

Crossing the Street

ADDRESSING ONE OF URBAN WARFARE'S
GREATEST CHALLENGES



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Everybody has a plan until they get punched in the mouth.

– Mike Tyson¹

Many of the challenges of urban warfare are not new; nor, unfortunately, are the options soldiers have to confront these challenges. The US Army has a long history of fighting in cities and its tactics, techniques, and procedures have been refined mostly from the hard lessons of World War II and the evolution of close-quarters combat that occurred following the failed 1972 rescue attempt during the Munich Olympics. Furthermore, urban warfare poses a set of challenge that is not going away. Gen. Mark Milley, Army chief of staff, and Gen. Stephen J. Townsend, commander of US Army Training and Doctrine Command, frequently emphasize the need to prepare the Army for combat in densely populated urban areas. At the most basic level, however, there is an obvious, but neglected tactical problem in city fighting: simply crossing the street.^{2 3}

The amount of damage and numbers of casualties in fighting in recent years in Raqqa, Aleppo, Marawi, and Mosul show how rudimentary urban warfare tactics remain, as well as the highly destructive nature of combat in cities. Without new tactics and tools for dealing with some of the basic challenges of urban combat, military units are forced to employ extremely destructive methods to reclaim cities from entrenched defenders. These tactics are reflected in the “destroy the city to save it” mantra.⁴

To be sure, much of the city fighting in the past five years has not been directly executed by American ground forces. Rather, US troops were advising and supporting local partner forces, providing intelligence, and directing airstrikes and artillery fire. Nevertheless, although US ground forces are better trained, equipped, and led than the militaries that conducted the destructive operations that have unfolded especially against the so-called Islamic State, they, too, would have been limited to similar tactics if they were in the lead.

Since the major urban battles of World War II, Vietnam, Panama, Somalia, Iraq, and other conflicts, the US Army has developed and improved its equipment and technology. Soldiers now have advanced precision weaponry allowing them to target a single floor of a single building on a crowded block with ordnance that minimizes collateral damage, drones for aerial surveillance and weapons delivery, military satellites for signal intelligence and electronic warfare, and even cyber offensive and defensive capabilities.

Despite all the advanced technology, there are still very limited options or tools for one of the biggest and historically dominant challenges for military forces conducting offensive operations in a city—crossing the street. A defending enemy can establish long and clear lines of sight and fields of fire for approaching units. They can funnel them into kill zones and move from one protected fighting position to the next to gain clear shots on attackers trying to traverse the maze-like features of urban terrain. If the defender can see the attacking military forces, they can engage them. It does not take a trained sniper, just a weapon oriented at any of the many gaps between buildings that the defenders know the attacker must cross.

To analyze the options and tools available to soldiers for crossing open areas, we must first review doctrine, because that is what our soldiers use to train for the challenge. The most applicable Army doctrine for training tactical-level operations, especially the task of crossing open areas or urban movement, is found in a few manuals: Training Circular (TC) 90-1, *Training for Urban Operations*; chapter eight (“Urban Areas”) of TC 3-21.75, *The Warrior Ethos and Soldier Combat Skills*; and chapter eleven (“Urban Operations”) of TC 3-21.76, *Ranger Handbook*. There are also a few supporting tasks in Soldier Training Publication (STP) 7-11B1-SM-TG, *Solder’s Manual and Trainer’s Guide, MOS 11B, Infantry, Skill Level 1* and STP 7-11B24-SM-TG, *Soldier’s Manual, MOS 11B, Infantry, Skill Levels 2-4*. The higher-level manuals, such as Army Techniques Publication (ATP) 3-06, *Urban Operation*; ATP 3-21.8, *Infantry Platoon and Squad*; and Army Tactics, Techniques, and Procedures (ATTP) 3-06.11, *Combined Arms Operations in Urban Terrain* only briefly mention the challenge or task.

In training for urban combat, doctrine recommends a progressive and sequential program ranging from individual marksmanship to attacking single buildings and up through full combined-arms attack and the defense of built-up areas.

The specific task of crossing the street is referenced in urban doctrine in connection with crossing open areas, movement between positions, and movement parallel to buildings.

The practice of these movements starts once soldiers move up to a training structure to train to enter a building and clear a room and specifically in training for the task “conduct tactical movement in a built-up area.”⁵ The training manuals only provide a few considerations for units to address open areas and moving across gaps.

For the individual soldier, the training task is to “perform exterior movement techniques during an urban operation.”⁶ The guidelines for this task are very specific. Doctrine recommends soldiers follow these general rules of movement and further state the rules “must be practiced until they become second nature.”⁷ These general rules are:

- a) Take care to avoid silhouetting yourself in doors or windows, or on rooftops.
- b) Avoid open areas (streets, alleys, and parks).
- c) Make a visual reconnaissance of the next position before moving.
- d) Conceal movement with smoke or covering fires, and by using buildings, rubble, and vegetation.
- e) Always move rapidly from one position to another.
- f) Stay alert and expect the unexpected.⁸

In general, these individual recommendations coincide with most of the recommendations for larger groupings of soldiers and units.

Thus, doctrine offers only a few practical steps: avoid open areas like streets and alleys, use smoke to conceal soldier's movements, and suppress buildings to cover moving soldiers. Each of these is worth exploring.

