

December 2014

ACTION ON
ARMED VIOLENCE

AOAV

UNDER FIRE

Israel's artillery policies scrutinised



“ The use of a statistical weapon is like a game of Russian roulette. Those who use artillery weapons in Gaza cannot honestly say that they are doing all they can to avoid harming innocent civilians.”

Idan Barir, former IDF soldier in the Artillery Corps, 8 August 2014.¹

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With thanks to

Maya Brehm, Martin Butcher, Henry Dodd, Jane Hunter, Richard Moyes, Frank Slijper, Claudia Xavier-Bonifay, and all in Israel who helped facilitate this research.

Cover Photo

Destruction of houses in Beit Hanoun,
(Muhammad Sabah, B'Tselem)

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Clarifications or corrections from interested parties are welcome.

Research and publication funded by the Government of Norway, Ministry of Foreign Affairs.

CONTENTS

FOREWORD	2
INTRODUCTION: ISRAEL AND GAZA	4
GENERAL CIVILIAN PROTECTION MEASURES IN THE IDF	7
ARTILLERY	10
MUNITION SELECTION	13
SAFETY DISTANCES	16
MORATORIUM	20
CONCLUSION	22
RECOMMENDATIONS	24
ANNEX: IDF OFFICIAL RESPONSE	25
ENDNOTES	26

FOREWORD

“ Sound military tactics employed in the pursuit of strategic objectives tend to restrict the use of explosive force in populated areas. [There are] ample examples from other international military operations that indicate that the excessive use of explosive force in populated areas can undermine both tactical and strategic objectives.”

Bård Glad Pedersen, State Secretary, Ministry of Foreign Affairs of Norway, 17 June 2014²

The language of conflict has changed enormously. Today, engagements are often fought and justified through a public mandate to protect civilians. And yet the weapons used, and the way they are used, far too often pose a great danger to those civilians.

The use of explosive weapons in populated areas puts civilians at grave risk of death and injury, as AOA V has documented over several years.

How then, the urgent question must be asked, can explosive weapons be used by governments in a way that is consistent with a mandate to reduce harm to civilians?

How can state and international forces regulate the use of weapons that affect a wide area and so minimise their collateral damage?

What are the political, military, strategic and technological factors that shape the decision to fire?

And, ultimately, how can a government achieve peace without creating desolation?

In this series of reports, of which this is one, Action on Armed Violence (AOAV) explores recent and ongoing military practices in the use of explosive weapons. We looked at three separate contexts where explosive weapons have been deployed by foreign forces, in a territory where *their government* is not the governing authority.

Three case studies in three places most heavily-affected by explosive violence in recent years: Afghanistan, the Gaza Strip, and Iraq.

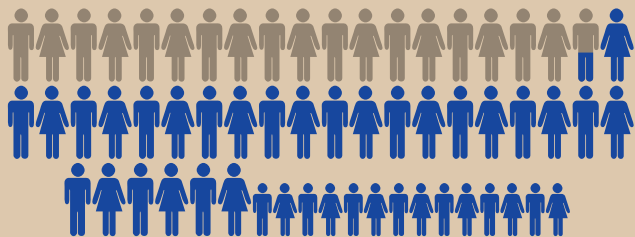
These reports build on research by AOA V that shows how the use of explosive weapons with wide-area effects in populated areas leads to a predictable pattern of excessive civilian harm. It considers what rules and policies already exist to regulate the use of such force. And it asks to what extent are civilians protected not only by international law, but also by the practices of states on the ground, many of which go beyond existing law? It concludes by asking, too, what measures could still be taken to reduce the terrible harm of explosive weapons on civilians?



OPERATION PROTECTIVE EDGE

The human toll and wider harm caused in the Israel-Gaza conflict from 7 July until 26 August 2014

The following casualty data is taken from the United Nations Office for Coordination of Humanitarian Affairs (UNOCHA) and covers harm caused by all forms of violence during the operation.



2,131 PALESTINIANS WERE KILLED IN OPERATION PROTECTIVE EDGE.

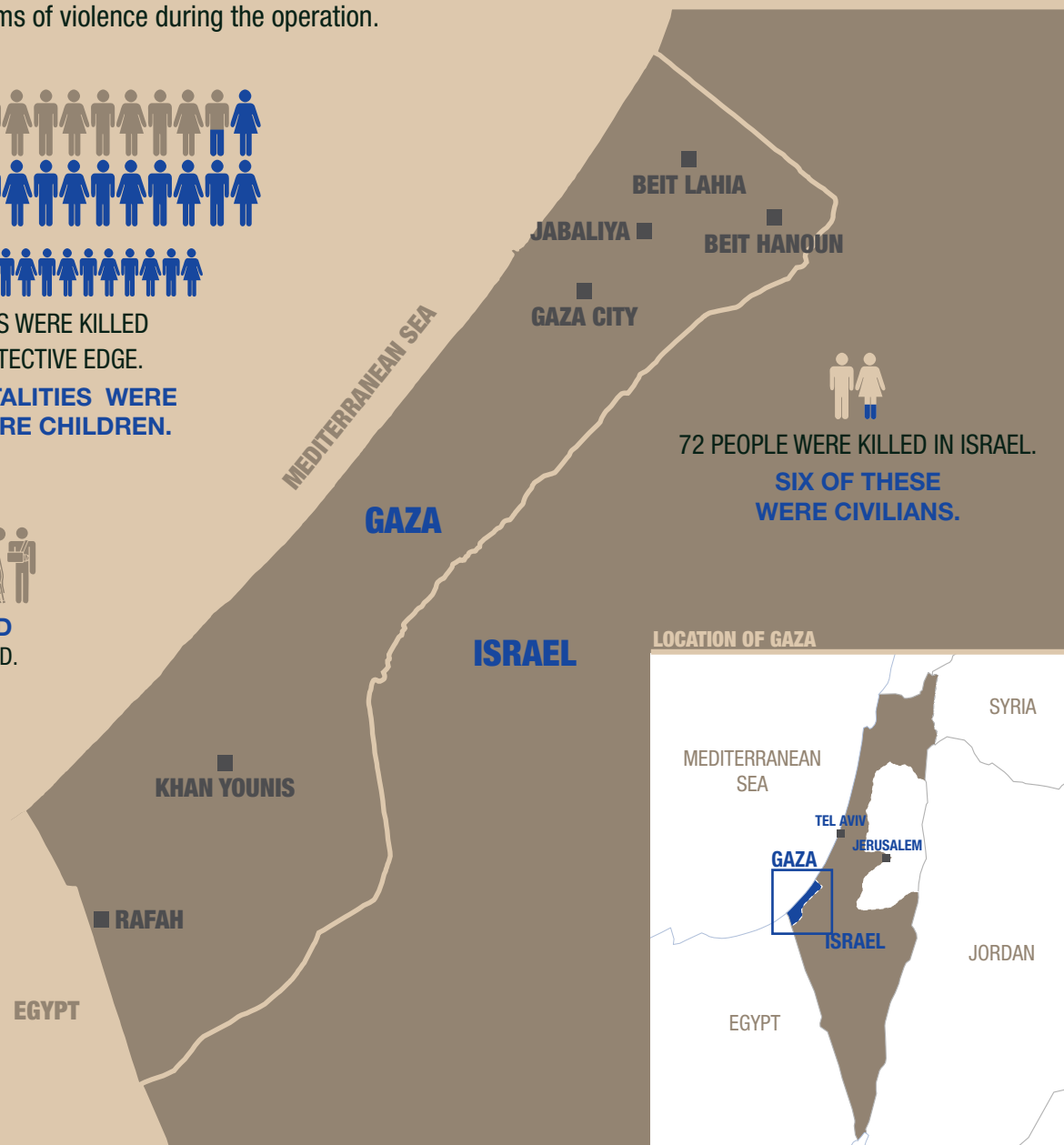
69% OF THESE FATALITIES WERE CIVILIANS. 501 WERE CHILDREN.



10% OF THOSE INJURED MAY BE PERMANENTLY IMPAIRED.



A QUARTER OF THE TOTAL POPULATION OF GAZA WAS INTERNALLY DISPLACED. (AS OF 22 AUGUST 2014)



72 PEOPLE WERE KILLED IN ISRAEL.

SIX OF THESE WERE CIVILIANS.

WIDER HARM



373,000 CHILDREN WILL REQUIRE PSYCHOLOGICAL SUPPORT (EST.).



AT LEAST **15 OUT OF 32** HOSPITALS WERE DAMAGED.



26 SCHOOLS WERE COMPLETELY DESTROYED 122 WERE DAMAGED.



18,000 HOUSING UNITS ARE UNINHABITABLE, LEAVING 108,000 PEOPLE HOMELESS.



1,900 EXPLOSIVE REMNANTS OF WAR HAVE TO BE SECURED (EST.).



COST TO REBUILD GAZA: \$6 BILLION



PLEDGES FROM INTERNATIONAL DONORS: \$5.4 BILLION

INTRODUCTION: ISRAEL AND GAZA

On 7 July 2014 a series of air strikes hit the Gaza strip.

It was the opening volley of what the Israeli military called ‘Operation Protective Edge.’³ Over the course of the next 50 days hundreds of tonnes of explosive weapons were used. The widespread use of explosive weapons led, by most estimates, to over 2,000 fatalities in Gaza.⁴ Many thousands more were injured. At the height of fighting a quarter of the Gazan civilian population were displaced as shelling and bombing destroyed homes and livelihoods.⁵

Operation Protective Edge was the latest in a series of recent explosive weapon exchanges that involved the Israel Defense Forces, or IDF.

Since 2005, when it unilaterally withdrew its forces from Gaza, Israel has been involved in several major military engagements with armed groups in the Gaza strip and in Lebanon (see Figure 1).⁶

In each and every one of these engagements, explosive weapons have played a prominent role— at great cost to civilians on both sides of the conflict.⁷

Explosive weapons project blast, heat and often fragmentation from around a point of detonation.

They vary in size and power, and include the likes of rockets, aircraft bombs and artillery shells. They also include improvised explosive devices (IEDs), which have been a particular threat to civilians in Israel in recent decades.⁸

When these weapons are used in populated areas it is often civilians who are most severely-affected.⁹ Small arms fire bullets at a point, but explosive weapons affect wide areas. They kill, injure and damage anyone or anything within that area. As such it is near-impossible, when using explosive weapons in a populated area, to restrict the deadly impact of an explosive shell or bomb to just one person or to a targeted group. The use of explosive weapons in populated areas, therefore, raises special concern when it comes to debating the protection of civilians.

Gaza is one of the most densely-populated places on earth.¹⁰ Explosive violence therefore frequently takes place in areas where large numbers of civilians are concentrated.¹¹

Gaza-based militants often base themselves in populated areas, from where they fire rockets and mortars at civilian areas in Israel.¹² These militants gravely endanger both Palestinian and Israeli civilians.¹³ According to the IDF’s own figures, during

Figure 1: Operations in Gaza and Lebanon since 2006

- Second Lebanon War (12 July— 14 August **2006**)
- Operation Summer Rains/Autumn Clouds (28 June – 26 November **2006**)
- Operation Cast Lead (27 December 2008— 18 January **2009**)
- Operation Pillar of Defense (14— 21 November **2012**)
- Operation Protective Edge (7 July – 26 August **2014**)

the 2014 operation at least 4,382 rockets were fired into Israel, and many of these could have hit a populated area if not intercepted by Israel's missile defence system.¹⁴

Much of the rocket and mortar fire from Gaza into Israel is deliberately intended to target civilians and is indiscriminate.¹⁵ This use of an explosive weapon is a war crime and as such utterly condemned by AOA V.

METHODS AND SCOPE

This report considers the extent to which the IDF has made changes to the explosive weapons it uses and to the methods it employs when using these weapons in populated areas ever since its disengagement from Gaza in 2005.

In short, it will interrogate what Professor Isaac Ben-Israel, a lecturer at Tel Aviv University and former Major General of the Israel Air Force (1998-2002), has recently gone on record to claim – that *“a bomb can injure someone unintentionally, but the IDF has gradually reduced the risk.”*¹⁶

The purpose of this report is to explore if the IDF has, indeed, done just this: reduce the risk.

To this end, we set out to look at what measures and policies have been adopted by the IDF to protect civilians from the use of explosive weapons in populated areas; to examine how these policies and practices have evolved since 2005; and to ask what more can or should be done by the IDF to further the protection of civilians.

Within the broad group of explosive weapons, this report focuses specifically on the IDF's deployment of artillery shells since 2005.

Artillery encompasses a range of explosive weapons, but broadly applies to the ground-launched systems that fire projectiles or shells through a barrel. They include various howitzers and guns that are designed to be fired indirectly (i.e. without a clear line of sight between a user and a target).¹⁷ The primary artillery weapon used by the IDF is the 155mm 'Dohar' howitzer, which is covered in detail on pages 10-12.

