

# Journal of Conventional Weapons Destruction

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Volume 20  
Issue 1 *The Journal of Conventional Weapons  
Destruction*

Article 6

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April 2016

## UNMAS Gaza Emergency Response Report

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### Recommended Citation

Frankish, Mark (2016) "UNMAS Gaza Emergency Response Report," *Journal of Conventional Weapons Destruction*: Vol. 20 : Iss. 1 , Article 6.

Available at: <https://commons.lib.jmu.edu/cisr-journal/vol20/iss1/6>

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# UNMAS GAZA EMERGENCY RESPONSE REPORT

by Mark Frankish [ UNMAS Gaza ]



Extent of ERW damage in the residential area in Beit Lahiya, Gaza.  
All graphics courtesy of UNMAS.

From 7 July to 26 August 2014, significant quantities of explosive ordnance were used during hostilities between the Israel Defense Forces (IDF) and Gazan armed groups. It is reported that approximately 72,000 items of ordnance were fired and launched during this period.<sup>1</sup> This presented a significant risk for civilians and hampered humanitarian and reconstruction operations. Many unexploded aircraft bombs, tank projectiles, mortar shells and other munitions from both sides of the conflict were reported in civilian areas. Based on a 10 percent fail rate, it was assumed there are approximately 7,200 items of explosive remnants of war (ERW) in Gaza, including a significant number of air delivered bombs.<sup>2</sup> The ERW contamination has interrupted the lives of entire communities in Gaza, where simply gaining

access to homes, schools, health facilities, etc. is challenging and dangerous. Livelihoods are also directly affected when small industries and farmlands are destroyed and littered with ERW.

The military operations resulted in over 2,000 casualties in Gaza, 65 in Israel and massive damage to infrastructure and civilian property in Gaza.<sup>3</sup> A review on structures by United Nations Operational Satellite Applications Programme (UNOSAT) detailed that within the 327 sq km (126 sq mi) of the Gaza strip, 6,761 structures were destroyed, 3,565 were severely damaged and 4,938 were moderately damaged. In addition, there were 7,473 craters recorded in agricultural and non-urbanized areas.<sup>4</sup>

Approximately 74 percent of the damage sustained was within 3 km (1.8 mi) of the Armistice Line. Within this area multiple neighborhoods such as Shuja'iyya, Beit Hanoun, Khuza'a, etc., were damaged to such an extent that the vast majority of structures in these communities were completely destroyed.

## Threat Defined

While the majority of ERW seen to date in Gaza is of conventional type, there have been no reports of submunitions or landmines used with the exception of anti-tank mines deployed by combat engineers in the destruction of buildings. Ground ordnance in the form of tank, artillery, cannon and

Damage Assessment Summary					
	Destroyed	Severely Damaged	Moderately Damaged	Total Structures Affected	Crater Impact
North Gaza	1,253	761	1,000	3,014	1,702
Gaza City	1,963	1,127	1,378	4,468	1,765
Deir Al Balah	809	406	683	1,898	553
Khan Younis	1,749	898	1,379	4,026	1,549
Rafah	987	373	498	1,858	1,604
<b>Total</b>	<b>6,761</b>	<b>3,565</b>	<b>4,938</b>	<b>16,264</b>	<b>7,473</b>

Figure 1. Damage assessment summary.



UNRWA classroom in Biet Hanoon.



Destroyed residential area of Shejaayea.



Removal of a neutralized 2000 lb bomb at the Rafah border crossing.

recoilless projectiles, mortar bombs, grenades, and rockets all exist. In addition, there is the threat from air delivered ordnance of up to 2,000 lb (907 kg) bombs and the toxicological hazard associated with fired-depleted uranium, armor-piercing projectiles.

### UNMAS Gaza Emergency Response

On 27 July 2014, in response to a directive from the U.N. Secretary General, the United Nations Mine Action Service (UNMAS) deployed three explosive ordnance disposal (EOD)

technical advisors to work directly with the United Nations Relief and Works Agency (UNRWA) and other U.N. agencies. The UNMAS team was based in the UNRWA compound during the conflict and was responsible for carrying out ERW risk assessments at U.N. facilities and other structures. This was to ensure that U.N. personnel and civilians seeking refuge in U.N. premises were safe from ERW and other explosive hazards. During the emergency response, UNMAS Gaza carried out 214 ERW risk assessments on facilities of which 209 were cleared and five were handed back to the parent organization to be included within the reconstruction phase. As a result, UNRWA was in a position to reopen all schools on their scheduled date, thereby enabling 240,000 children to resume their academic curriculum in a safe environment free from ERW. The UNMAS emergency response phase was critical to address immediate ERW and other explosive threats to the U.N., as well as responding to the critical humanitarian needs of the general civilian population.

