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Coordinating Draft

House Take Down Tactics, Techniques and Procedures (TTPs) INTERIM



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US Marine Corps

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Foreword

The observations, analyses, and assessments summarized in this interim publication are based on the candid comments and reports of the men and women who fought the battles, supported the forces, and led our Marines. The high level of professionalism and military aptitude demonstrated by individual and unit performances during Operation Iraqi Freedom/Operation Enduring Freedom were a hallmark of these conflicts. The Marine Corps has an enviable reputation for innovation and adaptation, and maintains the highest standards of excellence in the art of warfare. It is with a conscious intent to maintain this reputation that the Marine Corps Center for Lessons Learned (MCCLL) offers the observations and commentary within this report.

Comments and feedback are welcome and encouraged. It is recognized that what works in one area of operations (AO) may not be effective in another AO or conflict. Just as the enemy changes his tactics, techniques, and procedures (TTPs), we too must quickly change and adapt to the fight at hand. It is of the utmost importance that individuals and units continue to provide their lessons and observations so we can ensure the next unit to deploy has your documented hard earned experience prior to crossing the line of departure. Getting your observations and lessons into the Lesson Management System (LMS) early enough to impact pre-deployment training is crucial to increasing the effectiveness of follow on units and saving the lives of our Marines.

This is one of many documents and briefings covering a wide variety of topics that have been put together by the MCCLL. These collations of lessons and observations are neither sole source nor authoritative, but are intended as a means of informing the decision making process and effecting needed changes in our institution.

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE
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HOUSE TAKE DOWN TACTICS, TECHNIQUES AND PROCEDURES (TTPs)

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Executive Summary

Question—

The Commanding General, Marine Corp Combat Development Command presented the question: “When we know the enemy is occupying a house (and no innocents are thought to be there), should our TTPs be to level the house?”

Answer—

Based upon the lessons, observations, and interviews contained within the MCCLL LMS, this TTP was adopted by the operating forces upon a change in the rules of engagement (ROE) during Operation Al-Fajr. Furthermore, it is clear that upon adopting this TTP the rate and number of friendly killed in action and wounded in action were reduced. The consensus of the data contained within the LMS is this: *When insurgents are occupying a building in which noncombatants are not present, the building should be destroyed using the most appropriate method consistent with the ROE and the commander’s guidance regarding weapon selection.*

This interim publication is based upon vetted input from operating forces submitted to the MCCLL LMS and observations and information gathered by forward deployed collectors from the MCCLL. While the information contained within the LMS provides insight into the area of interest, it may not represent a comprehensive overview of the issues. In some cases, there may be perspectives not available within the MCCLL database. Circumstances and the operating environment that existed for any particular observation may not apply in other regions or even other locations within an AO. Sound military judgment has been

applied in vetting these lessons for inclusion in the LMS and in this interim publication.

A wide variety of TTPs were employed and many evolved over time. Generally TTPs progressed toward broader reduction of enemy strong points rather than clearing operations. Numerous factors influenced the TTPs discussed in the MCCLL database, including developing experience, conflicting resources, equipment shortfalls, and training limitations.

Breaching tools were issued to the infantry squad level, but supporting arms were not always immediately available at the squad level. Junior Marines have extensively practiced clearing buildings in training, but almost certainly had not practiced tank and close air support (CAS) coordination in an urban environment. Additionally the ROE impacted operations, and may have initially fostered a mindset to clear, rather than reduce enemy positions. Finally, incredibly challenging decisions required immediate action at junior leadership levels, often involving wounded Marines in buildings.

An overview on the development of improved TTPs is provided by the following observation:

“We continued to refine our TTPs as Operation Al-Fajr unfolded combining the effects of tanks, AAVs, engineers, and infantrymen on the urban battlefield. Most of us did not have integrated tank-engineer-infantry training in the CONUS, and CONUS-based urban training centers are unable to support tanks and engineer vehicles. When working in the most hostile parts of the city (southern Queens), very effective TTPs began to surface. Usually, when conducting detailed clearing, a tank section would lead down trafficable streets with infantry clearing adjacent buildings. As the infantry encountered enemy held strong points in these buildings, tanks were requested to neutralize the threat via tank

main gun, often times at distances 150 feet and closer (as close as 15 feet in many cases). The D-9 would then be called to finish off the enemy strong point by completely leveling the structure and ensuring the enemy threat was destroyed. The infantry company commanders quickly realized that this technique was much more preferred to sending in infantrymen in buildings that were strong pointed by an enemy determined to attrite as many friendly forces before dying in place. In enemy held ground such as Queens, this became the technique of choice.”

*After Action Report on Operation Al-Fajr,
C Company, 2d Tank Battalion*

CHAPTER 1

SMALL UNIT TACTICS

In order to provide background information on the nature of house clearing operations, the following methods and recommendations on house clearing techniques were drawn primarily from an after action report (AAR) produced by K Company, 3d Battalion, 5th Marines, who was heavily involved in Operation Al-Fajr.