Research for this report was carried out through a combination of desk-based analysis, and interviews conducted with military, legal and policy experts in the US and Israel. Interviews were carried out in person, over phone, and through email discussions. AOA V conducted interviews with some experts on the IDF's military practices who have been kept anonymous at their request.

As with many militaries, Israel does not publicly disclose details of its current operating practice and policy, much of which is classified. AOA V requested interviews with IDF representatives on multiple occasions but access was not granted. The IDF's response to AOA V is included as an annex to this report. Analysis of military practice, then, had to be based on information that exists in the public arena.

The purpose of this report was not to take sides in the wider debate about the justifications for military action from any party. The report equally did not set out to pass judgement on the legality of specific actions during the conduct of hostilities in 2014. At the time of writing both the Israeli government and the United Nations Human Rights Council are conducting separate investigations into Operation Protective Edge.¹⁸

This report is focused on understanding the rules that apply to the use of artillery shelling exclusively. The humanitarian concerns with other weapons allegedly deployed by the IDF, such as flechette shells or depleted uranium, fall outside the scope of analysis here.¹⁹

Finally, while this report encompasses a trajectory of military practice that includes events of the past summer, it is broader in scope, and is not intended to pass comment on the applicability of international humanitarian law to incidents solely occurring during Operation Protective Edge. We leave that, for the moment, to others.

REPORT STRUCTURE

AOA V will first introduce Israeli military doctrine, and how it relates to international humanitarian law (IHL). It will then profile in detail the 'Dohar' 155mm artillery system which is the weapon under analysis in this report. It explores the extent of the weapon's

inherent damage potential, and the process typically undergone when operating this system.

In considering the IDF's current artillery practice, and the impact of changes made in the last decade, this report then investigates three specific claims that assert the IDF has increased civilian protection from artillery shelling;

First, that investment in new weapons technology will reduce civilian casualties from artillery;

Second, that the IDF has strong rules that greatly limit the conditions in which artillery can actually be used;

Third, that the IDF is reducing its reliance on unguided artillery.

In this report AOA V considers each claim in turn and questions to what extent measures introduced by the IDF since 2005 have been successful in achieving the stated public aim of reducing civilian harm.

Our conclusions are stark. We argue in this report how the changes to military practice made by the IDF over the last decade to regulate their use of heavy explosive weapons have not led to significant and effective civilian protection on the ground. Public rhetoric from IDF officials consistently emphasises efforts to reduce civilian casualties, but evidence of recent operations show these efforts are not reflected on the ground.



Damage to homes in Beit Hanoun.

GENERAL CIVILIAN PROTECTION MEASURES IN THE IDF

This section looks at the military practices and philosophies within the IDF that address civilian protection. While the measures identified here all relate directly to the IDF's use of explosive weapons in populated areas, in many cases they are not limited to bombing and shelling.

The conduct of hostilities in armed conflict is governed by international humanitarian law (IHL). One of the primary goals of IHL is to minimise civilian suffering.²⁰

In addition to the fundamental prohibition on any direct attacks against civilians or civilian objects, the central tenets of IHL include rules on **precaution** (measures must be taken ahead of any attack to avoid and minimise harm to civilians), **distinction** (efforts necessary to distinguish at all times between combatants and civilians, as well as military and civilian objects), and **proportionality** (that no attack can be excessive in the harm caused to civilians in relation to the concrete and direct military advantage anticipated).²¹

These core humanitarian principles are important for regulating the use of explosive weapons, and represent the building blocks upon which many national military practice is based.²²

RULES OF ENGAGEMENT

AOAV considers 'Rules of engagement (RoE)' to refer to the manuals, doctrines and policies that regulate the use of force by a state military. Like most, if not all, state militaries, the IDF's RoE are based on international humanitarian law (IHL). These policies continually adapt and evolve according to both military necessity and the evolution of collective and national laws.²³

As with many militaries, public information on the IDF's Rules of Engagement is limited. However, information in the public domain shows that Israel

acknowledges its legal obligations to protect civilians.²⁴

Israel's 2006 manual on the rules of warfare, for example, asserts that: *"the means of attack should be planned in such a way as to prevent or at least minimise casualties among the civilian population."*²⁵ It goes on to state that *"bombing a city... will not necessarily weaken the enemy's army, it will merely cause unnecessary suffering, and such actions are morally tainted on humanitarian grounds."*²⁶

Accordingly, Israel has developed RoE that articulate the need to protect civilians in the course of hostilities. However, particularly in relation to the use of heavy artillery, there are significant concerns with how these rules guide practice on the ground, as this report will detail.

CODE OF ETHICS

The protection of civilians also appears to be integral to IDF training. Israel claims its training and supervision measures are similar to, and in some ways more extensive, than those undertaken by other nations such as the US and UK.²⁷

For example, since 2003 Israel's military forces have been required to follow a Code of Ethics.²⁸ One of the values that the Code urges all soldiers to uphold is called 'Purity of Arms', and says *"the IDF servicemen and women will use their weapons and force only for the purpose of their mission, only to the necessary extent and will maintain their humanity even during combat. IDF soldiers will not use their weapons and force to harm human beings who are not combatants or prisoners of war, and will do all in their power to avoid causing harm to their lives, bodies, dignity and property."*²⁹ A version of this code is issued to all soldiers as part of their basic training.³⁰



Arabic language leaflet, warning civilians to evacuate, dropped over Beit Lahiya in July 2014

WARNINGS

One example of military practice where the IDF claims to have made advances with regard to the protection of civilians, is the development of warnings to civilians before attacks. The legal obligation to provide effective advance warnings to civilian populations has long been enshrined in IHL as part of the principle of precautionary measures. IDF experts have asserted that the approach applied in Gaza is “*probably the most elaborate and systematic*” seen.³¹

These warnings have expanded in scope and technology over the last decade. They include text messages and phone calls – both automated and personalised – to civilians in buildings where an attack is expected. Leaflets are also dropped from planes urging civilians to move away from a given area or neighbourhood.³²

This method of issuing warnings has been consistently criticised by lawyers and human rights groups as too generic to represent an effective warning.³³ It also raises the question of whether

the IDF then view leafleted locations as completely evacuated of a civilian presence.³⁴

ROOF-KNOCKING

In 2009 Israel begun to launch warnings using so-called dummy bombs.³⁵ These are thought to either contain little or no explosive content and are dropped onto a property’s roof ahead of an impending attack. The practice has come to be known as ‘roof knocking’; the intention being that the munition should represent a specific and unequivocal warning of further action.³⁶ Often this method is used in combination with multiple calls and warnings in the cases of particularly vulnerable targets.³⁷

Roof knocking is a warning method that tries to go beyond the requirements of IHL provisions. It is an approach that is not thought to have been replicated yet by other militaries.

Roof-knocking is a tactic that has been criticised by human rights advocates for three reasons.

Firstly, concerns have been raised that dropping a bomb as a warning is not effective. It may not give enough time or direction for people to leave before a larger attack is launched. The use of a bomb as a warning might be confusing, or might even be a form of psychological warfare.³⁸

Secondly, these are still bombs. Amnesty International has recorded casualties from these warning shots themselves.³⁹ While they may only contain a small amount of explosive compared to the many hundreds of kilograms in the standard munitions dropped by the Israeli Air Force (IAF), they fall with significant force from great heights and project explosive energy as they land.⁴⁰

Finally, warnings and precautions are much more seen in the deployment of air power than in, for instance, shelling. Yonah Jeremy Bob, a lawyer and correspondent with The Jerusalem Post, notes that “*a large volume of air strikes get vetted and often approved by the IDF’s highly specialised international law division, with lawyers present both in the war room at IDF headquarters and at forward headquarters, sometimes even in real-time. Shelling on the other hand, is often an immediate response to rocket fire or an attack on*

ground forces. There is certainly no time to consult with lawyers, and sometimes not even to consult with the generals at forward headquarters.”⁴¹

DO PRECAUTIONARY MEASURES ACTUALLY WORK?

Regardless of the effectiveness of these warnings, they can only partly address the impact that the deployment of heavy explosive weapons in populated areas has on civilians. As Middle East expert Anthony Cordesman recognised in his analysis of the 2008 operation in Gaza, “*no war can be fought*

in a densely populated urban area where civilians have no clear place to flee, and essential goods and services cannot be provided, without a high human and economic cost.”⁴²

The urban environment of Gaza makes it a challenge for any of these basic protection measures to make a significant impact in reducing civilian casualties. Especially so, when unguided or multiple explosive weapons are launched in such large number among a densely-crowded civilian population. In such a context, measures such as these can only be piecemeal solutions to a wider problem.



© Muhammad Saleh, B'Tselem

Residents explore damaged houses in Beit Hanoun.

ARTILLERY

Israel's Artillery Corps has been described as "one of the most technologically advanced in the world."⁴³ It is also one of the largest and best-equipped. In 2013, Israel had the ninth-highest total of self-propelled artillery pieces in the world (706 units).⁴⁴

One such item of heavy artillery is the 155mm self-propelled 'Dohar' howitzer. The Dohar is a modified version of an old US-made weapon (the M109). The IDF has hundreds of these weapons, having received its first shipment in 1969.⁴⁵

The most common ammunition for the Dohar is the 155mm high-explosive artillery shell, normally the M107.⁴⁶ This is originally a US-made shell, although those used by Israel are predominately made by in-country arms manufacturers. The M107 is popular not only in Israel. It is described as "probably the most widely used of all Western artillery projectiles

and is still one of the 'international standard' of projectiles by which all others are measured."⁴⁷

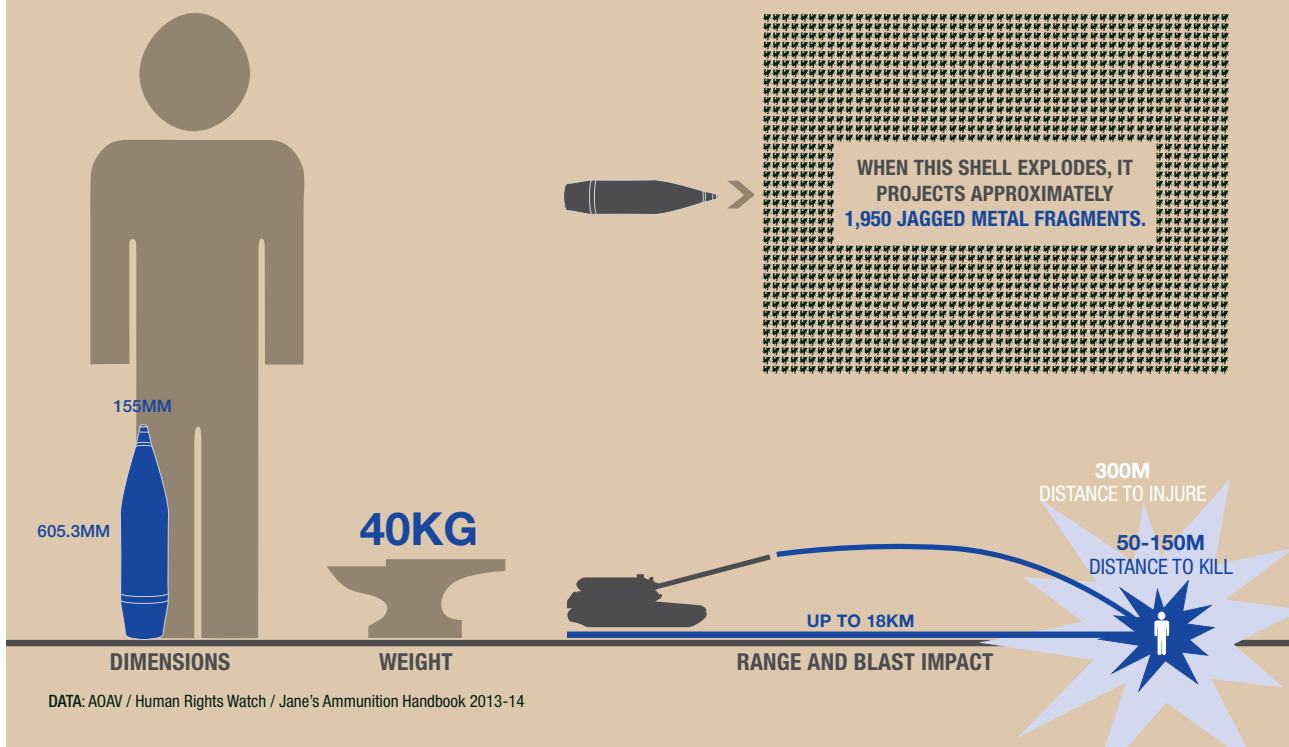
The 'international standard' it may be, but M107 shells are also, as Human Rights Watch (HRW) notes, "extremely deadly weapons."⁴⁸ Filled with high-explosive TNT, the M107 shell weighs more than 40kg. When it explodes it projects approximately almost 2,000 jagged metal fragments.⁴⁹

These fragments often carry across a wide area. They, and the blunt blast force from the shell itself, have high chances of killing people up to 150m away, and can injure people even 300 metres away from the point of detonation.⁵⁰

Furthermore, they are not that accurate. The shell is unguidable. IDF officials have said the error radius for each individual 155mm shell is usually 25 metres.⁵¹

155 MM ARTILLERY SHELL

THE 155MM ARTILLERY SHELL IS THE MOST COMMON AMMUNITION IN USE IN THE ISRAELI DEFENSE FORCES. IT IS FIRED FROM THE SELF-PROPELLED 'DOHER' HOWITZER.