Avoid Open Areas

It may seem common sense, but in case it is not, Army doctrine reminds soldiers to avoid open areas "such as streets, alleys, and parks" because they are "natural kill zones for enemy, crew-served weapons, or snipers."⁹

As dangerous as open areas are, it is most likely, especially during continuous operations in dense urban environments, that avoiding them altogether will not be an option. Still, soldiers should at least try to reduce their exposure. This can include operating at night, moving through buildings (instead of on streets), and in areas with restricted visibility for the enemy such as areas with rubble. Each of these come with their own challenges and may not be options.

There are also specialized tactics that can be used to avoid some open areas. Conducting an air assault on top of a target building to quickly gain access through the roof considerably reduces soldiers' exposure to open areas. But this tactic is mostly reserved for special operations units and assumes the urban mission is against a confirmed building and an enemy without air defense capabilities.

Soldiers can also attempt to move through buildings. Urban doctrine does briefly mention this tactic as an attempt to stay off streets and provides examples of having teams prepared to execute wall breaches to continue movement through the building when conducting an assault.¹⁰

The advantages of moving through buildings has been demonstrated in historical examples of urban fighting. The practice of cutting holes through walls, often referred to as "mouse-holing," has been used by US and enemy forces—such as the Islamic State—alike.¹¹¹² The Israel Defense Force (IDF) are said to have used the practice of moving through walls and ceilings as a city-wide form of maneuver during operations in Nablus in 2002. IDF soldiers were reported to have not used "any of the streets, roads, alleys, or courtyards . . . and none of the external doors, internal stairwells, and windows." Rather, they "moved through the city across hundred-meter-long 'over-ground-tunnels'" created by explosives and sledgehammers.¹³ Although effective, this tactic obviously increases the risk to noncombatants and the destruction of building interiors.

US Army urban training generally focuses on breaching for entry into a single building and not multiple wall breaches to facilitate avoiding open areas. Unlike, for example, the Israeli urban training sites at the Tze'elim army base, few if any US urban training centers offer the ability to train blasting through walls in conjunction with infantry maneuver.¹⁴

Air assaulting on top of buildings and moving through walls require extensive additional training and equipment that most Army units do not have. Thus, they are not realistic options, particularly in large-scale urban operations. Consequently, soldiers will be required to move across open areas to accomplish their missions. To obscure their movement from the enemy, doctrine recommends soldiers use smoke.

Use Smoke to Conceal Your Movement

Doctrine recommends using smoke to conceal movements in a number of tactical circumstances: approaching a building; moving to a breach site; maneuvering between buildings; or crossing an open area. By far, it is the most mentioned tool in urban training doctrine. Consequently, one would think every soldier carries large amounts of smoke devices when conducting urban operations. They usually do not.

There are many smoke-creating tools in the Army's inventory. For the individual soldier, smoke grenades, which have changed very little from World War II, are the principal device.¹⁵ The grenades are either hand-thrown devices or rounds fired from an M203 or M320 grenade launcher.

One of the main handheld smoke grenades recommended to obscure troops' movements is the AN-M8 HC white smoke grenade, which emits a dense cloud of white smoke that lasts for 105 to 150 seconds.¹⁶ Other smoke grenades—the M83 TA white smoke, M18 colored smoke, or M15 white phosphorous grenades—only emit for sixty to ninety seconds. Hand-thrown smoke grenades emit more smoke than the smaller variety used with 40-millimeter grenade launchers.

The Army also has "smoke pots." Once ignited, these devices can dispense smoke, depending on the model, for 10–20 minutes.¹⁷ Smoke pots, however, are heavy (between ten and thirty pounds). While useful in defensive operations, they are not practical for maneuvering soldiers.

If soldiers are supported by vehicles they have additional smoke options. Many Army vehicles have smoke grenade launchers that can simultaneously launch up to four, eight, or even more smoke grenades depending on the number of launchers on the vehicle. But, these vehicle-mounted grenade launcher systems are mainly meant to obscure and protect vehicles and not necessarily designed to cover troop movements.¹⁸ Although some versions of Bradley Infantry Fighting Vehicle and Abrams tanks do have smokescreen generators that can be used to screen troop movements, many newer versions of these vehicles do not. Obviously, any vehicle-based smoke capability will depend on getting a vehicle into position to place smoke in the right place at the time.

There are also a wide range of mortar- and artillery-delivered smoke rounds that mostly consist of white phosphorus. Accurately using mortar or artillery smoke rounds to conceal troop movements is extremely difficult in urban environments because of the nature of urban terrain. Additionally, their use increases the chance of unintended damage to noncombatants and civilian infrastructure—especially from fires caused by white phosphorus, which burns at temperatures in excess of 5,000 degrees Fahrenheit.¹⁹

Aside from the technical and delivery challenges, there are other issues with using any type of smoke in dense urban areas. Smoke is neutral; it not only prevents enemy observation, but also that of friendly soldiers. In most instances, soldiers cannot even see where they are operating, because the only devices that can see through the smoke are thermal goggles, which are not yet widely available.²⁰ Furthermore, most smoke options are not safe to breathe (there is one grenade, the M106 screening obscuration device—visual restricted terrain that is safer to breathe). Almost all smoke grenades and devices produce harmful hydrochloric fumes that irritate the eyes, throat, and lungs. Soldier protective

masks do not filter the smoke or provide oxygen and therefore are of little use. Military smoke displaces oxygen to the point that it is hazardous for soldiers or civilians unless they have forced air respirators.²¹

