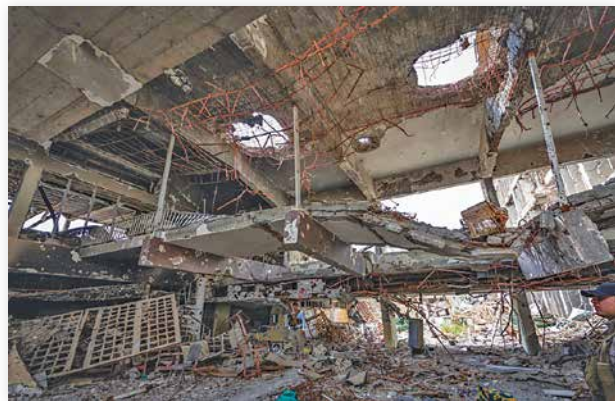
Although Daesh officially has been defeated, daily security reports confirm what UNMAS Iraq teams know from experience in the field: Daesh remains an active if sporadic threat, often returning to recontaminate cleared areas.⁷



Aerial view of Al-Shifa Hospital.
Image courtesy of United Nations Mine Action Service Iraq/George Tan.



Al-Shifa Hospital: armored heavy equipment operations.
Image courtesy of United Nations Mine Action Service Iraq/George Tan.



Al-Shifa Hospital interior.
Image courtesy of United Nations Mine Action Service Iraq/George Tan.

Observations

Convention. Iraq's National Strategic and Executive Plan for Mine Action 2017–2021 outlines Iraq's commitment to work toward a safe environment free from explosive hazards, designating the DMA as the national authority for explosive hazard management charged with the responsibility to survey, mark, and render safe 50 percent of known contamination by 2021. Iraq's commitment to the National Strategic and Executive Plan currently covers only landmines and ERW, not IEDs.

Outcomes. UNMAS Iraq reports explosive hazard

management results in terms of square meters and items cleared on a monthly basis; however, without an accompanying narrative, numbers can understate the complexity of the situation. Planning is integral for both mine action professionals and those agencies responsible for stabilization and humanitarian tasks.

Priorities. Should we clear rural communities last because urban populations are larger? Do the 50 families in Al Bokald matter any less than the 6,500 workers waiting to return to their jobs in the textile factory? Government



Divers at the Iron Bridge in Fallujah.
Image courtesy of Wtorplast.

authorities could benefit from a system that measures an economic and/or social return and avoids perceptions of political, ethnic, or other arbitrary influences when setting priorities. The HMA community can assist decision makers with this responsibility by efficiently managing and deploying assets and managing conditions that reduce task times while meeting quality standards.

Assessment. How might government authorities assure themselves and donor organizations of maintaining capacity once it is enhanced? One idea the mine action community might adopt is to formally recognize the need to recertify staff based on peer reviews or skill audits conducted by a professional board or regulatory authority as commonly practiced by other professions. Organizations and individuals would need to meet standards and demonstrate proficiency in managing information and conducting surveys as well as generating, monitoring, and closing tasks.

Costs. Although explosive hazard clearance precedes stabilization and humanitarian tasks, the HMA community has yet to recognize high-value clearance, as illustrated by the



Euphrates Rive with near zero visibility.
Image courtesy of Wtorplast.



Iron Bridge, Fallujah.

Image courtesy of United Nations Mine Action Service.

Fallujah Iron Bridge or scenarios involving long-distance travel, high-threat environments, physical constraints such as heavy debris, collapsed buildings, or limited access to infrastructure, all of which add to costs. For many, the conventional thinking and measures regarding cost date from battle area clearance or legacy mine fields where experience says clearance can cost as little as US\$3.50 for one meter cubed (one square meter to a depth of one meter). The HMA community needs to develop and refine appropriate benchmarks as a basis for value statements consistent with clearance costs related to stabilization and humanitarian returns.

Disposal. Although the Iraqi government understandably restricts exclusive use of explosives to Iraqi Security Forces, this procedure demands the secure and timely transportation of explosive hazards to secure sites for safe disposal to avoid potential buildups of large amounts of explosive hazards. A

handover methodology and a certification procedure could leverage available international organization expertise to include destruction after rendering safe, removal, and collection of explosive hazards, thereby maintaining accountability while alleviating a potential delay.

Knowledge management. IED removal is predicated on problem-solving skills and understanding how the devices function so as to identify the different components. How IEDs are manufactured, function, IED composition variety, and knowing what to look for before going into the field have become daily tasks for operators and caused UNMAS Iraq to re-invent its information/knowledge management capabilities.

Community. UNMAS Iraq has relied extensively on community liaison officers to help establish trust with the local community to gather information regarding possible IED



locations and areas to avoid should Daesh have a presence. Casual cash-for-work cadres when trained have proven successful as a multiplier for areas thought to be cleared when paired with other UNMAS clearance teams. Cash-for-work workers are hired as casual laborers to remove debris in destroyed neighborhoods in Mosul and elsewhere. While they are hired only to remove and clear debris, they are given risk education to be able to identify, report, and warn of explosive hazards. By doing this, local citizens identify and report on potential hazards. ©

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Pehr Lodhammar
Senior Programme Manager
United Nations Mine Action Service



Pehr Lodhammar, UNMAS Iraq Senior Programme Manager, has more than 28 years of professional work experience from military and humanitarian mine action. He began his humanitarian demining career in 1999 in northern Iraq following 10 years in the Swedish Army where he specialized in EOD/IEDD and demining operations. Lodhammar has worked in Kosovo, Eritrea, New York, Lebanon, Jordan, and Democratic Republic of the Congo and a number of other countries. He also worked for the Geneva International Centre for Humanitarian Demining for seven years and with the Mine Action Unit of the Swedish Rescue Services Agency (now MSB). Lodhammar holds a Bachelor of Military Arts and a Master of Arts in International Cooperation and Humanitarian Aid.