“ [A]s an artillery officer I know that even now—with advanced technologies artillery fire is unpredictable. As an artillery forward observer, I always looked up to the sky, praying my shells hit the targets and not land on my head. Artillery shells have a strange habit of going astray.”

Dr Ahron Bregman, former IDF Major, 8 August 2014.⁵²

THE DOHER

The Dohar is capable of firing multiple munitions in a short space of time. In common with all artillery, the Dohar primarily launches its shells without the operator needing, or being able, to see the target, in a process called indirect-fire.⁵³ The Dohar fires shells in a broad, arching trajectory over obstructions such as tall buildings, and the element of range means that threats can be neutralised or destroyed as far as 18km away.⁵⁴

Shelling a target at great ranges both distances and protects the operator from attack. Israel has compulsory military conscription for all citizens. People are drafted into the army, which means that *“the political and military leadership is under real pressure to reduce the costs on their side in the heat of battle. One of the reasons Israel continues to opt for indirect fire, artillery, mortars, air strikes is in part because they are under real pressure to minimise their own casualties.”*⁵⁵

However, indirect-fire means that shells are not always delivered with accuracy. Firing sometimes requires a process of error correction in which shells are aimed over and short of a target as the artillery weapon gradually closes in on the correct range.⁵⁶ An attack with the Dohar is considered a ‘hit’ if a shell lands within 50 yards (46 metres) of the target.⁵⁷

In a densely-populated area such as Gaza City, 46 metres can mean life or death to many individuals.

Israeli military experts commonly refer to artillery systems as *“statistical weapons”* as a result of this process.⁵⁸ This term shows that the IDF itself readily-acknowledges that the wide area dispersal of shells is not only possible but likely: an inherent feature of way this weapon works.

Shells are generally fired under the guidance of coordinates provided by a forward observer, who watches the shells land and suggests adjustments where necessary. In recent years the role of observer is increasingly being played by small hand-launched drones deployed by the IDF Artillery Corps.⁵⁹ Unobserved fire - launching shells without adjustment or observation - is reportedly not permitted within the IDF RoE for artillery deployment.

In the Israeli military, artillery targets are either pre-planned or are otherwise targets of opportunity (i.e. responding to a mortar fired from, say, a residential neighbourhood in Gaza City). In pre-planned strikes, teams of officers in regimental intelligence units identify targets and provide coordinates to a battalion commander.

When carrying out attacks against emerging targets, intelligence units only have a short space of time to place the proposed target on a map, identify the existence of any locations requiring authorisation to fire near, such as hospitals, and then to order a strike. Commanders are given a ‘code’; a single order that dictates the intensity of artillery fire.⁶⁰

FIRING CODES

An expert on the IDF’s Artillery Corps explained to AOA that if the order *“Harassment”* is issued, for example, it means that *“you need to fire at maximum speed, which is usually three shells a cannon per minute, and you need to shoot, for example, ten explosive shells, five smoke shells, and two ‘flash’ shells.”* Harassment is a common purpose of artillery weapons. It refers to the use of such weapons to hamper enemy reconnaissance, traffic of materials etc.⁶¹ As the detailing of the ‘Harassment’ code suggests, not all shells fired by the

Dohar and other artillery systems have a primary effect of causing death, injury or damage through explosive energy. Other shell types include smoke shells used for their obscuring effects, and flash/illumination shells.

The Dohar is clearly a powerful and destructive weapon system. It is capable of firing large numbers of heavy, high explosive artillery shells across great distances in a short space of time. It is not, however, capable of firing these munitions in a precise manner. Nor is it capable of limiting the blast and fragmentation effects to a specific individual. As such AOA V believes that such weapon system should not be used by the IDF in attacks against residential neighbourhoods or near to other populated areas.

What is also of concern to AOA V is that the Rules of Engagement regulating the Dohar's use have themselves been progressively relaxed over the last decade, illustrating a widening gap between public rhetoric and action on the ground.

“ When we ask them [IDF soldiers] ‘if it’s one specific house, why three shells?’ they say ‘that was in order to make sure that we actually hit’. Because [artillery] is not an accurate weapon, the chances are that you’re not going to hit if you’re going to use only one shell. The problem is that if you shoot three [shells], all three of them are going to fall in the area of Gaza, and the chances are that a lot of people will get hurt.”

IDF artillery expert, interview with AOA V, November 2014



155mm Dohar artillery fires into Gaza.

MUNITION SELECTION

The IDF has repeatedly and publicly asserted the importance of choosing appropriate munitions in its attacks. Following Operation Cast Lead in 2009, for example, Israel issued a statement saying, *“the IDF gave considerable care to the choice of munitions. Wherever possible, and even though it is not strictly required under international law, the IDF conducted pinpoint surgical aerial strikes, using precision guided munitions [...]”*⁶²

Within the Artillery Corps there has certainly been extensive investment in new-guided missile alternatives to help reduce its reliance on traditional unguided systems.⁶³

In particular the IDF is increasingly using guided munitions called the Tammuz (‘Spike’) missile. During the fighting in 2014, the IDF fired more than 250 Tammuz missiles, compared to just 26 in Operation Cast Lead in 2008-09.⁶⁴ This is more than a nine-fold increase.

Used by a special unit within the Artillery Corps, the Tammuz is first thought to have been tested in the field during the 2006 Lebanon War.⁶⁵ The Tammuz can travel 25km, further than the 155mm artillery shell, but has a guidance system that includes a camera in the nose.⁶⁶ *“It can be steered in mid-flight,”* Mitch Ginsburg, the military correspondent at The Times of Israel newspaper told AOA. *“The army has shown videos where it can sometimes be steered away suddenly from the target if it becomes surrounded by civilians.”*

TAMMUZ V M107

The number of Tammuz missiles fired in 2014 by the IDF, however, was dwarfed by the deployment of high-explosive artillery shells (see Figure Two). As Mitch Ginsburg explained to AOA, this is for two reasons.

First, the Tammuz is extremely expensive. Each missile is thought to cost 500,000 to 800,000 Israeli shekels, (approx. GBP 82-132,000) meaning that roughly GBP 20 million was spent on

this ammunition during the 2014 operation. By contrast the 155mm shells cost as little as 4-5,000 shekels each (GBP 600-800).⁶⁷ The cost of using unguided artillery shells, even when a strike involves multiple numbers, is significantly less than the use of one Tammuz missile.

The second factor is that the RoE for Tammuz munitions permit them to be fired only in select circumstances. Ginsburg believes that the IDF fires the Tammuz *“only if they know exactly what they want to hit. In a more complex situation, if you don’t have the coordinates for exactly what you want to hit, but rather you want to quiet an area then they claim that they need the [155m] artillery.”*

Not only was the traditional unguided artillery still favoured over the guided alternative in 2014, but a side-by-side comparison of the last two operations in which heavy artillery was deployed (Cast Lead, 2008-09, and Protective Edge in 2014) shows that in 2014 there was a 533% increase in the number of unguided high explosive munitions launched compared to 2008/9.

This happened despite criticism from within the Israeli government that the IDF had previously been wasteful in the past in its use of artillery ammunition.⁶⁸ In the Lebanon conflict of 2006 the IDF fired over 170,000 artillery shells. As far as is known, not a single Hezbollah combatant was killed in these barrages.⁶⁹ As HRW investigators in southern Lebanon found, however, *“almost every house in many villages within range of Israel (or Israeli position inside Lebanon) bore evidence of artillery strikes on its exterior walls,”* and that civilians had been killed by shelling with 155mm artillery.⁷⁰

In 2014, it is estimated, based on figures provided by the IDF itself, that at least 34,000 artillery shells were fired into Gaza.⁷¹ Although significantly less than the staggering quantity of shell-fire expended in Lebanon in 2006, this is still more than four times as many as were fired in the last major operation in Gaza involving the use of artillery.

Artillery shell type ⁷²	Operation Cast Lead, 2008-09	Operation Protective Edge, 2014	Percentage change
High-explosive	3,000	19,000	533%
Smoke	4,000	12,000	200%
Illumination	1,000	3,000	200%
Total	8,000	34,000	325%

Figure two: Artillery shells launched in 2014 and 2008/09.

This was Operation Cast Lead, which took place over 23 days in December 2008—January 2009.⁷³

A side-by-side comparison can only tell us so much, but it does reveal a continuing presumption in favour of high explosive unguided artillery. Over the course of 2014’s fifty-day operation there was a daily average of 680 artillery shells fired in Gaza by the IDF, compared to 348 per day in the 2008-09 operation. Just over a third (38%) of artillery shells fired in 2009-09 were high explosive. In 2014 that proportion increased to 56%.

The quantity of high-explosive artillery shells fired in 2014 also means that the approximate outlay in unguided artillery ammunition alone was somewhere in the region of 170 million shekels (GBP 28 million). One senior officer said that, including tank shells, the total cost of ammunition expended in Operation Protective Edge was 1.3 billion shekels (more than GBP 200m), and that this was in part because *“troops fired more ammunition than was planned.”*⁷⁴

HAS ISRAEL BEGUN TO USE MORE ACCURATE MUNITIONS OVER TIME?

Has Israel really begun to shift more and more towards the use of much-trumpeted ‘precision’ weapons in their engagements? Have these new munition systems replaced outdated and unguided weapons like the Doher? Or rather have they just added to the already daunting firepower at the IDF’s disposal?

Our analysis of the type of artillery munitions fired into the Gaza strip suggests that there is more rhetoric than reality when it comes to guided missiles. ‘Statistical weapons’ are still considered fit-for-purpose for firing near civilian homes and communities.

This is a deeply concerning finding that suggests that the rules regulating their use within the IDF allow are too flexible and permit significant leeway for application by commanders on the ground.

Crucially, moreover, focusing solely on a technological response does not eradicate the risk to civilians. Accuracy is important, certainly, and if an explosive weapon cannot be trusted to be delivered reliably to a target it is clearly unsuited to use in populated areas because it will likely affect a wide area. However, it is not just accuracy that can be an influential factor in this regard. Explosive weapons can also have a wide-area effect if they have an inherently large blast yield, or if they are launched in multiple numbers.⁷⁵ This is seen in the use of aerial bombs, for example, discussed on page 15.

For as long as these bombs, guided or unguided, are used in populated areas, they will continue to pose a grave threat to civilians. Mistakes are made, both human and technical. Anthony Cordesman, a military strategy expert with the Center for Strategic & International Studies (CSIS), summed it up by saying: *“No matter how careful planners are, some targets will be empty or misidentified. No matter how careful pilots are, any large-scale use of ordnance will – and did – lead to significant numbers of misidentified targets, misfires, and weapons that do not hit their targets with the intended precision. US experience indicates that anywhere from 5-10% of precision weapons might hit the wrong target in a closely packed urban environment, even with ‘best effort’ target planning, rules of engagement, and pilot release and guidance.”*⁷⁶

As AOAV will next consider, it is the rules of engagement that can have the greatest impact in improving civilian protection from heavy explosive weapons.

Aerial bombing

Following the 2008-09 operation in Gaza the IDF claimed that 80% of the aerial munitions that it fired were precision-guided.⁷⁷ However the use of aerial weapons in 2014 shows that despite recent technological advances in weapon delivery, civilians still frequently pay the price of bombing in populated areas.

Many of the aerial munitions used, while more accurate than their historic predecessors, still have a wide-area effect because of their size and power.

One munition used by the Israeli Air Force is the Mk-84, a high-explosive bomb fitted with a guidance system that weighs 2,000lb. It “can form a crater 50 feet wide and 36 feet deep, and it can penetrate up to 15 inches of metal or 11 feet of concrete, depending on the height from which it is dropped; it has a lethal fragmentation radius of 400 yards.”⁷⁸

On 29 July, a bomb thought to be a Mk-84 fell on a three-storey apartment building in the Gaza town of Khan Younis.⁷⁹ Thirty-six people were killed, including 16 members of the Abu Amer family and seven of the al-Najjar family.