One of the biggest challenges with smoke is that it is subject to the vicissitudes of weather. A smoke cloud goes in the direction the wind is blowing. It can go towards the enemy, but if the wind changes, the obscurant can work against friendly soldiers by engulfing them. Furthermore, rain, snow, and cold temperatures can also reduce the effectiveness of a smoke cloud as much as by 25 percent, and in extreme conditions, weather can all but prevent the use of smoke to conceal troop movements.²²

In a high-tempo urban fight the most likely smoke tool soldiers will have will be smoke grenades. And based on the specific urban terrain, weather, quantity of available grenades, and training, soldiers may still be forced to cross open areas while visible to the enemy. In this case, soldiers turn to their third tool—suppressive fires.

Suppress Buildings with Bullets and Other Munitions

The last option to assist soldiers crossing open areas in urban terrain is the use of support by fire, defined in doctrine as “a tactical mission task in which a maneuver force moves to a position where it can engage the enemy by direct fire in support of another maneuvering force.”²³ Either direct fire (small-arms and machine-gun fire) or indirect fire (mortars and artillery) are used. If soldiers take fire, the support position engages the enemy to eliminate or suppress the threat. Suppression is defined as “a tactical mission task that results in temporary degradation of the performance of a force or weapons system below the level needed to accomplish the mission”²⁴ Importantly, in urban combat, suppression allows soldiers to cross open areas.

This use of suppressive fires, in an urban environment potentially with a civilian population still in the city, is legal and compliant with the Law of Armed Conflict.²⁵ The four basic principles of distinction, proportionality, military necessity, and not causing unnecessary suffering are followed by US forces.²⁶ But urban combat puts many aspects of the Law of Armed Conflict, especially those involving taking all measures to remove and prevent the effects of military actions against civilians, to the test.

How do soldiers know for sure that the fires used to cover their movement won’t strike civilians? How do they know if there are noncombatants in a building with enemy fighters? To deal with these tough questions soldier actions are governed by rules of engagement (ROE)—“directives issued by competent military authority that delineate the circumstances and limitations under which U.S. forces will initiate and/or continue combat engagement with other forces encountered.”²⁷

The military ROE will dictate what types of fires are authorized and when. Often, military necessity in combat within dense urban areas is pitted against the soldiers’ rights to self-defense. Commanders at all levels ensure compliance with both the law and rules of engagement. In numerous past urban battles, such as the 1968 Battle of Hue, the initial rules of engagement prohibited the use of certain weapons—including artillery or close air support—to prevent destroying the city, but the reality of the difficulty of fighting house to house has often caused, as it did in Hue, such restrictions to be lifted.²⁸

It is very important to point out that the urban mission and context are central in the planning for the use direct fires to support troop movements. There are planned movements, like an assault of an enemy building in an otherwise semi-permissive environment. In such a case, soldiers would seek to use hours of darkness, deception, stealth, and other methods to get as close as possible to the building without its occupants detecting them. Once at the target building, they would plan to emplace a support-by-fire position to cover troops moving up to the building. If no enemy contact is made outside the building, no rounds are fired by the support-by-fire positions.

By its very nature urban combat often involves unplanned fighting—reacting to ambushes or fighting concealed enemy forces as they are encountered in a movement to contact. In both of these cases suppressing fires are critical. The specifics of the battle, the status of the enemy, and rules of engagement will determine what type of fires are allowable, from small arms to airstrikes.

The use of covering fire causes much of the destruction in urban combat. It may seem simplistic, but when military forces have to remove enemy forces from a city, or even from a block, and soldiers take fire from a building, they need to move to that building to clear it. They may try to employ smoke to screen their movement, but frequently suppressive fires will have to be used. If the enemy position is too strong to take by direct assault, fires may have to be used to destroy the building and its combatant occupants.

The brutal reality of urban combat is that land forces rely on fires to defeat determined enemies fighting within these areas and there will be significant destruction of the city as a result. This has been well documented in recent battles like Fallujah, Mosul, Raqqa, Marawi, Aleppo, and many other places where US or US-supported forces faced determined fighters. During the battle for Raqqa, Sgt. Maj. John Wayne Troxell recalled, “Every minute of every hour we were putting some kind of fire on ISIS in Raqqa, whether it was mortars, artillery, rockets, Hellfires, armed drones, you name it.”²⁹ Indeed, the volume and intensity of artillery fire burned out Marine cannon barrels, something that is not easily accomplished.

Although the UN secretary-general has called for all militaries to avoid using explosive weapons in populated areas,³⁰ this has proven impossible in the previously noted battles. Unfortunately, technologies or methods that can defeat a determined enemy fighting in dense urban terrain are still very limited and fires are the great equalizer.

The Pursuit of Other Options

The limitations of the current tactics and tools available to soldiers in urban combat, particularly in the dangerous business of crossing open areas, make it clear that new ideas and approaches are needed. If the city is the battlefield of the future, we do a disservice to those of our soldiers who will fight there by not giving them better options than they have now.

