Designing for Violence. And its undoing

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Abstract: Our world is experiencing ongoing wars causing massive humanitarian desperation and suffering. Design for violence investigates how design is currently used in extremely violent situations of war and mass conflicts. Within the framework of design for violence, the main questions asked are: what are the successful aspects of design thinking in escalating conflicts, war and terrorism? And how can such insights be used to counteract the same entropic elements? The first case investigates the design and production of IED – Improvised Explosive Devices. The lessons and design principles of the IED indicate how recent design thinking renders itself redundant in the extreme situations and scenarios of war. The second case presents the inverse design methodology used in the Preemptive Architecture project as an alternative way to deal with violence. The project proposes design of houses built to be bombed. Rather than opposing destruction, the paper suggests to embrace it as a design principle. Not as self-annihilation, but as a preemptive rule of action that aims at the subversion and undoing of violence through making it futile. That is designing for the violence we know will come, and it is the radical design thinking needed for its undoing.

Keywords: violence, IED, inverse design methodology, preemptive design, speculative design

1. Introduction

Our world of 2017 is in violent transformation, scarred by war, the refugee crisis and the impact of global warming. (Serres 2013) And where we find transformation, there is design. (Antonelli 2015) How can next design impact real change and difference both in present and unforeseen emergencies? Contemporary design methodologies and approaches aim to help a world in crisis by offering good and wholesome solutions. In the real world such ‘good’ designs are often misplaced, dysfunctional as in providing new war targets or simply missing its target by being superfluous. In extremely violent situations, the optimistic approach of ‘good’ design offers merely temporary relief. Next design methods need to do more than fueling the illusion of a world in constant peace and harmony. The next design thinking must incorporate the bad. The dangerous. The vile and violence that we know exist and know is coming.

The manifestations of violence in contemporary society are many and they can be mapped. (AOAV, 2016) That leaves little room for naivety and next designs can easily situate solutions by real-time
conflict monitoring, data-driven solutions with participatory fact mapping such as citizen journalism. (Weizmann 2012)

The weapons and war industry deliver some of the most effective design solutions for crisis. Their products and methods are aimed at violence, taking account of it and applying a situational awareness. Designs for war is often sustainable as it maintains itself by escalating situative desperations. This is intolerable from a humanist perspective, but we can deliver sustainable human centered designs by learning from this bad. If so, how? And can design thinking really break the war driven chain of violent weapons design?

Defining violence

There are many and conflicting understandings of violence. A broad definition is that violence is the changing of the world against the will of others. (Design and Violence) Such a definition is wide and too general in that any form of change -from house cleaning to barrel bombs- could be labeled violence. A common understanding of violence is its ostensive definition: we know it when we see it. Examples let us define it through recognition. (Potter, 1999, p.67) One example would be a suicide bomber who lets his car full of explosives rip off at a packed market. Such ostensive definitions appear intuitive but depend on forms and level of emphatic correlation, not to mention a cultural understanding of what violence is. To most people the suicide bomber scenario seems extremely violent, but from the point of view of the warrior- martyr suicide bomber such an act could be understood more as a necessary deed, righteous and honorable, and less as an act of violence. (Barlow, 2015) Violence is not just visual or visceral, it can take multiple forms and expression from the insidious, invisible to immaterial. (Antonelli, 2015) The World Health Organization (WHO) defines violence in the following way in their World report on violence and health (WRVH):

"the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation." (Krug, 2002, p.5)

This definition is also broad, but is further specified by WRVH by explicating various types of violence, in particular self-directed violence, interpersonal violence and collective violence. Such a categorization takes account of how many are involved in violence; an individual, a smaller group or larger factions such as national states, political groups, terrorist movements or military groups.

The working definition of violence used in this paper is based on WHOs description in relation to larger factions in situations of war and terrorism. In particular this paper investigates the design for violence we encounter in products of IEDs – Improvised Explosive Devices-, devices that are abundant in war and weaponized conflicts where the stakeholders are a mix between military and civilian participants. This form of violence includes the intent to use force with the purpose of causing physical damage. Some of the current geopolitical hotspots of particular concern to such situations are the Middle East with Afghanistan, Iraq and Syria. Exempt from investigation here is the many other forms of violence such as domestic and those found in video games.