While Amnesty International investigators claim to have identified military targets nearby, the 29 July air strike shows the inherent danger of deploying even the most accurate munitions in a populated area. The evidence of their use in Gaza shows strongly that where powerful explosive weapons are used in populated areas it is difficult to control the harm they will cause. No matter how targeted, the inherently large blast yield of large aerial bombs will affect a wide area, and their use in populated areas dramatically increases risks to civilians nearby.



© Muhammad Sabah, B'Tselem

The Kware' family home in Khan Younis after an air strike killed eight family members on 8 July 2014.

“ We don't know what happened. I was sleeping beside my children. Suddenly we woke up and the entire house collapsed on top of us. I started yelling and screaming. I have five children, three daughters, and my son's daughter. They all died. I have no one left. I said 'Just save my children, save them, get them out- leave me and pull them out.' Nothing is left for me. My husband is dead.”

Hana' al- Najjar, speaking to Amnesty International investigators, November 2014⁸⁰

SAFETY DISTANCES

“Because artillery is less accurate, we have rules of engagement especially for artillery that are different from other weapons. We are working with artillery experts on these matters. The potential for artillery is terrible, as you know.”

Brigadier General Mandelblit (Military Advocate General)⁸¹

The IDF has claimed that it is not its practice or policy to fire unguided artillery into populated areas, except in rare special cases, specifically the self-defence of IDF personnel under fire.⁸² *“The sheer orders are you are not allowed to fire artillery or mortar shells into urban areas unless there imminent risks for human lives,”* an IDF general told The New York Times in 2014. *“[M]eaning only if you are under deadly fire or under great risk. The orders are clear.”*⁸³

This, however, leaves unanswered the crucial question of how the IDF defines an urban populated area during operations.

POPULATED AREAS?

In 46 separate incidents of Israeli ‘shelling’ recorded by AOA during the 2014 Gaza operation, 94% were in or near a reportedly populated area.⁸⁴ This included incidents where artillery shells landed on or next to homes, hotels and schools. AOA’s definition of a populated area is based on Protocol III of the 1980 Convention on Certain Conventional Weapons (CCW) which states: *“any concentrations of civilians, be it permanent or temporary, such as in inhabited parts of cities, or inhabited towns or villages, or as in camps or columns of refugees or evacuees, or groups of nomads.”*

One expert on IDF artillery recently told AOA that in 2005 the Israeli RoE guiding the artillery response to mortar fire from militants was that it was only permissible to return fire into ‘open’ areas: *“You have a field of a couple of kilometres between Deir al Balah or any other Palestinian town and the border with Israel, you can shoot there [...] Now, when we asked the soldiers ‘what is your definition of an open area in one of the most densely populated areas in the world?’, they told us that if it’s more or less the size of a football pitch or even smaller than that, then that’s regarded as an open area.”*⁸⁵

However, in 2014, it was clear that the RoE no longer was as limiting as this. The IDF repeatedly returned fire into areas that, in 2005, their own rules would have not permitted such.

SAFETY ZONES

A safety zone, or distance, is a policy which prescribes exactly how close an artillery shell can land to specific structures or people.

In 2005, the safety distance for firing artillery near residential houses was 300 metres. The IDF reduced this in April 2006, saying it was permitted to fire shells as close as 100 metres from civilian homes.⁸⁶

The minimum distance within which Israeli artillery can be fired near IDF forces is 250 metres, over twice the protection radius it affords to Gaza’s civilians.⁸⁷

This regressive policy change has clearly raised the threat of death from artillery for civilians in Gaza.

Between September 2005 and the end of May 2007, UN casualty data suggests that artillery shelling killed 57 people in Gaza. They were believed to be primarily, if not exclusively, civilians. HRW determined that all of the civilian deaths had occurred after this downshifting of safety distance policies from 300 metres to 100 metres in April 2006.⁸⁸

.....

“The pattern of casualties should have alerted the IDF to problems in its targeting decisions, that any mistakes took place in a context in which the IDF had loosened its strictures on 155mm artillery use thus in part were a foreseeable consequence of using a weapon of limited accuracy very close to residential areas.”

Human Rights Watch, 2007⁸⁹

.....

As the expected casualty-producing radius of each 155mm artillery shell is close to 300 metres, even the most expansive safety distance provides a very fragile assurance of security to civilians.⁹⁰ A reduction to 100 metres puts civilians well-inside the potential lethal radius.

Following the 2006 instigation of this lowered safety distance, six human rights groups appealed to the High Court of Justice in Israel for the policy to be reversed. They said that the range proposed in the IDF policy *“is not sufficient and results in the death and injury of large numbers of civilians who are not involved in the fighting, thereby rendering the order to reduce the ‘security zone’ patently illegal.”*⁹¹

There is no evidence to suggest that the larger safety zone of 300m for civilians has since been reinstated on a widespread scale by the IDF.⁹²

Shujaiyeh

.....

The rigid 250m safety zone protecting IDF units from artillery fire is immovable in all but the most extreme scenarios. On 20 July 2014 IDF troops came under heavy fire in the Gaza City neighbourhood of Shujaiyeh. Thirteen soldiers were killed including seven who died when struck by an anti-tank missile.⁹³

In response, and in an effort to extract endangered forces, soldiers were ordered to shelter in armoured vehicles, and the safety zone was reduced. *“We fired about 100-120 meters from our forces [...],”* said Brig. Gen. Roy Riftin, IDF Chief Artillery Officer. *“Some of which obviously leaked inside [the safety zone].”*⁹⁴

It is believed that at least 600 artillery shells were fired into the densely-populated neighbourhood. A hundred one-ton bombs were also dropped. Upwards of 65 Palestinians were reportedly killed that day, including ten women and thirteen children, while more bodies were later recovered from the rubble.⁹⁵

“The hospital was totally overloaded,” said a Norwegian doctor working in the Shifa hospital of Gaza City that day. *“For many of us, these were the worst scenes we’ve ever had, not only for the density of patients and total overwhelming of our capacity but because of all this pain and agony. There were children in enormous pain. Totally devastated families were bringing their dead children in and lying on the ground screaming.”*⁹⁶

The shelling in Shujaiyeh shows that regardless of whether or not a stricter safety distance to protect one’s own forces is standard military practice, the reduction of the comparative zone for civilians greatly elevates the risk from an unpredictable and inexact weapon system. While the earlier distance of 300m barely qualified as providing a minimum protection to civilians in 2006, its steady reduction shows a clear regression in the IDF’s RoE for artillery.

SENSITIVE SITES

The IDF stated after Operation Cast Lead in 2008-09 that it would undertake new RoE and training to improve protection of certain sensitive sites in Gaza, including UN-run schools and medical facilities.⁹⁷

This was the result of one specific incident during Operation Cast Lead. On 6 January 2009, four 120mm ‘Keshet’ mortars landed near a school run by the United Nations Relief and Works Agency (UNRWA).⁹⁸ The mortar shells were fired by the Paratrooper Brigade, who were unable to launch a missile after a technical malfunction and selected the mortars as *“the most precise weapon available to Israeli forces at that time.”*⁹⁹

The IDF claimed that its use of mortars was in response to incoming fire received from either near or inside the school itself.¹⁰⁰ At the time, however, the school was also a shelter for hundreds of internally-displaced civilians, and even though the mortars did not land inside the school compound itself, as many as 40 people were reported killed.¹⁰¹

An internal investigation into the 2009 school attack claimed that the IDF commander in question carried out the attack in accordance with the requirements both of IHL and Israel’s RoE. However, it was felt within the IDF that it was necessary nonetheless to *“formulate more stringent definitions in military orders to govern the use of mortars in populated areas and in close proximity to sensitive facilities.”*¹⁰² No information has been made public about either the content or the effect of such tighter guidelines to IDF personnel.

LEARNING LESSONS

New procedures introduced in the fallout from the 2008-09 fighting in Gaza, however, do not appear to have led to demonstrable increases in protection for these ‘sensitive’ facilities.

Interviews conducted by AOA in 2014 confirmed that sensitive sites now require a higher level of authorisation before any attack can be launched in the vicinity.¹⁰³ The coordinates for each sensitive site are shared and updated regularly by the Israeli Coordination and Liaison Administration, a government

agency which shares information about protected sites with the military decision-making hierarchy.¹⁰⁴

In addition, since 2009 each battalion commander is advised by a Humanitarian Affairs Officer about how to coordinate operations in a way that best reduces the impact on civilians, civilian property, and infrastructure.¹⁰⁵ The function of this new officer position is explicitly concerned with civilian protection.¹⁰⁶ However, as Bill Van Esveld of Human Rights Watch, put to AOA, more substantive efforts to change military practice were required and several incidents of harm to civilians in Gaza during 2014 have indicated that the introduction of a humanitarian affairs officer has not led to appreciable improvements.¹⁰⁷

On 30 July 2014, at least ten 155mm artillery shells landed in and around a UN-run school for girls in the town of Jabaliya, which was sheltering over 3,000 displaced people.¹⁰⁸ More than a hundred civilians, including children, were killed and injured.¹⁰⁹ Witnesses reported that warning missiles preceded the attack, which is alleged to have been in response to militants firing mortar shells at IDF soldiers in the vicinity.¹¹⁰ The UN claimed that it had informed the Israeli military of the school’s location 17 times.¹¹¹

At the time of the attack, the Jabaliya school was the sixth such shelter struck during the 2014 operation.¹¹² In the aftermath of the fighting, the UN reported that 22 schools had been completely destroyed, and another 118 damaged in the conflict.¹¹³

DOES THE IDF HAVE ACCEPTABLE SAFETY DISTANCES?

The fact that the IDF felt it necessary to redraw its guidelines and RoE for the deployment of mortars in 2009 is encouraging.

However, it seems that whatever rules were clarified and redrawn following Operation Cast Lead are proving ineffective in establishing red lines beyond which heavy explosive weapons can and cannot be deployed. It means that virtually no space in Gaza can be considered safe and protected unless meaningful measures are introduced to limit the deployment of all explosive weapons with wide-area effects.

“Why aren’t the safe zones working? Why are the military decisions being made that are leading to these tragedies?”

Robert Turner, Gaza Director for UNWRA, August 2014.¹¹⁴

The Hannibal Directive

The Hannibal Directive was developed in the 1980s after several high-profile kidnappings of IDF soldiers. Mitch Ginsburg, military correspondent at The Times of Israel and one of Israel’s leading experts on the IDF, explained to AOA that in principle the directive *“authorises soldiers to use force levels that they ordinarily wouldn’t use, that they were restricted from. In Rafah [on 1 August] there was far more artillery bombing in populated areas than there was in other places during the war because of that protocol.”*¹¹⁵

Several commentators have indicated that there has been difficulty communicating to soldiers on the ground the precise level of leeway that commanders have to act under the directive.¹¹⁶ The actual level of fire authorised is described as *“taking a calculated risk to thwart a soldier’s capture, but prohibits using massive fire that could kill the soldier with his captors.”* It would not therefore be permissible under the regulation to fire an artillery shell at a fleeing vehicle as it would likely kill the captive soldier.¹¹⁷

The Hannibal Directive was reportedly used by IDF forces in the Gaza town of Rafah on 1 August 2014 after an attack in which two soldiers were killed and a third thought to have been abducted. The IDF responded through heavy shelling with artillery and tanks, as well as airstrikes.¹¹⁸

As many as 150 civilians were reportedly killed in Rafah under the barrage of artillery and other explosive weapons.¹¹⁹ Unlike in the majority of reported incidents in Gaza, there was no prior warning or evacuation process for civilians.¹²⁰ This incident is currently under investigation, and human rights advocates are campaigning for changes to the implementation of the Directive in densely-populated areas such as Rafah.¹²¹

MORATORIUM

Experts attest that the IDF has attempted to play down its reliance on artillery shelling in recent years: *“What we have tried to do is not to use what we call ‘statistical fire’, or to use it only in very special cases,”* Professor Bin-Israel, a former air force Major General, told AOA. *“Everything here is not black and white, it is a case of degree, but we have tried to reduce the need for so-called statistical fire, this we define to mean unguided artillery, mortars; things like this.”*

In December 2006 the IDF introduced a moratorium, or suspension of artillery shelling in Gaza. This remains the only measure taken by the IDF to have seen clear and measurable improvements in civilian protection, but after artillery was redeployed in 2008 this practice has fallen into disuse.