This deployment was vital in facilitating an ERW response during the early stages of the conflict. The immediate ERW threats to the civilian population were addressed and requirements for a long-term ERW response were determined through a defined needs assessment. The assessment included the identification and analysis of the ERW threat, identifying those affected by the threat, as well as the extent and measurable effects caused by the threat. The approach was “bottom-up” whereby all community stakeholders and beneficiaries were consulted prior to any program development, thereby identifying potential barriers early. The results of the needs assessment were formalized within the UNMAS Gaza concept of operations (CONOPS).

### Overview of ERW Risk Assessment

Generic risk assessment is a multi-disciplinary approach used by many organizations and industries for hazard identification, accident prevention and mitigation. It consists of an objective evaluation of hazards and risks in which suppositions and fears are measured, analyzed and presented so that a decision can be made concerning a course of action.

Within the context of the UNMAS Gaza emergency response, a hazard was defined as any item of ERW that could

cause harm, whereas a risk was defined as the chance that somebody could be harmed by an ERW hazard. Therefore the ERW risk assessment was an invaluable process that determined how the ERW hazards were defined and how they affected planning and operations. A conscious decision was made to ensure that the processes should always work toward producing useful information that can be assimilated practically into all levels of operations. The ERW risk assessment was a systematic and investigative process that involved identifying hazards, predicting possible incidents, and determining the impact of hazards and mitigation measures that can be implemented or planned.

### Principles of ERW Risk Assessment

The ERW risk assessments were conducted in a constantly changing environment due to the fluid nature of the conflict in Gaza. From an operational management perspective, the following core principles guided our principle-based approach:

- The protection of human life—conducting ERW risk assessments inevitably exposed individuals to a high level of risk; therefore, all exposure was preemptive and deliberate where possible, with all mitigation measures in place.
- The adoption of a holistic view—ensuring that the ERW risk assessments were viewed as an integrated system with several interconnecting components, all of which needed to be analyzed in order to determine the threat or hazard.
- The adoption of an investigative mindset—knowing the mission, method and means of the conflict often revealed the most probable type and extent of ERW contamination likely to be encountered. However, the importance of remaining open-minded was emphasized, as it can lessen the risks of making premature decisions and developing personal biases.
- The dissemination of detailed and practical findings ensured that mitigation measures could be effectively implemented and monitored with minimal disruption.

### Phases of ERW Risk Assessment

In order to develop a comprehensive, reliable and consistent ERW risk assessment system, the following six-phased approach was adopted for all ERW risk assessment activities, regardless of requesting agency or facility type:

- Task planning
- Risk assessment

- Information analysis
- Report production
- Information dissemination
- Process evaluation

The phases flow in a continuous cycle creating a system that is self-improving and adaptable to most situations.

### ERW Risk Assessment Methodology

Conducting ERW risk assessments within the context of the Gaza armed conflict, whether during the conflict or immediately after the cessation of hostilities, was challenging due to the specific facets that had to be considered. These facets included security, access, logistics, neutrality, and access to locations and information sources. Particularly challenging during the ERW risk assessments was the ever-changing security situation that could change from a workable, conducive environment to one of heightened danger in a short period of time. In an attempt to mitigate the security threat whilst conducting ERW risk assessments, a very specific security risk management plan through an ERW Security CONOPS was defined and implemented with the UNRWA field security office (FSO), which included:

- Casualty Evacuation procedures
- Contingency plans
- Coordination mechanisms
- Escort arrangements
- Identification of safe havens
- Route assessment and planning
- Security measures
- Security risk assessment matrix

As the purpose of the ERW risk assessment was to identify hazards and risks, this methodology was chosen through a fact-building questionnaire within an ERW risk assessment report. This methodology was chosen because it provides a systematic way of evaluating situations, ascertaining threats, collecting and analyzing information, and reporting pertinent facts and results to the client.

On completion of the ERW risk assessment report, all details were forwarded to the requesting agency along with details of any recommended risk-mitigation measures.

### ERW Risk Assessment Results Analysis

The following section is an analysis of the collated ERW risk assessment resulting from the 214 facilities visited. The actual analysis was a two-stage process where the data was identified and organized into the pre-selected tables and then interpreted to gain a better understanding of the facts.

	UNRWA Schools	UNRWA Clinics	UNRWA Other	UNDP	UNICEF Schools	UNSCO	WHO Hospitals	UNESCO Education	NGO Education	Total
ERW RA Requests	100	12	34	15	26	3	9	14	1	214
ERW RA Completions	100	12	34	15	26	3	9	14	1	214

Figure 2. ERW risk assessment by agency.