Training and Doctrine

The majority of Army units train for urban combat at their home stations at urban operations ranges (also referred to as military operations on urban terrain sites), where they practice “Battle Drill 6: Enter and Clear a Room.”³¹ They may sequentially progress to more difficult challenges, like entering and clearing

multiple buildings or executing an urban assault course consisting of multiple buildings. Nevertheless, more often than not, the central task for soldiers is mastering the “enter and clear” battle drill. These tactics are also commonly referred to as close-quarters battle (CQB) tactics.

These very specific tactics do not originate from the Army’s past experiences in urban combat. Rather, their origins are traceable to counterterrorism operations beginning in the 1970s.

After the failed attempt to rescue Israeli Olympians during the 1972 Munich Summer Olympics, many militaries created specific counterterrorist organizations, (e.g., the US Army’s Delta force, the British Special Air Service, and the German Grenzschutzgruppe 9).³² These new organizations developed advanced counterterrorist tactics to safely breach, enter, and clear confined spaces—rooms or airplanes, for example—for hostage rescue or urban raid operations against terrorists. They became the masters of CQB tactics. The special operations forces CQB tactics made their way into conventional forces and then were further emphasized because of the requirements for urban raids during the wars in Iraq and Afghanistan.

Over time, though, the Army forgot many of the lessons learned from past major urban operations as it prepared for the much smaller subset of urban operations represented by counterterrorist raids. Comparing the 1993 Field Manual 90-10-1, *An Infantryman’s Guide to Combat in Built-Up Areas* to the 2008 TC 90-1, *Training for Urban Operations* or the 2011 ATTP 3-06.11, *Combined Arms Operations in Urban Terrain*, one finds that the former contains more information on the specifics of large clearing operations, while the later focuses mainly on CQB tactics.

This over-emphasis on conducting targeted training for intelligence-driven urban raids assumes soldiers will know the exact building to raid. As a result, fundamental urban combat skills have atrophied. This includes preparing for the challenge of wide-scale clearing operations that involve repeatedly crossing open areas, streets, alleys, and gaps between buildings.

Army units are also hindered by their training sites and scenarios. For many reasons, the Army needs to build new urban training sites and to create an urban warfare school.³³ Most urban training sites are little more than small villages, typically surrounded by woods or wide-open desert. When training platoon and higher-level operations, many units will plan their approach through the woods, up to the closest building, and then utilize support by fire to quickly secure a foothold in the mock urban area. In desert settings, units often drive up to their targets and establish vehicle support-by-fire positions near the buildings they are attacking. Both scenarios assume military units will be able to move through the periphery of urban areas to their target location, or that the most likely urban mission will be an attack on a specific building or set of buildings. Both of these assumptions are fundamentally wrong in a dense urban combat environment.

The largest current urban training sites, like those at the combat training centers, are also inadequate. They are constrained by their size and location and this limits training scenarios. These sites, small as they are, also have wide open streets, rather than the complex maze of narrow alleys and dense infrastructure that characterize dense urban terrain in many real cities. The shortcomings of Army urban training sites are understood. The Army’s most recent analysis of the October 2016 battle to liberate

Mosul noted “Urban training scenarios are too limited and sterile to replicate conditions such as those experienced in Mosul. The U.S. Army needs to change the scope of its urban training scenarios in terms of both intensity and time.”³⁴

The inherent limitations of the Army’s urban training sites, coupled with the over-concentration on training CQB tactics, results in a lack of preparation for the challenge of crossing open areas that characterize urban combat. Indeed, this requirement is given short shrift in the urban training manual, which only recommends forty minutes for training the tasks of conducting tactical movement in a built-up area, moving across an open area, and moving parallel to buildings.³⁵

The US Army would do well to balance training CQB tactics for counterterrorist-style missions with city-wide combat and clearing operations reminiscent of Aachen (1942), Fallujah (2004), Sadr City (2008), and Mosul (2016). Units should plan more training specific to approaching buildings during urban operations. They should require that opposing forces defend buildings with the intensity shown by Islamic State fighters in Mosul—who defended buildings to the death—and require training units to learn how to win this difficult fight.

Spending more time thinking about the realities of modern urban combat—and training to prevail in this tough environment—should spur a demand for new tactics, tools, facilities, and training methods. Some suggestions follow in the remainder of this paper.

Avoiding Open Areas

It will be impossible for soldiers and units to avoid all open areas in urban operations, but they should still plan, practice, and train to reduce exposure to them.

Soldiers need to practice urban land navigation and movements. They need to make the study of urban exterior terrain, as opposed to the inside of buildings, a priority. They should assume that they will have to fight to get to their objectives and cross open areas. They should become students of the urban environments, studying the angles, the dead space, and possible movement corridors to avoid open areas as much as possible. And when avoidance is not an option, they should understand how to employ smoke and fires to cover their maneuver.

Ultimately, the Army’s current training sites will not prepare soldiers for urban maneuver, especially when mounted. Until the army develops large, complex urban training sites to practice urban movement, leaders can take advantage of “training without troops” events in the major cities near many Army installations. These enable leaders to calibrate their thinking to the real challenges posed by cities, and force them to consider how they would operate to achieve objectives beyond raids and clearing single rooms or buildings. Map and staff exercises focused on urban areas around the world where the Army might operate in the future could complement the immersion in real US cities.