At 5.30 am on 8 November 2006 at least 12 artillery shells crashed into an apartment block in the northern Gaza town of Beit Hanoun.¹²² Nineteen civilians died, all but one of whom was a member of the Athamna family. Fourteen were women or children.¹²³ Another four people later succumbed to their injuries, bringing the total number of deaths from the artillery strike to 23.¹²⁴ The attack was blamed on a technical failure and Israel publicly apologised for the mistake.¹²⁵

Then-Prime Minister Ehud Olmert later announced in December 2006 that artillery would no longer be used close to populated areas.¹²⁶

Artillery was not deployed in Gaza following this policy decision in the whole of 2007, and as a result civilian deaths dropped massively, from 59 in 2006 to zero in 2007.¹²⁷ Large-scale artillery barrages were not seen until the start of the ground offensive during Operation Cast Lead on 3 January 2009.¹²⁸

A moratorium only necessitates a pause in activity. It does not illustrate meaningful policy change as it can be relaxed or reversed whenever the perceived need arises.

However, the introduction of a moratorium indicated an implicit acknowledgement within the IDF decision-making hierarchy that the shelling of the Athamna apartments was not just a tragic, isolated incident, but also that it was indicative of the inherent ‘tragic potential’ whenever heavy artillery is used in populated areas. While a temporary measure, it was a step towards the most effective measure that can be taken to protect civilians from explosive weapons harm: to end its deployment in populated areas where civilian populations are concentrated.

WIDE-AREA EFFECT

As far back as 1997, Israel has asserted that it *“does not make use of inaccurate weapon systems which are liable, by their very nature, to strike at locations far removed from their original target.”*¹²⁹ Crucially the interpretation of what constitutes ‘far removed’ is not defined in this statement, but use of heavy artillery in populated areas, where the margin for error is so narrow, could be seen to be inconsistent with this position.

There has however, broadly speaking, been a shift within the IDF away from using weapons with a particularly wide-area effect. For example the IDF Artillery Corps has the potential to deploy M270 multiple rocket launch systems (MLRS). The M270 has the power to saturate an extremely wide area with explosive force, and *“was not employed in Gaza on account of its inherent incompatibility with the urban setting.”*¹³⁰

Other devastating weaponry that has been used in past operations by Israel, such as cluster munitions (last used in 2006 in Lebanon), and white phosphorous (last used in Operation Cast Lead in 2008-09) now seem subject to either de-facto or partial moratoriums. The IDF decided to stop using ground-launched white phosphorous munitions on 7 January 2009 after its use was heavily-stigmatised internationally following Operation Cast Lead.¹³¹ This is a positive

and progressive policy, and there has been no evidence to date to suggest that either white phosphorous nor any other kind of incendiary weapon was deployed in 2014.¹³²

2014, when more shells were fired than in any other recent operation in Gaza, was a significant regression in the practice for artillery use from a humanitarian perspective. That white phosphorous, which the IDF claimed is important for its screening effect, was not deployed in 2014 may have influenced the sharp increase in artillery shelling, at least with smoke shells. The Israeli Ministry of Foreign Affairs said in 2009 that white phosphorous “permitted the IDF to avoid the use of high explosives and munitions that would have otherwise been necessary to protect Israeli forces.”¹³³

Israel’s shift away from using particularly abhorrent or indiscriminate weaponry is testimony to the power of public pressure, scrutiny and stigma. The use of cluster munitions and white phosphorous in Gaza and Lebanon was widely condemned. Similarly the moratorium against heavy artillery in populated areas was a demonstration of Israel’s sensitivity to the political ramifications of causing civilian casualties.

STRATEGIC COSTS

There are compelling strategic and ethical reasons for Israel to continue to move away from the use of explosive weapons with wide-area effects in populated areas. The ethical considerations are clear, and are readily recognised within the IDF’s written RoE and guiding principles.

Strategically, it is also in Israel’s self-interest to further its evolution of military policy. As Andrew Exum, a former US artillery officer and Middle East expert who has studied Israel’s recent military campaigns explained to AOA, the wide-area impact of weapons like artillery shelling damages the broader strategic goals of isolating militants in Gaza from the wider civilian population: “if somebody who is a Hamas collaborator who gets shot in the head, then I know ‘holy shit, that guy is a Hamas collaborator, I know exactly why that guy was shot in the head.’ The lesson here is: don’t be a Hamas collaborator. If however, I see a family of a Hamas member killed in an airstrike that also kills five people that were just walking to go

get groceries, then suddenly I’m really confused because I’m like, ‘well I might as well...I mean, I might get killed no matter whether or not I collaborate with Hamas you know, that might happen no matter what I do,’ so it’s almost as if I don’t have any agency over protecting myself because you know when artillery or airstrikes are falling, they tend to kill more than just the people you’re trying to kill. And it gets tougher to message to the population.”¹³⁴

“ Artillery fire can only be directed to relatively open areas [...] Artillery fire toward urban spaces is problematic if the estimation is that the chances of a shell hitting a [rocket] launcher is relatively small while the danger of many civilians being hurt is real.”

Achaz Ben-Ari, former Chief Legal Adviser to the Israel Defense Ministry, 2008¹³⁵

CONCLUSION

“ Heavy artillery shelling into a populated area would be inherently indiscriminate. You just can’t aim that weapon precisely enough in that environment because it’s so destructive.”

Bill Van Esveld, Israel and Palestine researcher, Human Rights Watch¹³⁶

The use of 155mm artillery shelling should be considered inappropriate for use in civilian populated areas because of the inherent inaccuracy and wide area dispersal. Experts in the IDF’s practices have compared the limited area effect of rifle fire with the inability, even under ideal conditions, of artillery to hit its target without incidental effects.¹³⁷

The repeated labelling of artillery systems as ‘statistical weapons’ is also an implicit recognition that only a certain percentage of the shells fired can be expected to fulfil the function intended.¹³⁸ The implications of the use of such a system in or near civilian areas are clear and catastrophic.

The dilemmas that underpin the use of artillery shelling in populated areas are also widely recognised within the IDF itself. Over the past ten years repeated guidance from senior legal and military advisors to the IDF decision-making hierarchy has emphasised that artillery is plainly unsuitable for use in populated areas. Perhaps the most notable guidance to this effect came from Achaz Ben-Ari, formerly Chief Legal Adviser to the defense ministry.

In December 2008, Ben-Ari wrote, *“Artillery fire can only be directed to relatively open areas [...] Artillery fire toward urban spaces is problematic if the estimation is that the chances of a shell hitting a [rocket] launcher is relatively small while the danger of many civilians being hurt is real.”*¹³⁹

Moreover among IDF artillery commanders on the ground who have to face the dilemma of how to fight in populated areas there is thought to be some discomfort at the requirement to fire unguided artillery.¹⁴⁰

In the last decade it has been repeatedly shown that it is possible for the IDF to draw important findings about the suitability of certain weapons in certain contexts, and to act accordingly.

There have been moves, however informal or temporary, away from using particularly harmful weaponry like white phosphorous or cluster munitions. There have been tighter guidelines to regulate the use of mortars near to ‘sensitive sites’. And progressive policies to curtail the effects of artillery have been introduced, even if they have not been retained in practice.

It is certainly the case that significant efforts have been made to mitigate civilian casualties, both through procedural measures and through an investment in technological advances that have sought to produce smaller munitions that can be delivered with a greater degree of accuracy.

However, the emphasis on technology suggests that the Israeli military is in danger of learning the wrong lessons from mistakes made in the past. Technology is important in helping to ameliorate some of the errors arising from technical failings inherent in other outdated weapon systems, but relying solely on investment in new weapons will not resolve the underlying challenges and dilemmas of their deployment in populated areas in the first place.

As Andrew Exum warns *“those Israeli soldiers who are calling for this [artillery] fire, they’re under tremendous stress, they may have sustained casualties, they probably had slept very little in the past couple of days. It’s extremely difficult [...] there are a lot of ways to screw up.”*

Tighter rules would better protect soldiers from the consequences of making errors born of the stress, fear, and exhaustion of fighting. Not only is technology alone unable to completely eradicate such factors as human error or changing weather conditions, it fundamentally is only as good as the rules that apply it. If the rules of engagement are loosely-defined or give extensive leeway for the interpretation of an individual commander on the ground it heightens the likelihood that error, brought about through the heat of battle, will have severe and damaging impacts on civilian populations.

Since 2005 there have been worrying regressions in the rules that regulate the IDF's use of heavy artillery in populated areas, that have undermined progress made in trying to reduce harm to civilians, and that have contributed to the loss of civilian life, livelihoods and homes. Mitch Ginsburg, military correspondent for The Times of Israel, told AOA that *"In the wake of this operation [Protective Edge], they will probably draft some more specific orders, but in general I know that there has to be a pretty major debate on in what circumstances you are allowed to use artillery in populated areas."*¹⁴¹

It can only be hoped that Israel is on the cusp of an important national debate about the relevance and appropriateness of these weapons in populated areas.

Fundamentally, the deployment of heavy unguided artillery shells, or the dropping of bombs with a large explosive yield, in populated areas puts civilians at great risk of unintended death or injury. As has sadly been seen in Gaza, this is a pattern of violence with effects that are hard to limit even under the best conditions.

There are compelling strategic and ethical reasons for Israel to continue a progression away from the use of explosive weapons with wide-area effects in populated areas. The most impactful change that can be made to mitigate unwanted civilian harm is to immediately cease the use of such weapons in populated areas.

AOAV is a member of the International Network on Explosive Weapons (INEW). We believe that there is a need for stronger standards against the use of explosive weapons with wide-area effects in populated areas. Stopping the use of these weapons in populated areas would save civilian lives both during attacks and in the longer-term.¹⁴²

“ There’s no reason to think the Israeli’s couldn’t change the rules, though. We have international conventions banning, for instance, the use of chemical weapons in war, so it is possible, I believe, to also prohibit the use of heavy artillery, big bombs and cruel procedures in densely populated areas such as the Gaza Strip. After all, it is also in Israel’s interest, as the horrific pictures coming out of the Gaza Strip ruin the country’s already tarnished reputation.”

Dr Ahron Bregman, former IDF Major, 8 August 2014¹⁴³

RECOMMENDATIONS

GENERAL

- State forces should immediately end the use of explosive weapons with wide-area effects in populated areas.
- State should work collectively towards an international commitment aimed at stopping the use in populated areas of explosive weapons with wide-area effects.
- In line with the October 2014 request from the United Nations Secretary-General to all Member States, states should take this opportunity to share examples of good practice and policy in the use of explosive weapons with wide-area effects in populated areas.¹⁴⁴
- States should recognise the pattern of unacceptable harm caused by the use of explosive weapons in populated areas, and should publicly condemn any such use at every opportunity, including, but not limited to, the UN Security Council debates on the Protection of Civilians.
- States, international organisations, and non-governmental organisations should gather and make available data on the impacts of explosive weapons. More should be done to protect and support the organisations and individuals that work to gather such data.
- States and users of explosive weapons should work towards the full realisation of the rights of victims of explosive weapons, including those killed and injured, their families, and affected communities.

ISRAEL

- Should immediately end the use of heavy unguided artillery in populated areas.
- Should introduce binding national legislation and rules of engagement that enforce a halt to the use of these weapons in and among concentrations of civilians or civilian objects.
- Should entrench and affirm its de-facto prohibition on the use of cluster munitions by signing up to the 2008 Convention on Cluster Munitions.
- Should make publicly-available the results of its internal investigations into the conduct of hostilities in 2014, and should cooperate fully with any external investigations.

ANNEX: IDF OFFICIAL RESPONSE



January 18th, 2015

Dear Mr. Perkins,

The use of explosive weapon in urban area is subject to various limitations explicitly provided in IDF directives, which take into account the features of urban warfare and the features of the weapon in question. IDF directives concerning the use of weapon are constantly reviewed and updated in accordance with the operational reality and on the basis of lessons learned from previous operations, and meet the requirements of international law. Unfortunately, the IDF cannot disclose detailed information regarding specific safety ranges of different weapons, as such directives are confidential.

It should be noted that the international law governing armed conflict does not contain a blanket prohibition on the use of explosive weapons, including artillery and mortars, in urban areas. Rather, their use must be conducted in accordance with the relevant rules of the laws of armed conflict. Some of the restrictions on the use of explosive weapons in urban areas as set out in the IDF directives are provided by the dictates of the law, while others even go beyond the legal requirements and are imposed as a matter of policy.