Methodology and approach

Design can itself be seen as a practice of violence as there is arguably no innovation without conflict and disruption. (Shipulski, 2015)(Galli, 2013)(Baerten, 2014)(Borka, 2016) Such a position appears to counteract the widespread understanding of the designer as a positive force with the intent of improving life and living. Interacting with design is supposed to 'ensure a positive, enjoyable experience’ (Norman, 2013, p.5). Design is often elevated on to a moralistic level where it is
understood as ‘the conscious and intuitive effort to impose meaningful order’. (Papanek, 1984, p. 4) Its creative process should both include intellectual reflection and sensual interaction. Hence good design interacts with us in a natural way and meaningful actions unfold almost as if it was by themselves. However, as Papanek also noted, ‘there are professions more harmful than industrial design, but only a few of them’. (Papanek, 1984 p. ix) Here he points to the many harmful designs that have come from the hands of professional designers. The contradiction and paradox inherent in bad design is that one cannot design oneself out of the actual problem: the design itself. This interesting issue must be discussed elsewhere as design for violence investigates the success of another form of bad design, namely that of material destruction and killing humans. This paper expands the focus on harmful design by including the making of lethal weaponry designed by dedicated amateurs and self-taught engineers. In particular the IED – Improvised Explosive Device – presents interesting case studies of the present. Tackling such a contradictory and conflict ridden design issue demands a different approach than ‘good’ design of ‘better’ solutions. It needs a design methodology similar to violence, full of conflict and disruption. The research topic of designing for violence is therefore initially approached through the methodology of discursive and speculative design (Dunne & Raby, p.11, 2013). The purpose of this methodology is to ask speculative questions of both how things can function and how/if we want them. Dunne and Raby are proponents of such making and thinking as the odds of achieving desirable futures increase if we open the debate and discussion of what kind of future we want – or not.

A shorter history of design for violence

Weapons are one of the favored objects of design. The Arms industry alone produces products with a total net value of 400 billion US dollars every year. (SIPRI, 2016) This represents enormous needs and possibilities for designers. The design of objects suitable for fighting and killing has most likely a history as long as humans have made tools. (Tunis, 1999) Some of the oldest and best known designs are Leonardo da Vinci’s proposals for war machines ranging from catapults, a tank, a steam powered cannon, horse powered carts and weapons to a gigantic crossbow that could compete with cannons in firepower. (Klein, 2011, p. 76)

A historical, but also controversial approach to the design of violence was George Nelson 1963 television broadcast entitled ‘A Problem of Design: How to Kill People’. Here he presented a cultural history and overview of weapons design from rock to axe to spear to bow and arrow, onwards towards the atomic bomb. The background was his investigation into the massive ‘problem in design... killing occupies so much of our attention.’ (Nelson, 1960) Not a surprising statement from someone that had lived through both the second world war, the recent Korea war and -at the time- experiencing the arms race during the Cold War. Killing people is a very real and existential design problem if you are at war or amidst armed conflicts. One of Nelson’s main goals with the program was therefore to create awareness of the obvious, yet publically invisible field of weapons design. The 60ies were already an age with a global mass market for warfare. And war is all about killing people. Nelson asked why is it that we do not talk about this design field when it is just as much in our face as homemaking and fashion? To him the ‘three areas of design which receive the unquestioning support of society are: design for fashion, design for homemaking and design for killing.’ (Nelson, 1960) His presentation of the design for killing people is much debated. Some think he was outright naïve and propagating the industry of killing (Rawsthorn in Antonelli, 2015, p. 180), others that he was downright ironic and stating that designers only do what they are paid for. They give form to whatever seems important to society and to which purpose society allocates most funding. (Eldredge, 2012)(Nelson, 1960) (Antonelli, 2015, p. 183) Nelson has also be seen as representing the designer nerd only seeing designs role in improving weapons –and killing- through
better combinations of form and function (Steyerl, 2016) As it is still up to debate if aesthetics can improve lethal technology by itself, it is true that weapons can at least appear better through emotional and anthropocentric engagement. (Eldredge, 2012) The beauty and magic of weapons is symbolized through the many historic and spiritual ceremonies for naming of weapons such as swords (Sato, 1983, p.83) and the airplane Enola Gay that delivered the first atomic bomb. Although today’s wars might be good business for some, it is certainly less beauty and magic in the average street fight in hotspots such as Mosul and Aleppo. Much of today’s design for killing is dirtier and cheaper than many could hope for. Designing for violence is here well exemplified in the IED.