Soldiers should also practice other movement methods. As previously discussed, going through buildings to reduce exposure to streets, alleys, and gaps between buildings has been practiced in the past by the US and other militaries. How to do this safely and smartly takes practice. The methods, either explosive or mechanical, require building material-specific tools and techniques. Training sites should

include the ability to breach interior and connecting walls so that soldiers can practice breaching for the purpose of movement through buildings rather than a single entry point.

The Army also needs to review its history of blowing holes in walls with weapons. While the rules of engagement, presence of civilian population, and damage to civilian infrastructure would have to be heavily considered, the tactic has been used with success in the past. Soldiers have used tank rounds, 90-millimeter recoilless rifles, bazookas, and artillery as improvised methods to blow holes in building so that dismounted infantry could avoid open areas and enter buildings to clear them. Doctrine recommends using a Bradley Fighting Vehicle, Abrams tank, and artillery rounds for penetrating exterior building walls.³⁶ During the 1968 Battle of Hue, US Marines first attempted to penetrate the thick walls of an enemy-held citadel, which were up to ninety feet wide at many points, and other thick concrete and stone structures by firing 90-millimeter tank guns at them. They discovered the rounds were ineffective, often ricocheting off the thick walls. Tank crews eventually switched to concrete-piercing fused shells that would penetrate most walls in the city.³⁷

Soldiers in Iraq also struggled to overcome the challenge of walls in urban environments, and were left surprised that an AT-4 fired at a wall did slight damage (the author witnessed this surprise as a company commander in Baghdad in 2008). The AT-4's unsuitability for the task of penetrating a wall should have been known. It is an anti-tank weapon and employs a shaped-charge warhead that is designed to make a small penetration in armor, rather than blast a large opening. The lesson for the future is clear: Soldiers should study past innovations for urban fighting. They should also be very aware of the capabilities and limitations of the weapons they have available to them.

None of the weapons discussed above were designed for urban combat. They were either designed to be multi-purpose or specifically for open terrain. The battlefield improvisation for punching holes in walls has ranged from direct-fire artillery rounds to driving bulldozers and tanks through buildings. The lack of development of effective means to accomplish these tasks has forced soldiers to resort to destructive weapons, designed for different purposes, to solve the challenges of urban combat.

Making holes in buildings to maneuver is a good place to start innovating. One could imagine a small mining robot that can detect the specific features of walls or what is in a room and then proceed to both plot and create a route through buildings for dismounted movement. Laser-cutting technologies or nonhazardous chemicals that dissolve concrete and other building materials on contact might be additional options. The Army will find different approaches through experimentation against realistic urban challenges. Quite simply, current approaches result in the use of explosives and penetrating projectiles that put civilians—and soldiers—at risk and destroy the city.

The Army could also explore avoiding open areas by going underground. Utility, sewer, rail, pedestrian, and other types of tunnels are present in many dense urban areas. Digging tunnels to avoid detection and targeting is as common in historical urban battles as are the holes in walls discussed above. With the right navigation, communication, and survival tools, soldiers might be able to use tunnels to reach their objectives undetected or move within urban area without exposing themselves to surface-based enemies. Research to facilitate these type of movements is only just beginning, but with the right

experimentation in the context of urban operations, efforts could yield very different approaches to avoiding open, surface areas.³⁸

One capability that would considerably lessen the challenge of urban maneuver that has yet to materialize in a feasible manner is the ability to see through walls. While there have been military and civilian advances in this area, there has yet to be a useable system that would allow soldiers to know what is inside the buildings ahead of them.^{39 40} For the task of urban movement, soldiers will need the ability to see what is inside buildings that will affect their movement, rather than only what is on the other side of the wall of the building to which they are adjacent, which is the extent of what military and police research and development efforts have produced thus far.

The proliferation of inexpensive drones could also help in knowing what is inside buildings (and have other advantages, as discussed below). Drones, either singularly or in swarms, could fly in advance of soldiers to look around and into buildings to alert soldiers of their contents.⁴¹ Knowing what is inside a building would drastically alter approaches to both urban movement and the conduct of urban warfare in general.

Obscuring (Smoke and Other Options)

Despite all the limitations of using smoke described above, for the foreseeable future it will be the primary method for concealing soldiers in urban terrain. Therefore, Army units need to expand their training using the currently available obscurants.

Before the Army's shift to training for counterinsurgency missions, smoke operations were a major consideration in scenarios at the National Training Center. There were even smoke platoons to screen large armored assaults. Bringing these formations back may not be a solution, but their capabilities and a focus on smoke operations, especially in urban environments, should be revisited.

The number of smoke grenades an infantry platoon carries is limited. Their employment is complicated by placement, wind, and the capabilities of the specific device. Effective smoke grenade placement takes practice. Furthermore, even an effective smoke cloud can telegraph friendly movements; the enemy may choose to fire into smoke clouds, knowing they are there to screen friendly force movement.⁴²

Drones could be used to deploy smoke, even if limited initially to using current smoke grenades. It would open options for precision placement and adjustments after placement of current and new smoke devices. In the civilian world, drones are already being used to spray crops and to paint buildings.⁴³

⁴⁴ Simple modifications to existing aerial delivery systems could increase the time and coverage of smoke for soldiers' movements.