Sincerely,

Public Appeals Office

Spokesperson's Unit

Israel Defense Forces

ENDNOTES

- 1 Idan Barir (translated by Hadas Leonov), "IDF soldier: Artillery fire in Gaza is like Russian roulette," +972 Blog, 8 August 2014, <http://972mag.com/idf-soldier-artillery-fire-in-gaza-is-like-russian-roulette/95194/> (accessed 25 November 2014).
- 2 Bård Glad Pedersen, State Secretary, Ministry of Foreign Affairs of Norway, "Use of explosive weapons in populated areas," Oslo, 17 June 2014, www.regjeringen.no/nb/dep/ud/aktuelt/taler_artikler/taler_og_artikler_av_ovrig_politisk_lede/bgd_taler/2014/expert-meeting-explosive.html?id=763828 (accessed 2 December 2014).
- 3 IDF, "Operation Protective Edge: General Information," www.idfblog.com/operationgaza2014/#Generalinformation.
- 4 See for example UNOCHA, "Gaza: Initial Rapid Assessment," 27 August 2014, www.ochaopt.org/documents/gaza_mira_report_9september.pdf (accessed 10 December 2014).
- 5 UNOCHA, "Gaza Emergency Situation Report," 4 September 2014, www.ochaopt.org/documents/ocha_opt_sitrep_04_09_2014.pdf (accessed 28 November 2014).
- 6 BBC, "Israel completes Gaza withdrawal," 12 September 2005, http://news.bbc.co.uk/1/hi/world/middle_east/4235768.stm (accessed 27 November 2014).
- 7 Since 1 October 2010 AOA V has recorded information on the impacts and incidents of explosive weapon use worldwide, using English-language media sources. An 'incident' of explosive violence is recorded if it takes place within a 24-hour period, in a given location, and in which there has been at least one casualty (death or injury). Between 2011-2013, both Gaza (12th) and Israel (21st) were among AOA V's list of most-affected countries or territories. AOA V recorded 956 civilian casualties from explosive weapon use in Gaza, and 221 in Israel.
- 8 The Suicide Attack Database at the University of Chicago has placed Israel as the country with the fifth-highest number of suicide attacks between 1982, when the dataset began, and 2014. It ranks only behind Iraq, Afghanistan, Pakistan and Sri Lanka in that time. Chicago Project on Security and Terrorism, "Suicide Attack Database," University of Chicago, http://cpostdata.uchicago.edu/search_results_new.php (accessed 10 December 2014).
- 9 For more information on the global pattern of harm from explosive violence in populated areas see, for example, Henry Dodd and Robert Perkins, "An Explosive Situation: Monitoring Explosive Violence," Action on Armed Violence (AOA V), March 2013, <http://aoav.org.uk/wp-content/uploads/2013/06/An-Explosive-Situation-Explosive-Violence-in-2012.pdf> (accessed 16 December 2014).
- 10 Analysis carried out by The Washington Post showed that "there are few cities that can compare to Gaza City for density and limitations of geographical footprint". Gaza City has a population density of 42,600 people per square mile and covers just 17 square miles. Richard Johnson and Adam Taylor, "Gaza City is being hit by missile strikes. This is how densely populated it is." *The Washington Post*, 14 July 2014, www.washingtonpost.com/blogs/worldviews/wp/2014/07/14/gaza-city-is-being-hit-by-missile-strikes-this-is-how-densely-populated-it-is/ (accessed 28 November 2014).
- 11 Between 2011 and 2013, 56% of the incidents of explosive violence recorded by AOA V in Gaza took place in areas reported to be populated (144 out of 255 separate events).
- 12 Robert Mackey, "Indian TV Crew Shows Rare Video of Rocket Launch From Gaza," *The New York Times*, 5 August 2014, www.nytimes.com/2014/08/06/world/middleeast/indian-tv-crew-shows-rare-video-of-rocket-launch-from-gaza.html?_r=0 (accessed 27 November 2014).
- 13 Human Rights Watch, "Q&A: 2014 Hostilities between Israel and Hamas," 3 August 2014, www.hrw.org/news/2014/08/03/qa-2014-hostilities-between-israel-and-hamas (accessed 8 December 2014).
- 14 Israel Defense Forces, "Operation Protective Edge: General Information," www.idfblog.com/operationgaza2014/#Generalinformation (accessed 8 December 2014).
- 15 Human Rights Watch, "Q&A: 2014 Hostilities between Israel and Hamas," 3 August 2014, www.hrw.org/news/2014/08/03/qa-2014-hostilities-between-israel-and-hamas (accessed 20 December 2014).
- 16 Professor Maj. Gen (ret.) Isaac Ben-Israel, "The use of weapons in densely populated areas," Institute for National Strategic Studies, April 2014, www.inss.org.il/uploadImages/systemFiles/BenIsraelTheUseofWeaponsinDenselyPopulatedAreas.pdf (accessed 11 November 2014).
- 17 Henry Dodd and Robert Perkins, "Explosive Events: Monitoring Explosive Violence in 2013," Action on Armed Violence, 1 November 2014, <https://aoav.org.uk/2014/explosive-events/> (accessed 1 December 2014).
- 18 In response to AOA V's written enquiries, the IDF Public Appeals Office issued a general response, explaining that the IDF has ordered a special Fact-Finding Assessments Committee to examine 'exceptional incidents' that occurred during Operation Protective Edge. For more information see "Israel Conducts Fact-Finding Assessment following Operation Protective Edge," 12 September 2014, www.idfblog.com/blog/2014/09/12/idf-conducts-fact-finding-assessment-following-operation-protective-edge/ (accessed 28 November 2014); "UN Rights Council appoints members of commission to investigate purported Gaza violations," UN News Centre, 11 August 2014, www.un.org/apps/news/story.asp?NewsID=48459#.VHhWetKsWOG (accessed 28 November 2014).
- 19 For more information on these weapons, see for example, "Flechette Shells: an illegal weapon," B'Tselem, 1 January 2011, www.btselem.org/firearms/flechette, and Campaign Against Depleted Uranium, www.cadu.org.uk/cadu/du-the-basics.
- 20 For more information see, Maya Brehm, "Unacceptable Risk," Pax, October 2014, Available for download from www.paxforpeace.nl/our-work/programmes/explosive-weapons-in-populated-areas (accessed 28 November 2014).
- 21 ICRC, "Customary IHL Database," www.icrc.org/customary-ihl/eng/docs/v1 (accessed 7 December 2014).

- 22 Crucially, however, the basic guidelines for behaviour established by IHL provides only limited protection against the pattern of harm caused by the use of explosive weapons in populated areas. Maya Brehm, "Protecting Civilians from the Effects of Explosive Weapons," UNIDIR, New York and Geneva, 2012, www.unidir.org/files/publications/pdfs/protecting-civilians-from-the-effects-of-explosive-weapons-en-293.pdf (accessed 8 December 2014)
- 23 See the ICRC's Customary IHL database for more information, www.icrc.org/customary-ihl/eng/docs/home.
- 24 Israel Ministry of Foreign Affairs, "The Operation in Gaza 27 December 2008- 18 January 2009: Factual and Legal Aspects," July 2009, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaOperation%20w%20Links.pdf (accessed 8 December 2014).
- 25 Israel, Rules of Warfare on the Battlefield, Military Advocate-General's Corps Command, IDF School of Military Law, Second Edition, 2006, pp. 27-28, cited by ICRC, Customary IHL, "Israel, Practice Relating to Rule 15. The Principle of Precautions in Attack," www.icrc.org/customary-ihl/eng/docs/v2_cou_il_rule15 (accessed 18 November 2014).
- 26 Israel's Manual on the Rules of Warfare (2006), cited by ICRC, Customary IHL, "Israel Practice Relating to Rule 13: Area Bombardment." https://www.icrc.org/customary-ihl/eng/docs/v2_cou_il_rule13.
- 27 Israel Ministry of Foreign Affairs, "The Operation in Gaza 27 December 2008- 18 January 2009: Factual and Legal Aspects," July 2009, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaOperation%20w%20Links.pdf (accessed 8 December 2014).
- 28 Amos Harel, "The philosopher who gave the IDF moral justification in Gaza," Haaretz, 6 February 2009, www.haaretz.com/print-edition/news/the-philosopher-who-gave-the-idf-moral-justification-in-gaza-1.269527 (accessed 8 December 2014).
- 29 Israel Defense Forces, "IDF Code of Ethics," www.idfblog.com/about-the-idf/idf-code-of-ethics/ (accessed 8 December 2014).
- 30 "Ten Fundamental Values- The Spirit of the IDF," Israel Defense Forces, 2 November 2011, www.idfblog.com/blog/2011/11/02/the-spirit-of-the-idf/ (accessed 8 December 2014).
- 31 Pnina Sharvit Baruch and Noam Neuman, "Warning Civilians Prior to Attack under International Law: Theory and Practice," *International Law Studies*, Volume 87, pp. 359-41.
- 32 IDF, "How is the IDF Minimizing Harm to Civilians in Gaza?" 16 July 2014, www.idfblog.com/blog/2014/07/16/idf-done-minimize-harm-civilians-gaza/ (accessed 20 November 2014).
- 33 Amnesty International, "Israel/Gaza conflict: Questions and Answers," 25 July 2014, www.amnesty.org/en/news/israelgaza-conflict-questions-and-answers-2014-07-25 (accessed 15 December 2014).
- 34 See for example The Legal Center for Arab Minority Rights in Israel, "Grave concern regarding Israeli calls to vacate northern Gaza strip," 14 July 2014, <http://adalah.org/eng/Articles/2307/Joint-letter:-Grave-concern-regarding-Israeli-to> (accessed 10 December 2014). This letter was signed by nine human rights organisations, including B'Tselem, Physicians for Human Rights, and Amnesty International. For more information on recent practice in warnings and related concerns see Human Rights Watch, "Israel: Ensure Improved 'Attack Warnings' to Civilians Are Effective," 3 August 2009, www.hrw.org/news/2009/08/02/israel-ensure-improved-attack-warnings-civilians-are-effective (accessed 10 December 2014).
- 35 Amnesty International, "Families Under the Rubble," 2014, www.amnesty.org/en/library/asset/MDE15/032/2014/en/613926df-68c4-47bb-b587-00975f014e4b/mde150322014en.pdf (accessed 12 December 2014).
- 36 Israel Defense Forces, "How is the IDF Minimizing Harm to Civilians in Gaza?" 16 July 2014, www.idfblog.com/blog/2014/07/16/idf-done-minimize-harm-civilians-gaza/ (accessed 8 December 2014).
- 37 Interview with Bill Van Esveld, Israel and Palestine Researcher, Human Rights Watch, 13 November 2014.
- 38 Adam Taylor, "'Roof knocking': The Israeli military's tactic of phoning Palestinians it is about to bomb," 9 July 2014, www.washingtonpost.com/blogs/worldviews/wp/2014/07/09/roof-knocking-the-israeli-militarys-tactic-of-phoning-palestinians-it-is-about-to-bomb/ (accessed 08 December 2014); Adam Withnall, "Israel-Gaza conflict: Israeli 'knock on roof' missile warning revealed in remarkable video," *The Independent*, 13 July 2004, www.independent.co.uk/news/world/middle-east/israelgaza-conflict-israeli-knock-on-roof-missile-warning-technique-revealed-in-stunning-video-9603179.html (accessed 8 December 2014).
- 39 Amnesty International, "Israel/Gaza: UN must impose arms embargo and mandate an international investigation as civilian death toll rises," 11 July 2014, www.amnesty.org/en/news/israelgaza-un-must-impose-arms-embargo-and-mandate-international-investigation-civilian-death-t (accessed 14 October 2014).
- 40 Peter Beaumont, "A knock on the roof, then another Gaza home destroyed by Israeli missile," *The Guardian*, 14 July 2014, www.theguardian.com/world/2014/jul/14/gaza-home-destroyed-israel-shati (accessed 8 December 2014).
- 41 Yonah Jeremy Bob, "Rule of Law: ready for a fight," *The Jerusalem Post*, 11 September 2014, www.jpost.com/Arab-Israeli-Conflict/Rule-of-Law-Ready-for-a-fight-375144 (accessed 8 December 2014).
- 42 Anthony H. Cordesman, "The 'Gaza War': A Strategic Analysis," Center for Strategic and International Studies, 2 February 2009, http://csis.org/files/media/csis/pubs/090202_gaza_war.pdf (accessed 25 November 2014).
- 43 Institute of Palestine Studies, "The Israeli Arsenal Deployed Against Gaza During Operation Cast Lead," *Journal of Palestine Studies* p. 177.
- 44 Global Firepower, "Self-Propelled Gun (SPG) Strength by Country," Last updated 3 April 2014, www.globalfirepower.com/armor-self-propelled-guns-total.asp (accessed 25 November 2014).
- 45 Analysis of publically-available records of arms transfers identify three principal production orders for variants of the M109 howitzers placed by Israel to the US. Sixty units were received in 1970; 294 were delivered between 1972 and 1979; and a further 75 arrived in 1983. SIPRI Arms Transfers Database, Information generated 19 November 2014. More information is available at www.sipri.org/contents/armstrad/at_data.htm.
- 46 Human Rights Watch, "Indiscriminate Fire," July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 47 "155mm M107 HE projectile," in Leyland S Ness and Anthony G Williams, "Ammunition 2013-14," *IHS Jane's Weapons*, pp. 842-845
- 48 Human Rights Watch, "Indiscriminate Fire," July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).