**Killing by Design: IED – Improvised Explosive Device**

There is currently an arms race happening on the kitchen-table. (Higginbotham, 2010) In contemporary battlefields in Iraq, Afghanistan and Syria there is plentiful of explosive material readily available. It is found either in the many unexploded projectiles or homemade explosive material can be made from everyday items like paint thinner, nail polish remover, bleach and hair dye, and fertilizer (ammonium nitrate). To make an improvised bomb all one needs is to stuff the explosive material in any container, plastic bottles included, add a detonator and a trigger. That is why it is named the kitchen-table arms race: given the readily available material one can make an IED not just in the kitchen, but even with homemade kitchen material.

![Figure 1: IED – Improvised Explosive Device](image)

The engineering skills needed to make an IED are minimal and there are plenty of instructables found on the Internet. (Improvised Munitions Handbook, 1969) Added to the technological ease comes human ingenuity that has taken the design of IEDs to almost infinite variation. That makes for the IED’s incredible efficiency. With minimal costs one can cause high numbers of casualties. Up to 75% of the coalition forces casualties in Afghanistan was caused by IED. Worst of all is that 9 out of 10
victims globally are civilians. (AOAV, 2016) Between 2011 and 2015 there were 6,320 IED incidents in 75 countries killing at least 86,395 civilians. (AOAV, 2016) And the use of IED is on the rise. As the Joint Improvised Explosive Device (IED) Defeat Organization (JIEDDO) laconically commented ‘device effectiveness and lethality continued to improve in diverse regions around the world.’ (JIEDDO, 2010, p. 7) The share variety and adaptability of IED makes it a designers favorite malleable design object to kill humans. If the IED is so cheap to make, one is attempted to think that countermeasures also could easily be produced. This is not the case as the IED has developed as a result of modern warfare – a warfare that has turned peculiar and asymmetric.

IED design cycles

The asymmetry of modern warfare as found in the present Middle East is recognized in the great difference in the military power of the warring opponents. There is little comparison between the weapons arsenal available to the coalition forces in Afghanistan versus the local insurgents. The former has a great material power, supported with the latest in military equipment and weapons, while the latter is fighting with either old, stolen or even locally crafted firearms and weapons. This asymmetrical nature and uneven game constitutes a fundamental aspect of an IED campaign. Whereas the typical shorter draft mission of coalition forces have weapons based on speed, precision and high tech, the local insurgent has time, patience and local materials and knowledge at disposal. That does not make the campaigning of the insurgent necessary slower or less dangerous. What contemporary insurgency designers lack in material resources, they make up again with rapid speed design cycles. The consequence is a cat and mouse like game revolving back and forth. Once the insurgents device a new way to position and trigger an IED, the coalition force develop a countermeasure. Given the rapid prototyping like deployment of new IEDs, the insurgents are known to offensively work around countermeasures. A case study of a particular IED design called EFP (Explosively Formed Penetrator) exemplifies this. (Higginbotham, 2010) The Afghan insurgents first came up with Jammer-Proof bombs in the summer of 2004. Coalition force soldiers in the field came up with improvised decoys two years later. Only a couple of months later the insurgents had managed to recalibrate the EFPs, adjusting its aim with lethal precision. The next bombproof adjustment took a few months, but proved efficient for almost three years when the insurgents made a trigger that was triggered by the very countermeasure itself. And so the cycle continues with one important and reverse asymmetry: the superior in material power is always lagging behind in their defensive design cycle.

Lessons of Design for Violence

Certain lessons for design for violence can be deducted from the observation of design cycles in making IEDs. The following list some of the important reasons why IEDs are so successful in killing:

- Limited look ahead. Lack of information about functionality and placement of IEDs slows down countermeasures. The wide variability in IED design and constant innovations makes defensive countermeasures passive in the sense that they must await for the next IED to explode, then conduct lengthy and time consuming analysis of how it was made.

- Materials (explosives) are everywhere. Today there are explosive materials readily available from various sources such as opponents’ unexploded bombs or through the use of readily home chemicals and standard fertilizer. Various step-by-step guides to fabricating chemical for explosives are also available, such as the Improvised Munitions Handbook (1969).

- Rapid prototyping cycles from ‘lab’ to product. Designing and building new trigger mechanisms – both mechanic and electronic- is so cheap and fast to make that immediate
field-testing can easily be done. As a matter of fact it appears that insurgents employment into battlefield is their field test itself.

- Constant monitoring of functionality. One difference between mines and IEDs is that there is always one man –or more- watching and monitoring IED functionality in the field. (Stirling, 2012, p. 181) Thus design success or flaws of each design are immediately discovered.

- Rapid adaption to countermeasures. The rapid prototyping cycles and monitoring also enables rapid development of new offensive designs that circumvent countermeasures.