Agency	RA's	A/C Bomb	155 mm Illum	155 mm HE	120 mm Tank HEAT	120 mm HE Mortar	105 mm Tank HEAT	80 mm HE Mortar	Mine	Grenade	Guided Missiles	Total
UNRWA Schools	100	0	30	0	32	6	41	0	0	1	7	117
UNRWA Clinics	12	0	1	0	0	0	5	0	0	0	0	6
UNRWA Other	34	1	3	0	4	0	1	0	0	0	0	9
UNDP	15	5	10	0	20	1	11	5	0	0	0	52
UNICEF Schools	26	9	37	0	68	13	5	0	1	0	0	133
UNSCO	3	0	6	0	0	0	0	0	0	0	0	6
WHO Hospitals	9	0	1	0	6	0	0	0	0	0	0	7
UNESCO Education	14	7	0	0	23	0	10	0	0	0	1	41
NGO Education	1	0	5	5	0	0	0	0	0	0	0	10
Total	214	22	93	5	153	20	73	5	1	1	8	381

Figure 3. ERW designation types.

### Requesting Agency Type

The following summarizes which agencies requested ERW risk assessments:

- A total number of 214 ERW risk assessment requests were received and completed giving a 100 percent response rate.
- U.N. agencies accounted for 99 percent of the ERW risk assessment requests, with the majority of ERW risk assessment requests originating from UNRWA (146), followed by UNICEF (26); United Nations Development Programme (15); and United Nations Educational, Scientific, and Cultural Organization (UNESCO) (14).
- Educational facilities comprised 65 percent of the ERW risk assessment requests, while medical facilities comprised 10 percent.
- Although it was openly stated during all humanitarian meetings attended by UNMAS Gaza during the emergency response phase that UNMAS was available to help, UNMAS received only one request for an ERW risk assessment from an NGO.
- A relatively low number of UNICEF-supported

schools were assessed by UNMAS Gaza because the Civil Protection Police (CPP) EOD teams conducted the majority of ERW risk assessments at the request of the Ministry of Education.

### ERW Designation Type

A total number of 381 items of ERW (or component parts) were located and cleared with the assistance of the CPP EOD teams.

- The highest proportion of ERW type cleared was the 105 mm and 120 mm high-explosive anti-tank (HEAT) munitions, with 59 percent recorded. This ammunition is associated with the two main variants of the Merkeva main battle tank. These HEAT munitions were allegedly used to reduce collateral damage, as the munitions contain directional charges (as opposed to being omnidirectional) and have considerably less explosives.<sup>6</sup>
- For 60 percent of the 93 assessments where 155 mm illuminating artillery ammunition was cleared, the munition consisted of an empty illuminating projectile casing. It should be noted, however, that substantial damage was

sustained to many facilities due to the free falling casings, including one that entered the roof and exited the floor pan of a U.N. Special Coordinator’s Office (UNSCO) B6 armored land-cruiser.

- In all assessments of guided missile use, the component parts recovered were thought to be those of Hellfire guided missiles.
- The only recorded use of a mine was an M-15 anti-tank mine that was used as a demolition charge to destroy a mosque adjacent to a Palestine Authority (PA) school; the mine only partially detonated with the remnants being thrown into the school grounds.
- All aerial bomb component parts matched that of the MK-80 series, low-drag, general-purpose aerial bomb.
- The only hand grenade recovered was an M26 hand grenade that was cleared following a family dispute at an UNRWA school, which was being used as a camp for internally displaced persons.
- All ERW items cleared, with the exception of the hand grenade and 120 mm mortars, originated from the IDF or the Israeli Air Force (IAF).

### Structural Damage

Figure 4 provides analysis on the sustained structural damage:

- Of all facilities that were assessed, 70 percent received some degree of structural damage whether through direct fire or indirect fire, with 30 percent receiving no structural damage.<sup>7,8</sup>
- There was a higher proportion of ERW risk assessed facilities that received structural damage through indirect fire (53 percent) than direct fire (47 percent).
- Of the UNESCO facilities that were assessed, 92 percent were found to have sustained structural damage from either direct fire or indirect fire, with 73 percent of UNICEF-supported PA schools having sustained some level of damage.
- The damage ranged from Small Arms Ammunition (SAA) impact strikes to the total destruction of buildings and facilities by the use of aerial bombs.
- In addition to damage sustained from direct fire or indirect fire, some facilities also had direct damage from IAF armored bulldozers; this is especially the case for facilities located to the east of the Salah Ed Deen main arterial route.
- The one NGO facility, a children’s nursery, was completely destroyed by tank projectiles, artillery projectiles, aerial bombs and armored bulldozers.

### Evidence of Military Occupation

Evidence of military occupation is presented in the following narrative and in Figure 5:

- Only eight percent of ERW risk assessments saw evidence of any military occupation.
- This eight percent was only evident in UNRWA Schools and UNICEF-supported school facilities.