If we expand ideas on how best to obscure the enemy's ability to see troop movements in urban environments, we can consider other options. Larger-scale options, such as blanketing an entire city in something that limits visibility, should be considered. A cloud, fog, rain, or sandstorm could all potentially fulfill the task. While investments in weather modification have vetted minimal effects, China continues national-level interest in the capability.⁴⁵

Whether altering weather or using major, manmade natural obscurant creators—like industrial-sized fog machines—reducing the visibility of enemy forces defending a city would change the conduct of urban operations considerably.

To be sure, each action in warfare has a counteraction and secondary effects. Reducing the visibility of the enemy could reduce the visibility of friendly forces. Reducing visibility also limits access to combat enablers like air support. But, it could also spur the development and fielding of different types of goggles to impart an advantage to US forces like night-observation devices enabled them to “own the night.” The ability to create an environment that only our soldiers can see in would be the goal.

Any obscuration methodology must also consider the enemy’s capabilities. US forces would not want to use normal smoke against an enemy that has thermal vision as well; such an enemy capability would require thermal-blocking smoke.

If the goal is just to block enemy vision so that soldiers can get to where they are going, then smoke is not the only option. Any object in the line of sight of the enemy would do the job.

During fighting in Aleppo, residents strung up giant sheets between buildings to block the view of snipers and allow civilians to cross the street with less worry.⁴⁶ It would not be hard to develop a technology that allows soldiers to shoot anchors tied to a blanket or some similar object straight into buildings to create a visual curtain wall across streets.⁴⁷ This would work especially well if soldiers needed to block enemy observation from a far distance. In this vein, if soldiers want to block observation from a specific building (i.e., one containing known or suspected enemy shooters), some type of material could be shot at, or draped over the building, something like the way that tarps are often used to cover major construction sites.⁴⁸

Clearly, there is much work to be done to help soldiers conceal their movement in urban combat. Smoke operations need to be practiced and improved. There are also other ways that could be experimented with in the context of this specific tactical task.

What is clear, however, is that in urban operations soldiers will have to traverse dangerous open areas; new ways of screening maneuver are needed.

Suppressing Buildings to Cover Troop Movements

Ultimately, under heavy fire, possibly out of smoke, soldiers will be forced to cover their movements by suppressive fire.

Addressing this tactic is the most complicated. On one hand, soldiers need the most lethal weapons available. They need urban-specific weapons that can penetrate concrete and hit enemy forces using the defilade or cover of walls as protection. But on the other hand, soldiers need weapons that can engage enemy forces without causing civilian casualties and unintended infrastructure damage.

As previously mentioned, investing in technologies that can see through buildings from a distance or without the soldier being required to stand next to the building into which they want to look would significantly change the nature of urban warfare. Soldiers would know if a building contained civilians or

enemy forces, or was simply empty. This would provide the most critical information needed to determine whether soldiers need to avoid or bypass the building, deploy smoke, or suppress the building within ROE constraints.

Sensors that allow soldiers to pinpoint the exact location of enemy fire would also be extremely useful. This may come through advances in vehicle and soldier-wearable shot detection devices or remote sensors deployed into the urban area.^{49 50} Knowing precisely where enemy fire is coming from would help soldiers know exactly what to suppress.

Conclusions

Current Army doctrine is clear about the tactics and tools available to assist soldiers to cross the street in combat—and it has significant limitations. Soldiers are instructed to use cover and concealment, avoid openings whenever possible, deploy smoke, and use suppressive fires.⁵¹ If predictions by Army leaders that future battles will continue to take place in dense urban terrain are accurate, these means will no longer be good enough.

We know all too well from past experiences the advantages that accrue to a determined enemy defending a city. And we know the risks current capabilities pose to civilians and the infrastructure of the city itself. Recent and past experiences all substantiate these lessons. Consequently, there needs to be significant improvement in doctrine, materiel, and training if the Army is going to prepare itself for the future it says it is anticipating. Or our soldiers will pay a heavy price crossing streets.



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The views expressed are those of the author and do not reflect the official position of the United States Military Academy, Department of the Army, or Department of Defense.

¹ Berardino, Mike. "Mike Tyson explains one of his most famous quotes." Sun Sentinel. November 9, 2012. http://articles.sun-sentinel.com/2012-11-09/sports/sfl-mike-tyson-explains-one-of-his-most-famous-quotes-20121109_1_mike-tyson-undisputed-truth-famous-quotes

² Ricks, Thomas E. "Army chief: Time to prepare for urban war." Foreign Policy Best Defense Blog. March 22, 2017. <https://foreignpolicy.com/2017/03/22/army-chief-time-to-prepare-for-urban-war/>