- Advantage of surprise. The innovative and offensive deployment of IEDs gives it the advantage of surprise.

- Overwhelming numbers of designs. There are too diverse and numerous IDE designs for countermeasures to map and counteract them all.

- Availability everywhere. The necessary components, from explosives to technology and components are readily available everywhere. The custom made materials/procedures in countermeasures are not.

- Low cost. The availability of cheap material that make highly effective IED outcompetes high cost, high tech weapons

- Global design community and information sharing: “The enemies are very innovative, and they share their ideas and innovations”, US Army Lt. Gen. J. D. Johnson (2016). If a new IED design is successful one place, it is almost sure to be used elsewhere. Bomb making is not just a global phenomenon; it is also the product of a global design community sharing their recipes of ‘success’.

**Countermeasures to design for violence**

The immense scale of human suffering caused to humans and innocent civilians makes it a humanitarian and ethical cause to undo violence of war. At present there are a number of design projects proposing alternative design strategies and scenarios that replace the violent ones. (Borka 2016, p. 95) In case of the IEDs, traditional countermeasures have been based on stopping or counteracting the rapid innovation cycles in its design for violence. Attempting to combat IED harm is a complex and multilayered problem demanding a multifactorial approach. (AOAV, 2015) In their struggle to do so the US National Research Council has mapped a typical IED campaign. Here, the adversary must go through several steps before an attack can be done, including “obtaining funding and bomb materials, recruiting people, constructing the device, selecting the target, delivering the device to its target, carrying out the attack, and disseminating information about the attack for propaganda or other purposes.” (National Research Council, 2007) Together these steps make up the IED threat chain. The chain is again organized in three basic components: organization, resources, and operations. To break this chain they must all be attacked and broken on their own premise/means. The question of cat and mouse however remains. How can violence, whether offensive or defensive, ever solve asymmetric conflicts of violence? It seems more fit to escalate it. Despite two decades of designing countermeasures against IED, their use is still increasing. It is therefore time to think anew and radically different. One solution is inversing the situation, not with countermeasures of violence, but by radically new design thinking based on the lessons provided by the design for violence itself.

**Inverse Design Methodology to Inverse the Game**

‘Nothing but unadulterated non-violence can meet organized violence’,
– Gandhi (2012, p.226)
The IED design cycle case illustrates how it has not been possible to win over adversaries in situations such as the asymmetrical warfares of the present. Given the combination of almost freely available explosives, knowledge of bomb making and the shared skillsets among bomb designers, puts any warring fraction with expensive weaponry at high material risk. As the coalition forces experience in Afghanistan they loose out because they are vulnerable not despite of, but due to the wealth of their superior materials. They provide their enemies with the best targets ever: both expensive and visible equipment. The use of IDEs in Afghanistan, Iraq and Syria exemplifies how the insurgents compensate for their deficiencies in quantity and sometimes even quality. The enormous damages IEDs cause to military gear greatly increase the need for resources and consequently budgets. Costly weaponry can be replaced over time, but the extra expenses are effectual in reducing moral fighting power and political willingness. The result is a long-standing conflict where neither can win, but also not loose. Such a deadlock just increases the humanitarian suffering and costs. From a design perspective, how can such situations be solved? Gandhi proposed non-violence as means and method to inverse the oppressive situation in India during his time. How can such an inverse thinking be translated to an Inverse Design Methodology and be applied to the conflicts of the present?

One approach is turning the whole situation upside down by inversing the logic of weaponry: instead of designing for longevity and durability, one should design for the destruction of ones own material goods. This is different from willed self-destruction; it is destruction as a preemptive means to render material targets irrelevant.

Preemptive Architecture – inverse design thinking for the undoing of violence

Preemptive Architecture – inverse design thinking for the undoing of violence

Based on a case study and a collaborative project between the architect Magne Wiggen and interaction designer Stahl Stenslie, the paper propose inverse design thinking as a profoundly new design methodology by designing for the violence we know is coming. The Preemptive Architecture project turns its attention to another asymmetric situation of war: the Gaza strip. In the ongoing and historic war between Palestinians and Israelis, Gaza seems bound to explode again and again. What are the designerly possibilities in this impossible situation and how can this be used as a materiality to produce alternative patterns of thought, resilient symbolic representations and actual bombable structures, i.e., designerly architectures?