### Aerial Bomb Clearance

- During the UNMAS Gaza emergency response, a total of 118 aerial bombs were destroyed with 16 neutralized by UNMAS Gaza prior to final disposal by detonation. The Ministry of Interior realized that not all EOD tasks can be undertaken by the CPP EOD teams due to limitations in their technical knowledge base and therefore requested UNMAS to render-safe the bomb fuzes.
- Conducting major EOD clearance- tasks within the post-conflict Gaza environment was and still is extremely complex due to the differing interlocutors that must be considered and consulted. It is of paramount

Agency	RA's	Direct Fire	Indirect Fire	Total
UNRWA Schools	100	25	42	67
UNRWA Clinics	12	1	7	8
UNRWA Other	34	13	14	27
UNDP	15	6	2	8
UNICEF Schools	26	13	6	19
UNSCO	3	1	0	1
WHO Hospitals	9	2	4	6
UNESCO Education	14	8	5	13
NGO Education	1	1	0	1
<b>Total</b>	<b>214</b>	<b>70</b>	<b>80</b>	<b>150</b>

Figure 4. Structural damage analysis.

Agency	RA's	IDF	Armed Groups	Total
UNRWA Schools	100	4	7	11
UNRWA Clinics	12	0	0	0
UNRWA Other	34	0	0	0
UNDP	15	0	0	0
UNICEF Schools	26	5	0	5
UNSCO	3	0	0	0
WHO Hospitals	9	0	0	0
UNESCO Education	14	0	0	0
NGO Education	1	0	0	0
<b>Total</b>	<b>214</b>	<b>9</b>	<b>7</b>	<b>16</b>

Figure 5. Evidence of military occupation.

importance that for any major EOD operation, prior approval must be gained from the Ministry of Interior, the UNRWA director and the UNMAS director, and all relevant information must be presented to the Coordinator of Government Activities in the Territories Unit in the Coordination and Liaison Administration for Gaza.

### Aerial Bomb and Fuze Technical Analysis

A technical analysis on the 16 aerial bombs rendered safe including the following:

- All of the aerial bombs and 67 percent of the fuzes were of NATO origin and manufacture.
- Small diameter bombs accounted for 31 percent of the aerial bombs rendered safe; low drag general purpose bombs accounted for the remaining 69 percent.
- The 1000 lb aerial bomb was the most common aerial bomb type rendered safe, accounting for 43 percent of aerial bombs.
- An electronic multi-functioning aerial bomb fuze was the most common fuze type rendered safe, accounting for 38 percent of aerial bombs.
- During the render-safe operation, stuck-fast fuzes occurred in 25 percent of cases. With these aerial bombs, there was a medium degree of bomb body deformation through the initial impact with the target. This would have caused movement of the internal components within the aerial bomb, potentially leading to misfires and 31 percent of the aerial bomb fuzes had armed and partially functioned, but the detonating wave was not transferred into the booster element.
- In aerial bombs where both nose and tail fuzes could be fitted, only tail fuzes were used with inert aerodynamic plugs fitted in the nose cavity.

### Summary

Ensuring the safety of staff during operations was of paramount importance and required that UNMAS Gaza effectively manage the ever-changing security situation through the creation and implementation of a specific security risk management system. This was only possible through the close coordination and facilitation of the UNRWA FSO, who was fundamental in the management of the security enabling environment.

Conducting ERW risk assessments was and is a sensitive and delicate process, as it deals with how hazards and risks are perceived and managed. In order to eliminate any personal bias during the ERW risk assessment procedure, it was vital that a formal and systematic ERW risk assessment procedure

was agreed upon, documented, applied and reviewed. The defined ERW risk assessment methodology has been modified to suit the specific nuances of other ERW risk assessments within a phased response. Initially, the ERW risk assessment procedure was defined for the UNMAS emergency response phase and now has been modified for the UNMAS ERW reconstruction support phase.

The analysis of the ERW risk assessments from the 214 facilities visited was based on a relatively small sample number when looking at the quantities of explosive ordnance used and the damage and destruction within the wider context of the 2014 conflict. While in-depth, valid information was obtained, it should not be viewed as an exact representation of the situation Gaza-wide.

It should be noted that when managing the recovered data, a conscious effort was made to present “real impartial data” as opposed to unsubstantiated anecdotes. The data was simply presented in an unbiased manner with the intention of determining useful information and formulating conclusions to assist in the technical decision making process.

Collectively, the UNMAS emergency response findings and the results from the ERW response needs assessment provided the prerequisite information needed to accurately define the future UNMAS Gaza CONOPS. This has and will continue to ensure that appropriate technical assets and support mechanisms are in place for each operational phase, thereby ensuring that UNMAS continues to meet and exceed the expectations of all stakeholders involved. ©

See endnotes page 66

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