- 49 155mm M107 HE projectile,” in Leyland S Ness and Anthony G Williams, “Ammunition 2013-14,” IHS Jane’s Weapons, pp. 842-845.
- 50 It is often unknown how such distances are calculated by the military in question. Human Rights Watch, “Indiscriminate Fire,” July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 51 Human Rights Watch, “Indiscriminate Fire,” July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 52 Ahron Bregman, “I was in the IDF’s artillery. I saw first-hand the way the army brushes off civilian casualties,” 8 August 2014, *The Independent*, www.independent.co.uk/voices/comment/i-was-in-the-idfs-artillery-i-saw-firsthand-how-the-army-brushes-off-civilian-casualties-9657766.html (accessed 6 November 2014).
- 53 The Dohar, as with most large artillery systems, is also capable of direct fire. However, its range is so great that direct fire is not a practical option. “An artillery canon is supposed to be effective with most types of ammunitions to more or less 20 km. When the Israeli Army shoots it for example in Gaza, then it’s no more than I guess three, four, five km because that’s anything more than that would be the ocean.” Interview with Ahivai Stollar, Director of Research at Breaking the Silence, Tel Aviv, 11 November 2014.
- 54 Human Rights Watch, “Indiscriminate Fire,” July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 55 Interview with Andrew Exum, Former US artillery officer and Middle East analyst, Washington, 24 October 2014.
- 56 Headquarters, Department of the Army, “Field Manual 3-21.8,” 28 March 2007, www.infantrydrills.com/fm-3-21-8-chapter-2-section-v-employed-indirect-fires/ (accessed 3 December 2014).
- 57 Ben Hubbard and Jodi Rudoren, “Questions of Weapons and Warnings in Past Barrage on a Gaza Shelter,” *The New York Times*, 3 August 2014, www.nytimes.com/2014/08/04/world/middleeast/international-scrutiny-after-israeli-barrage-strike-in-jabaliya-where-united-nations-school-shelters-palestinians-in-gaza.html (accessed 8 September 2014).
- 58 Interviews with Professor Maj. Gen. Isaac Ben-Israel, and with Dr Gabi Siboni, Senior Research Fellow, The Institute for National Security Studies, 12-13 November 2014.
- 59 These drones “logged three times as many flight hours during the [2014] operation as during the entire previous year.” Mitch Ginsburg, “Israel’s artillery corps torn between precision and power,” *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 60 All information from AOV interview with IDF artillery expert, Tel Aviv, November 2014.
- 61 The other primary purposes of artillery are: **Neutralisation** (prevention of enemy fire for a given time), **Destruction** (infliction of such losses on the enemy forces and assets that they cannot continue operations without replenishment), and **Interdiction (denial)**; the prevention of an attack by enemy forces. Definitions taken from Maya Brehm, “Unacceptable Risk: Use of explosive weapons in populated areas through the lens of three cases before the ICTY,” PAX, October 2014, available for download at www.paxforpeace.nl/stay-informed/news/pax:-explosive-weapons-pose-unacceptable-risk-to-civilians (accessed 3 December 2014).
- 62 Israeli Ministry of Foreign Affairs, “The Operation in Gaza 27 December 2008—18 January 2009: Factual and Legal Aspects,” 29 July 2009, p. 97, http://www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaOperation%20w%20Links.pdf (accessed 18 November 2014).
- 63 In April 2012 the Artillery Corps announced plans to set up a short-range rocket battalion. The IDF is believed to be taking delivery of a new GPS-guided artillery rocket system called the ‘Romach’, which can be fired from Israel’s current multiple rocket launchers, and is intended to reduce some of the current reliance on 155mm artillery systems. <http://israeldefense.com/?CategoryID=411&ArticleID=2956>
- 64 Mitch Ginsburg, “Israel’s artillery corps torn between precision and power,” *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 65 Yaakov Katz, “IDF unveils special guided missile used in Lebanon, Gaza,” *The Jerusalem Post*, 8 January 2011, www.jpost.com/Video-Articles/Video/IDF-unveils-special-guided-missile-used-in-Lebanon-Gaza (accessed 5 December 2014).
- 66 Yaakov Katz, “IDF unveils special guided missile used in Lebanon, Gaza,” *The Jerusalem Post*, 8 January 2011, www.jpost.com/Video-Articles/Video/IDF-unveils-special-guided-missile-used-in-Lebanon-Gaza (accessed 5 December 2014).
- 67 All currency conversions as of December 2014. Mitch Ginsburg, “Israel’s artillery corps torn between precision and power,” *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 68 “The army’s use of firepower in the last war is a flagrant example of this [financial wastefulness]. According to the IDF’s own testimony, a large surplus of firepower was used, at a cost of billions of shekels. A great many targets were fired at, but with little to show for it. No one in the government or the army was assigned to examine this question and make a change [...] When resources are limited, the implications are self-evident.” The Brodet Committee, cited in Amos Harel, “The Israeli military: Winning wars, losing money,” *Haaretz*, 20 September 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.616598 (accessed 26 November 2014).
- 69 Amos Harel, “The Israeli military: Winning wars, losing money,” *Haaretz*, 20 September 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.616598 (accessed 26 November 2014).
- 70 Human Rights Watch, “Why They Died: Civilian Casualties in Lebanon during the 2006 War,” September 2007, www.hrw.org/sites/default/files/reports/lebanon0907.pdf (accessed 1 December 2014).
- 71 Mitch Ginsburg, “Israel’s artillery corps torn between precision and power,” *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 72 Information taken from Amos Harel and Gili Cohen, “Massive artillery shelling may have caused numerous civilian fatalities in Gaza,” *Haaretz*, 15 August 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.610733 (accessed 25 November 2014); and Mitch Ginsburg, “Israel’s artillery corps torn between precision and power,” *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).

- 73 Amos Harel and Gili Cohen, "Massive artillery shelling may have caused numerous civilian fatalities in Gaza," *Haaretz*, 15 August 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.610733 (accessed 25 November 2014). Fatality number taken from, UNOCHA, "Locked in: The Humanitarian Impact of Two Years of Blockade on the Gaza Strip," July 2009, www.ochaopt.org/documents/ocha_opt_gaza_impact_of_two_years_of_blockade_august_2009_english.pdf (accessed 15 December 2014).
- 74 Amos Harel and Gili Cohen, "Massive artillery shelling may have caused numerous civilian fatalities in Gaza," *Haaretz*, 15 August 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.610733 (accessed 26 November 2014).
- 75 For more information on how to characterise the wide-area effect of an explosive weapon see International Network on Explosive Weapons (INEW) www.inew.org/resources/inew-qa-august-2014 (accessed 5 December 2014).
- 76 Anthony H. Cordesman, "The 'Gaza War': A Strategic Analysis," Center for Strategic and International Studies, 2 February 2009, http://csis.org/files/media/isis/pubs/090202_gaza_war.pdf (accessed 25 November 2014).
- 77 Israel Ministry of Foreign Affairs, "The Operation in Gaza 27 December 2008- 18 January 2009: Factual and Legal Aspects," July 2009, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaOperation%20w%20Links.pdf (accessed 8 December 2014).
- 78 The Institute of Palestine Studies, "The Israeli Arsenal Deployed Against Gaza During Operation Cast Lead," www.palestine-studies.org/sites/default/files/uploads/files/%5B175-191%5D-IsrArsenal.pdf (accessed 5 December 2014).
- 79 Amnesty International, "Families under the Rubble," November 2014, www.amnesty.org/en/library/asset/MDE15/032/2014/en/613926df-68c4-47bb-b587-00975f014e4b/mde150322014en.pdf, pp. 19-20, (accessed on 5 December 2014).
- 80 Amnesty International, "Families under the Rubble," November 2014, www.amnesty.org/en/library/asset/MDE15/032/2014/en/613926df-68c4-47bb-b587-00975f014e4b/mde150322014en.pdf, pp. 19-20, (accessed on 5 December 2014).
- 81 Human Rights Watch, "Indiscriminate Fire," July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 82 Amos Harel and Gili Cohen, "Massive artillery shelling may have caused numerous civilian fatalities in Gaza," *Haaretz*, 15 August 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.610733 (accessed 26 November 2014).
- 83 Ben Hubbard and Jodi Rudoren, "Questions of Weapons and Warnings in Past Barrage on a Gaza Shelter," *The New York Times*, 3 August 2014, www.nytimes.com/2014/08/04/world/middleeast/international-scrutiny-after-israeli-barrage-strike-in-jabaliya-where-united-nations-school-shelters-palestinians-in-gaza.html (accessed 8 September 2014).
- 84 These are incidents in which a casualty resulted from reported shelling. AOAV records such incidents from English-language media sources, and does not claim to capture every attack or resulting casualty. Includes incidents reported as being either Artillery shelling, Tank shelling or Unspecified shelling where the responsible munition was not clearly reported. Incidents are designated as occurring in populated areas likely to contain concentrations of civilians if: a) It is stated in the source (e.g. a busy street, a crowded market); b) If an incident occurs in or near a pre-defined location which is likely to contain concentrations of civilians e.g. commercial premises, entertainment venues, hospitals, hotels, encampments (containing IDPs, refugees, nomads), markets, places of worship, public gatherings, public buildings, public transport, schools, town centres, urban residential neighbourhoods, villages/ compounds. This definition of a populated area is based on Protocol III of the 1980 Convention on Certain Conventional Weapons (CCW) which defines concentrations of civilians as: "*any concentrations of civilians, be it permanent or temporary, such as in inhabited parts of cities, or inhabited towns or villages, or as in camps or columns of refugees or evacuees, or groups of nomads.*" "Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons (Protocol III)," to the UN Convention on Certain Conventional Weapons, Geneva, 10 October 1980, www.icrc.org/ihl.nsf/FULL/515 (accessed 18 March 2013).
- 85 Interview with IDF artillery expert, November 2014.
- 86 Human Rights Watch, "Indiscriminate Fire," 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014)
- 87 Gili Cohen, "IDF: Bloodiest battle in Gaza could have been much worse," *Haaretz*, 28 July 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.607496 (accessed on 1 December 2014).
- 88 Human Rights Watch, "Indiscriminate Fire," 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014). Casualty data taken from United Nations Office for the Coordination of Humanitarian Affairs, "Israeli-Palestinian Fatalities Since 2000- Key Trends," August 2007, www.ochaopt.org/documents/cas_aug07.pdf (accessed 19 December 2014).
- 89 Human Rights Watch, "Indiscriminate Fire," July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 90 Human Rights Watch, "Indiscriminate Fire," July 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 91 "B'Tselem calls for criminal investigation, on suspicion of war crimes, in the killings in Beit Hanun," B'Tselem, Press Release, 9 November 2006, www.btselem.org/press_releases/200611009 (accessed 4 December 2014).
- 92 Michael Sfar, the lawyer who filed the petition against the IDF's policy to reduce the safety zone in the High Courts of Justice in 2006 confirmed in email correspondence with AOAV that "the 2006 artillery case ended after Cast Lead with a very poor ruling indicating the policy that was the subject of the case was no longer relevant." Email to AOAV, 6 December 2014.
- 93 Nidal al-Mughrabi and Allyn Fisher-Ilan, " Hamas says Israeli soldier captured; Gaza death toll jumps," *Reuters*, posted by *Yahoo! News*, 20 July 2014, <http://news.yahoo.com/israel-gaza-fighting-enters-13th-day-no-sign-015516409.html> (accessed 4 December 2014).