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- ³ “Townsend on Mosul Lessons for Future Megacity Conflicts.” Association of the United States Army. May 24, 2018. <https://www.ausa.org/news/townsend-mosul-lessons-future-megacity-conflicts>
- ⁴ Cavanaugh, ML. “Yes, Unfortunately, Sometimes Militaries Must “Destroy the Town to Save It,” Modern War Institute. February 6, 2018. <https://mwi.usma.edu/yes-unfortunately-sometimes-militaries-must-destroy-town-save/>
- ⁵ Department of the Army. *Training for Urban Operations*. TC 90-1. Page 36. Washington, DC: Department of the Army, 2008. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc90_1.pdf.
- ⁶ Department of the Army. *Soldier’s Manual of Common Tasks: Warrior Skills Level 1*. STP 21-1-SMCT. Page 3-40. Washington, DC: Department of the Army, 2017. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN5881_STP%2021-1-SMCT%20FINAL%20WEB%201.pdf
- ⁷ Department of the Army. *The Warrior Ethos and Soldier Combat Skills*. TC 3-21.75. Page 131. Washington, DC: Department of the Army, 2013. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc3_21x75.pdf
- ⁸ Department of the Army. *Soldier’s Manual of Common Tasks: Warrior Skills Level 1*. STP 21-1-SMCT. Page 3-40. Washington, DC: Department of the Army, 2017. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN5881_STP%2021-1-SMCT%20FINAL%20WEB%201.pdf
- ⁹ Department of the Army. *The Warrior Ethos and Soldier Combat Skills*. TC 3-21.75. Page 131. Washington, DC: Department of the Army, 2013. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc3_21x75.pdf
- ¹⁰ Department of the Army. *Training for Urban Operations*. TC 90-1. Page 45. Washington, DC: Department of the Army, 2008. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc90_1.pdf.
- ¹¹ “Breaking Down the Door: WWII’s Battle of Aachen.” Warfare History Network. July 26, 2016. <https://warfarehistorynetwork.com/daily/wwii/breaking-down-the-door-wwiis-battle-of-aachen/>
- ¹² “Hunt for Isis fighters goes on despite declaration of victory in Mosul.” *The Guardian*. July 14, 2017. <https://www.theguardian.com/world/2017/jul/13/isis-hunt-despite-victory-in-mosul>
- ¹³ Weizman, Eyal. "Lethal Theory." Log, no. 7 (2006): 53-77. <http://www.jstor.org/stable/41765087>.
- ¹⁴ Smith, Allan. “Israel Uses This 5,000-Acre Fake City To Train For Urban Combat.” *Business Insider*. July 24, 2014. <https://www.businessinsider.com/israel-fake-city-urban-combat-2014-7>
- ¹⁵ Campbell-Dollaghan, Kelsey. “The Army Is Redesigning Its Smoke Grenade For the First Time Since WWII.” *Gizmodo*. May 23, 2014. <https://gizmodo.com/the-army-is-redesigning-its-smoke-grenade-for-the-first-1580590672>
- ¹⁶ Department of the Army. *Soldier’s Manual and Trainer’s Guide, MOS 11B, Infantry, Skill level 1*. STP 7-11B1-SM-TG, Page 3 - 250. Washington, DC: Department of the Army, 2004. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/stp7_11b1.pdf
- ¹⁷ Department of the Army. *Smoke Operations*. FM 3-50. Washington, DC: Department of the Army, 1996. <https://www.globalsecurity.org/military/library/policy/army/fm/3-50/Appc.htm#s6>
- ¹⁸ Department of the Army. *Soldier’s Manual and Trainer’s Guide, MOS 11B, Infantry, Skill level 2-4*. STP 7-11B24-SM-TG. Page 3-305. Washington, DC: Department of the Army, 2004. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/stp7_11b24.pdf
- ¹⁹ Department of the Army. *Soldier’s Manual and Trainer’s Guide, MOS 11B, Infantry, Skill level 1*. STP 7-11B1-SM-TG, Page 3 - 250. Washington, DC: Department of the Army, 2004.
- ²⁰ Michaels, Jim. “Army’s new weapon: ‘Enemy can’t see we’re targeting him until we pull the trigger.’” *USA Today*. May 9, 2018. <https://www.usatoday.com/story/news/world/2018/05/09/new-army-goggles-help-soldiers-see-through-smoke-fog/588488002/>