Through the Amathlaah project (Amathlaah 2016) the project develops an inverse design strategy and approach by creating bombable architectural structures that act as instruments of anti-violence. It asks the inverse question to destruction: What if houses and civilian infrastructure would not loose, but gain symbolic as well as material value if being bombed? Such an approach promotes reversing common thinking patterns about warfare. Designing and building structures predestined for destruction becomes a creative act, challenging the way we currently practice design. Designing for destruction is a dark way of thinking, but not necessarily naive. Design for future violence is dark in the sense of Timothy Morton’s dark ecology: we must not act as if the catastrophe is ahead of us. It has already happened and it is both a part of our presence and future. (Morton, 2016) What we need is a new situational awareness that enables us to act out of the actual situation at hand. Such a post-apocalyptical awareness will make emerging design thinking and solutions more effective.
Figure 1: Concept drawing for Amathlaah, an experimental, bombable structure, top view. Users seen in scale. (Stenslie & Wiggen 2016)
Designing for Destruction

The project originates from the following background and hypothesis: architecture and its infrastructures are the primary war targets in modern warfare. Contemporary architecture in contemporary warzones has completely failed to take this into concern. In the last Gaza war in 2014, more than 14,000 single homes were bombed to trash. Enabling destruction at such a scale is a major failure. Not just for architecture, but for all the money spent on rebuilding these houses after the last war in 2008. Current architecture and builders in war zones have in common that they are all building new war targets, not safer living. They build and re-build in such a traditionally solid manner that they are setting up civilian infrastructure to become targets again and again. In Gaza we know that buildings and infrastructures will be bombed. And as bunker-buster bombs show, no building can resist a modern bomb. Rather than building 'good' houses, Preemptive Architecture proposes a most durable form of architecture, that, like Gandhi’s thinking and actionism, resists violence and bombing in the ways that destruction will raise the practical value of buildings and infrastructure, not decrease or annihilate it. If architectures resist war-based destructions, or even gain from it, it will function as an architecture of undoing violence. It will make no sense to bomb it.

Towards a Design by Passive Resistance

Inspired by Gandhi’s thinking about passive resistance, this paper propose designing structures, monuments and physical forms constructed in the same spirit. Buildings are generally static structures that are easily damaged in the war. What if they could be made plastic? Not rigid and tough, but changing and transforming structures in case of destruction. Examples are traditional Japanese pagoda architecture built so that the building does not become damaged by earthquakes (Silva, 2005, p. 29) or buildings where materials can be put together again afterwards. Other examples of designer products that get added value through destruction are Guy Mishaly’s Blast chairs, or transformed through physical violence as in Marijn van der Poll’s DO HIT furniture. (Borka 2016, p. 90 & p.40) The discursive question emerging here is what if we could design something that gets added value in the event of war? How can the energy from the bombing and fire be taken up and used in future design? And acquire both the actual, practical and symbolic value of reuse for victims of war. Ongoing investigations (Stenslie & Wiggen 2016) for materials and construction methods are:

- Materials that change composition through high pressure (pliable, plastic, mechanical).
- Structural explosion patterns built in. Concrete and cement based structures collapses in explosions and can not be repaired, while a brick building can be built up again brick for brick because the binding cement give in first in case of explosion.
- Adaptive surfaces that change its aesthetical appearance such as color and form by explosion / pressure / heat.
- Sound. Integration of mechanical sound/seismographic recorders detecting and recording the intensity, direction, and duration of a movement of buildings / players provide the basis for sound based expression / compositions.

Such types of material design based on passive resistance represents a non-violent strategy, and a strong opposition to giving in to the conventional logic of war. Moreover, such design by passive resistance represents a peace-building tactics in Gandhi’s spirit. Violence, and in particular the violence of the other, becomes a medium for peace. Thus, such structures or designs could act as instruments against violence and war’s wasted function. The proposed and bombable structure Amathlaah carry a symbolic significance in its reference to the mother of Abraham, appearing in the Old Testament. Taking departure in this archetype of motherhood, the project becomes a
psychophysical sculpture, i.e. objects and structures that are both physical and emotional, impacting our everyday life, mentally as well as socially. (Stenslie & Wiggen, Amathlaah 2016)

Figure 2. Shell structure for a preemptive architecture based on the shell of a beetle. Copyright Stenslie & Wiggen 2016.

Outlook

Designing for violence is a complex, multilayered field that on the one side exemplifies human ingenuity and creativity, and on the other how design can cause immense human suffering. A quite different design thinking and approach is needed to impact real change and difference both in present and future situations marked by the violence we know will come. Although preemptive architecture as an example of discursive and inverse design methodology is only in its early stage, it demonstrates possible ways of thinking towards a next design that break the war driven chain of violent weapons design.

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