- 94 Brig. Gen. Roy Riffin, cited by Barbara Opall-Rome, "Israel Lauds New Capabilities in Gaza," *Defense News*, 16 August 2014, www.defensenews.com/article/20140816/DEFREG04/308160016/Israel-Lauds-New-Capabilities-Gaza (accessed 10 October 2014).
- 95 Gili Cohen, "IDF: Bloodiest battle in Gaza could have been much worse," *Haaretz*, 28 July 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.607496 (accessed 1 December 2014); "Another Bloody Day On the 14th Day of the Israeli Offensive," Palestinian Centre for Human Rights (PCHR), 21 July 2014, www.pchrgaza.org/portal/en/index.php?option=com_content&view=article&id=10520:another-bloody-day-on-the-14th-day-of-the-israeli-offensive-complete-families-attack-while-inside-their-homes-rescue-crews-to-search-for-victims-in-al-shujaiya-neighborhood-more-palestinians-forcibly-displaced-in-border-areas&catid=36:pchrpressreleases&Itemid=194 (accessed 1 December 2014).
- 96 Mads Gilbert, speaking to the BBC, "Gaza shelling by Israel leads to deadliest day of conflict," 20 July 2014, www.bbc.co.uk/news/world-middle-east-28389282 (accessed 2 December 2014).
- 97 ICRC Customary IHL Database, "Israel: Practice Relating to Rule 32. Humanitarian Relief Objects," www.icrc.org/customary-ihl/eng/docs/v2_cou_il_rule32 (accessed 14 December 2014).
- 98 The State of Israel Ministry of Foreign Affairs, "Gaza Operation Investigations: Second Update," July 2010, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaUpdateJuly2010.pdf (accessed 5 December 2014).
- 99 Amos Harel, "IDF investigation shows errant mortar hit UN building in Gaza," *Haaretz*, 11 January 2009, www.haaretz.com/print-edition/news/idf-investigation-shows-errant-mortar-hit-un-building-in-gaza-1.267873 (accessed 9 December 2014); The State of Israel Ministry of Foreign Affairs, "Gaza Operation Investigations: Second Update," July 2010, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaUpdateJuly2010.pdf (accessed 5 December 2014). Mortars, while sharing many functional attributes with unguided artillery, are mostly used by the infantry, not the IDF Artillery Corps. The 120mm system is one of the larger mortars in common use, and a single shell has the ability to kill people up to 10 metres from the impact point, and wounding people up to 25m away, according to the soldiers who operate the system (Testimony 31: Rules of Engagement, in *Breaking the Silence, "Soldiers' Testimonies from Operation Cast Lead, Gaza 2009,"* Jerusalem, January 2009, pp. 70-73).
- 100 Human Rights Watch, "Gaza: Israeli Attack on School Needs Full UN Investigation," 7 January 2009, www.hrw.org/news/2009/01/07/gaza-israeli-attack-school-needs-full-un-investigation (accessed 9 December 2014).
- 101 "Strike at Gaza school 'kills 40'," *BBC*, 7 January 2009, http://news.bbc.co.uk/1/hi/world/middle_east/7814054.stm (accessed 9 December 2014).
- 102 The State of Israel Ministry of Foreign Affairs, "Gaza Operation Investigations: Second Update," July 2010, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaUpdateJuly2010.pdf (accessed 5 December 2014).
- 103 Interview with IDF artillery expert, November 2014.
- 104 Ben Hubbard and Jodi Rudoren, "Questions of Weapons and Warnings in Past Barrage on a Gaza Shelter," *The New York Times*, 3 August 2014, www.nytimes.com/2014/08/04/world/middleeast/international-scrutiny-after-israeli-barrage-strike-in-jabaliya-where-united-nations-school-shelters-palestinians-in-gaza.html (accessed 8 September 2014).
- 105 According to Israel's Ministry of Foreign Affairs, the Humanitarian Affairs Officer is responsible for, "advising the commanding officer and educating the soldiers with regard to: the protection of civilians; civilian property and infrastructure; the planning of humanitarian assistance; the coordination of humanitarian movement; and the documentation of humanitarian safeguards employed by the IDF." ICRC, Customary IHL, "Israel, Practice Relating to Rule 15. The Principle of Precautions in Attack," www.icrc.org/customary-ihl/eng/docs/v2_cou_il_rule15 (accessed 18 November 2014).
- 106 Interview with Bill Van Esveld, Israel and Palestine Researcher, Human Rights Watch, 13 November 2014.
- 107 Interview with Bill Van Esveld, Israel and Palestine Researcher, Human Rights Watch, 13 November 2014.
- 108 Human Rights Watch, "Israel: In-Depth Look at Gaza School Attacks," 11 September 2014, www.hrw.org/news/2014/09/11/israel-depth-look-gaza-school-attacks (accessed 5 December 2014).
- 109 Harriet Sherwood, "Gaza: at least 15 killed and 90 injured as another UN school is hit," *The Guardian*, 30 July 2014, www.theguardian.com/world/2014/jul/30/gaza-another-un-school-hit-in-further-night-of-fierce-bombardment (accessed 9 December 2014).
- 110 Human Rights Watch, "Israel: In-Depth Look at Gaza School Attacks," 11 September 2014, www.hrw.org/news/2014/09/11/israel-depth-look-gaza-school-attacks (accessed 5 December 2014).
- 111 Pierre Krähenbühl, Commissioner General of UNRWA, cited in UN News Centre, "Gaza: deadly shelling of another UN school draws condemnation, calls for ceasefire," 30 July 2014, www.un.org/apps/news/story.asp?NewsID=48369#.Vlh_2dKsWOH (accessed 7 December 2014).
- 112 Ben Hubbard and Jodi Rudoren, "Questions of Weapons and Warnings in Past Barrage on a Gaza Shelter," *The New York Times*, 3 August 2014, <http://www.nytimes.com/2014/08/04/world/middleeast/international-scrutiny-after-israeli-barrage-strike-in-jabaliya-where-united-nations-school-shelters-palestinians-in-gaza.html> (accessed 8 September 2014).
- 113 UNOCHA, "Occupied Palestinian Territory: Gaza Emergency situation report (as of 4 September 2014, 08:00 hrs)," www.ochaopt.org/documents/ocha_opt_sitrep_04_09_2014.pdf (accessed 16 December 2014).
- 114 Ben Hubbard and Jodi Rudoren, "Questions of Weapons and Warnings in Past Barrage on a Gaza Shelter," *The New York Times*, 3 August 2014, <http://www.nytimes.com/2014/08/04/world/middleeast/international-scrutiny-after-israeli-barrage-strike-in-jabaliya-where-united-nations-school-shelters-palestinians-in-gaza.html> (accessed 8 September 2014).
- 115 Interview with Mitch Ginsburg, Military Correspondent at the Times of Israel, Tel Aviv, 10 November 2014.
- 116 Interview with Mitch Ginsburg, Military Correspondent at the Times of Israel, Tel Aviv, 10 November 2014.
- 117 Amos Harel and Gili Cohen, "Massive artillery shelling may have caused numerous civilian fatalities in Gaza," *Haaretz*, 15 August 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.610733 (accessed 26 November 2014).
- 118 Mitch Ginsburg, "Has the Hannibal Protocol run its course?" 12 August 2014, www.timesofisrael.com/has-the-hannibal-protocol-run-its-course/ (accessed 5 November 2014).

- 119 Maayan Lubell and Nidal al-Mughrabi, "Did Israel's 'Hannibal directive' lead to a war crime in Gaza?" *Reuters*, 13 October 2014, www.reuters.com/article/2014/10/13/us-mideast-gaza-warcrime-insight-idUSKCN0I20FN20141013 (accessed 5 December 2014).
- 120 Amos Harel and Gili Cohen, "Massive artillery shelling may have caused numerous civilian fatalities in Gaza," *Haaretz*, 15 August 2014, www.haaretz.com/news/diplomacy-defense/.premium-1.610733 (accessed 26 November 2014).
- 121 Mitch Ginsburg, "Has the Hannibal Protocol run its course?" *The Times of Israel*, 12 August 2014, www.timesofisrael.com/has-the-hannibal-protocol-run-its-course/ (accessed 5 November 2014).
- 122 Human Rights Watch, "Indiscriminate Fire," 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 123 Rory McCarthy, "I cannot see a day when we live in peace with them," *The Guardian*, 9 November 2006, www.theguardian.com/world/2006/nov/09/israel (accessed 4 December 2014).
- 124 Human Rights Watch, "Indiscriminate Fire," 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014).
- 125 BBC, "Gaza barrage 'technical failure,'" 9 November 2006, <http://news.bbc.co.uk/1/hi/6134412.stm> (accessed 5 December 2014).
- 126 Human Rights Watch, "Indiscriminate Fire," 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014). Casualty data taken from United Nations Office for the Coordination of Humanitarian Affairs, "Israeli-Palestinian Fatalities Since 2000- Key Trends," August 2007, www.ochaopt.org/documents/cas_aug07.pdf (accessed 19 December 2014).
- 127 "Appendix IV, Israeli Artillery Shells Entering Gaza," Human Rights Watch, "Indiscriminate Fire," 2007, www.hrw.org/reports/2007/iopt0707/6.htm (accessed on 10 September 2014);
- 128 Interview with Bill Van Esveld, Human Rights Watch, Tel Aviv, 13 November 2014; Matthew Weaver, "Israel fires artillery shells into Gaza," *The Guardian*, 3 January 2009, www.theguardian.com/world/2009/jan/03/gaza-israel-attacks-artillery (accessed 4 December 2014).
- 129 ICRC Customary IHL Database, "Israel Practice Relating to Rule 71. Weapons That Are by Nature Indiscriminate," www.icrc.org/customary-ihl/eng/docs/v2_cou_il_rule71 (accessed 1 December 2014).
- 130 Mitch Ginsburg, "Israel's artillery corps torn between precision and power," *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 131 United Nations Human Rights Council, "Report of the United Nations Fact-Finding Mission on the Gaza Conflict," 25 September 2009, A/HRC/12/48, Chapter XII, 888, www2.ohchr.org/english/bodies/hrcouncil/docs/12session/A-HRC-12-48.pdf p. 194 (accessed 16 October 2014).
- 132 Human Rights Watch, "Ukraine, Syria: Incendiary Weapons Threaten Civilians," 11 November 2014, www.hrw.org/news/2014/11/10/ukraine-syria-incendiary-weapons-threaten-civilians (accessed 9 December 2014).
- 133 Israel Ministry of Foreign Affairs, "The Operation in Gaza 27 December 2008- 18 January 2009: Factual and Legal Aspects," July 2009, www.mfa.gov.il/MFA_Graphics/MFA%20Gallery/Documents/GazaOperation%20w%20Links.pdf (accessed 8 December 2014).
- 134 Interview with Andrew Exum, Washington, 24 October 2014.
- 135 Achaz Ben-Ari, cited in Mitch Ginsburg, "Israel's artillery corps torn between precision and power," *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 136 Bill Van Esveld, cited in The New York Times <http://www.nytimes.com/2014/08/04/world/middleeast/international-scrutiny-after-israeli-barrage-strike-in-jabaliya-where-united-nations-school-shelters-palestinians-in-gaza.html>
- 137 Idan Barir (translated by Hadas Leonov), "IDF soldier: Artillery fire in Gaza is like Russian roulette," +972 Blog, 8 August 2014, <http://972mag.com/idf-soldier-artillery-fire-in-gaza-is-like-russian-roulette/95194/> (accessed 25 November 2014).
- 138 Interviews with Professor Maj. Gen. Isaac Ben-Israel, and with Dr Gabi Siboni, Senior Research Fellow, The Institute for National Security Studies, 12-13 November 2014.
- 139 Achaz Ben-Ari, cited in Mitch Ginsburg, "Israel's artillery corps torn between precision and power," *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 140 One currently serving officer told Mitch Ginsburg at the Times of Israel for example, "If I don't have precision artillery, I don't shoot." Mitch Ginsburg, "Israel's artillery corps torn between precision and power," *The Times of Israel*, 12 October 2014, www.timesofisrael.com/an-artillery-corps-torn-between-precision-and-power/ (accessed 5 November 2014).
- 141 Interview with Mitch Ginsburg, Military Correspondent at the Times of Israel, Tel Aviv, 10 November 2014.
- 142 International Network on Explosive Weapons (INEW), "Explosive weapons in populated areas – key questions and answers," August 2014, available for download at www.inew.org/resources/inew-qa-august-2014 (accessed 9 December 2014).
- 143 Ahron Bregman, "I was in the IDF's artillery. I saw first-hand the way the army brushes off civilian casualties," 8 August 2014, The Independent, www.independent.co.uk/voices/comment/i-was-in-the-idfs-artillery-i-saw-firsthand-how-the-army-brushes-off-civilian-casualties-9657766.html (accessed 6 November 2014).
- 144 On 1 October 2014 a Note Verbale was issued to all Member States of the United Nations requesting "Member States to make available relevant information pertaining to good practice and policy that either expressly governs, or otherwise places limits on, the use by armed forces of explosive weapons with wide-area effects in populated areas." Such information is to be shared with the UN Office for the Coordination of Humanitarian Affairs. OCHA/ NV/188/2014.

ACTION ON ARMED VIOLENCE

Action on Armed Violence (AOAV) is a London, based charity that has a central mission: to reduce harm and to rebuild lives affected by armed violence.

We do this by carrying out field work, research and advocacy to reduce the incidence and impact of global armed violence.

The number of fatalities from armed violence is estimated to be over half a million people killed every year. Around two thirds of these violent deaths are estimated to occur outside conflict situations. Poorer countries are particularly badly affected.

We seek to remove the threat of weapons, monitor the impact of explosive weapons around the world and investigate what causes armed violence – from guns to suicide bombings. We aim to clear land of explosive weapons and work with governments to regulate guns.

We work with victims of armed violence, offering psychosocial assistance, providing opportunities to help them earn a living and to try to reduce conflict at local levels.

We work to build communities affected by armed violence, working with governments and measuring and monitoring the incidences and impacts of armed violence around the world.

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