-
- ²¹ Department of the Army. *Soldier's Manual and Trainer's Guide, MOS 11B, Infantry, Skill level 1*. STP 7-11B1-SM-TG, Page 3 - 250. Washington, DC: Department of the Army, 2004.
https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/stp7_11b1.pdf
- ²² Department of the Army. *Infantry Platoon and Squad*. ATP 3-21.8. Page 2-100. Washington, DC: Department of the Army, 2016. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ATP%203-21x8%20FINAL%20WEB%20INCL%20C1.pdf
- ²³ Department of the Army. *Terms and Military Symbols*. ADP 1-02. Washington, DC: Department of the Army, 2018. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN11969_ADP%201-02%20FINAL%20WEB.pdf
- ²⁴ Washington, DC: Department of the Army, 2016.
- ²⁵ "War and international humanitarian law." *International Committee of the Red Cross*. October 29, 2010.
<https://www.icrc.org/eng/war-and-law/overview-war-and-law.htm>
- ²⁶ "4 Basic Principles." *The Law of Armed Conflict (LOAC) Blog*. <https://loacblog.com/loac-basics/4-basic-principles/>
- ²⁷ Washington, DC: Department of the Army, 2016.
- ²⁸ Robertson, William Glenn, ed. *Block by block: The Challenge of Urban Operations*. Fort Leavenworth, KS: Combat Studies Institute, US Army Command and General Staff College Press, 2003. Page 153.
<http://cgsc.contentdm.oclc.org/cdm/ref/collection/p16040coll3/id/88>
- ²⁹ Trevithick, Joseph. "Marines "Burned Out" Two Howitzer Barrels During the Raqqa Offensive." *The Drive*. November 3, 2017. <http://www.thedrive.com/the-war-zone/15733/marines-burned-out-two-howitzer-barrels-during-the-raqqa-offensive>
- ³⁰ "5 ways to better protect civilians in conflict zones." United Nations Office for the Coordination of Humanitarian Affairs. August 15, 2018. <http://www.unocha.org/story/5-ways-better-protect-civilians-conflict-zones>
- ³¹ Department of the Army. *Infantry Platoon and Squad*. ATP 3-21.8. Page J-17. Washington, DC: Department of the Army, 2016. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ATP%203-21x8%20FINAL%20WEB%20INCL%20C1.pdf
- ³² King, Anthony. *The Combat Soldier: Infantry Tactics and Cohesion in the Twentieth and Twenty-First Centuries*. Oxford Press. 2013. Pg 238.
- ³³ Spencer, John. "The Army Needs An Urban Warfare School and It Needs It Soon." *Modern War Institute*. April 5, 2017. <https://mwi.usma.edu/army-needs-urban-warfare-school-needs-soon/>
- ³⁴ Department of the Army. *What the Battle of Mosul Teaches the Force*. Mosul Study Group. No. 17-24. Washington, DC: Department of the Army, 2017. <https://www.armyupress.army.mil/Portals/7/Primer-on-Urban-Operation/Documents/Mosul-Public-Release1.pdf>
- ³⁵ Department of the Army. *Training for Urban Operations*. TC 90-1. Page 36. Washington, DC: Department of the Army, 2008. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc90_1.pdf
- ³⁶ Department of the Army. *Infantry Platoon and Squad*. ATP 3-21.8. Page H-26. Washington, DC: Department of the Army, 2016. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ATP%203-21x8%20FINAL%20WEB%20INCL%20C1.pdf
- ³⁷ Robertson, William Glenn, ed. *Block by block: The Challenge of Urban Operations*. Fort Leavenworth, KS: Combat Studies Institute, US Army Command and General Staff College Press, 2003. Page 146.
<http://cgsc.contentdm.oclc.org/cdm/ref/collection/p16040coll3/id/88>
- ³⁸ Corrigan, Jack. "DARPA Wants to Make Underground Maps on the Fly." *Defense One*. August 15, 2018
<https://www.defenseone.com/technology/2018/08/darpa-wants-make-underground-maps-fly/150554/?oref=DefenseOneTCO>
- ³⁹ Shah, Saqib. "X-ray vision will soon give soldiers the ability to see through walls." Fox News. June 18, 2018.
<http://www.foxnews.com/tech/2018/06/18/x-ray-vision-will-soon-give-soldiers-ability-to-see-through-walls.html>

-
- ⁴⁰ Hickman, Matthew D. "Soldiers see through walls." *ARNEWS*. January 13, 2010. https://www.army.mil/article/32868/soldiers_see_through_walls
- ⁴¹ Spencer, John. "How drone swarms could change urban warfare." *C4ISRNET*. December 11, 2017. <https://www.c4isrnet.com/opinion/the-compass/net-defense-blogs/2017/12/11/how-drone-swarms-could-change-urban-warfare-commentary/>
- ⁴² Department of the Army. *The Warrior Ethos and Soldier Combat Skills*. TC 3-21.75. Page 8-1. Washington, DC: Department of the Army, 2013. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc3_21x75.pdf
- ⁴³ "Introducing the DJI GH-1 Agras - Crop Spraying & Aerial Application Drone System." *Youtube*. <https://www.youtube.com/watch?v=92wFLgK3vel>
- ⁴⁴ "Graffiti Drone." *Youtube*. <https://www.youtube.com/watch?v=uMVUet91AcE>
- ⁴⁵ Brodwin, Erin. "China spent millions on a shady project to control the weather ahead of the Beijing Olympics — and dozens of other countries are doing it too." *Business Insider*. July 29, 2016. <https://www.businessinsider.com/china-sets-aside-millions-to-control-the-rain-2016-7>
- ⁴⁶ "Children of Aleppo." Public Broadcast Station. February 11, 2014. <https://www.pbs.org/video/frontline-children-of-aleppo/>
- ⁴⁷ Spencer, John. "Grenade Launchers and Bed Sheets: An Invisibility Kit for Urban Combat." *Modern War Institute*. December 14, 2016. <https://mwi.usma.edu/grenade-launchers-bed-sheets-invisibility-kit-urban-combat/>
- ⁴⁸ "'Cover-up' is over: Las Vegas Sands moving past 'million-dollar' tarp." *Las Vegas Review-Journal*. April 2, 2014. <https://www.reviewjournal.com/business/cover-up-is-over-las-vegas-sands-moving-past-million-dollar-tarp/>
- ⁴⁹ "UPDATE: Shot Detection for the Individual." *Military.com* December 10, 2009. <https://www.military.com/defensetech/2009/12/10/shot-detection-for-the-individual>
- ⁵⁰ "Boomerang III and Boomerang Warrior X." *Raytheon*. <https://www.raytheon.com/capabilities/products/boomerang>
- ⁵¹ Department of the Army. *The Warrior Ethos and Soldier Combat Skills*. TC 3-21.75. Page 8-1. Washington, DC: Department of the Army, 2013. https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/tc3_21x75.pdf