Top Down Assault

An infantry squad can assault structures using two different methods, each with advantages and disadvantages. Doctrinally, the top down assault is taught as being the most ideal method for clearing a structure. Surprising the enemy by moving from the top down may throw the enemy off balance. The enemy's defenses may not be prepared for a top down assault and the squad could rapidly overwhelm the enemy. The squad has more momentum when moving down ladder wells. If the squad knows that the enemy is inside, the roof can be breached in order to drop grenades and explosives on top of the enemy. The enemy's egress routes are greatly reduced. The enemy's egress routes are greatly reduced but the house may not be entirely isolated. Indigenous residences were sometimes adjoining, like a townhouse, and asymmetrical in construction with rooftops of varying heights and molding. Alleys and walkways were often inaccessible from the main axis of approach, and certainly outside of the reach of tanks, tracks, or up-armored high mobility multipurpose wheeled vehicle (HMMWV) gun-trucks. The assaulting platoon

(if attacking with mechanized attachments) was required to simultaneously provide security for up to nine vehicles (tanks and tracks inclusive) and assault into innumerable, connected houses, most over three stories tall. Often the enemy's position was not known until entry was gained, so each house required time intensive positioning of forces in order to best and most safely bring supporting heavy fires to bear should the need arise. The pace of the assault demanded that houses be assaulted without optimal geometries of fire from the supporting elements established prior to entry. Many times this "shortcut" proved successful, but on occasion, friendly casualties or deaths would precede the platoon's ability to bring maximal destructive fires to bear. Tanks, tracks, and vehicle security caused significant manpower problems for the rifle platoon. All assets require grunt security, but a house cannot be cleared with machine gun and tank fires alone. Completely isolating a house in Fallujah is near impossible and, due to geometries, often prevents the use of heavy machine gun, tank, and rocket fires.

Realistically, however, assaulting from the top down may not be the best option for the infantry squad in every situation. When clearing from the top, once the squad makes entry and contact is made, pulling out of the structure is extremely difficult. This limits the options for the squad leader on how to engage the enemy. The structure must be flooded and Marines have to go overtop of casualties in order to kill the enemy. Additionally, top-down is unrealistic unless an adjacent house is first cleared from bottom-up, resulting in a force that can be stretched too thin simply providing security for itself.

If the squad decides to break contact they are moving opposite of their momentum and more casualties will result. Momentum must not be lost. Marines have been left behind in houses because the momentum was lost. Marine squads may not have

enough Marines to effectively flood the structure. If casualties are taken they are nearly impossible to pull up the ladder well with all their gear and a limp body. This is another reason why the structure must be flooded. The casualties will not receive immediate first aid because the entire squad must be committed to neutralization of the threat. The swiftness of medical attention may mean the difference between life and death.

Bottom Up Clearing

On the other hand “bottom up” clearing offers advantages. The squad leader has more options when contact is made. The structure does not have to be flooded. Momentum can be maintained in assaulting or breaking contact and the squad leader can switch rapidly from one to the other relatively quickly. The structure can be cleared with fewer Marines because the clearing is more controlled and smooth whereas top down is always in high gear. Casualties can be pulled out faster and easier simply because gravity is working for the squad. But the squad is moving into the enemy’s defenses. It is easy for the enemy to hold the second deck and ladder well. The squad is slow moving up the ladder well, which makes it harder to maintain momentum. The enemy has the ability to escape by using its preplanned routes.

Overall, there should not be a standard assault method; the squad leader should understand the advantages and disadvantages of each, assess each structure quickly, make a decision on which method to employ, and then take actions that maximize its advantages while minimizing its disadvantages. All unit leaders must understand geometries of fires, surface danger zones (SDZs) of all infantry and tank weapons, and have a thorough

understanding of realistic weapons capabilities and limitations—to include enemy weapons/weapons systems.

Footholds

Footholds are extremely important. By establishing footholds the squad establishes strong points during the assault that can be used for consolidation, coordination, base of fire positions, rally points, and casualty collection points. The squad must move from one foothold to another without stopping until each foothold is attained. The succession of footholds that the squad establishes will be different when assaulting from either the top down or the bottom up.

Top Down Assault

- All rooftops.
- Inside top deck.
- Each individual lower level to the bottom deck.
- Courtyard (including external outhouses, workshops, and tool sheds).

Bottom Up Assault

- Front courtyard.
- First two seating rooms.
- Central hallway.
- Each successive upper deck with its respective rooftop.
- Uppermost rooftop.

At each individual foothold, the squad can consolidate and coordinate its further clearing of the structure. If contact is made, the

footholds can be used to establish a base of fire in order to assault or break contact. When breaking contact, they are used as rally points in order for the squad and fire team leaders to get accountability of all their Marines. The squad will bound back through each foothold. A foothold can also be used as a casualty collection point.

Breaching Tools and Techniques

During the assault on Fallujah, the use of sledgehammers found in the assault breacher's kit and shot gun slugs played an important role in giving the assault elements the tools necessary to decrease collateral damage. Sledgehammers were also useful in the construction of firing ports inside houses when going firm or for sniper emplacement. Pre-deployment training, however, must include instruction on shotgun employment. A leader must not have to stop advancing during clearing of a house in order to give instruction on the proper procedures for safe and effective shotgun gunnery. Stun or flash-bang grenades were also particularly useful for extracting friendly casualties from enemy-dominated inside kill-zones. Flash-bangs would suppress the enemy without injuring friendly forces, but were in tragic short supply.

These options allowed the units to make dynamic entry without reverting to an explosive breach. The units that had stun grenades were able to use these in situations to diminish casualties to friendly personnel and noncombatants.

During the operation, it became readily apparent that the techniques used for breaching the outer perimeter gates of houses and opening the storage unit's metal roll doors kept the Marines exposed to possible enemy fire for an unacceptable time and was

also very time and energy consuming. Mechanical breaching has proved to be a slower method than training in the United States would indicate since most houses have metal gates and doors with very large padlocks. However, extreme caution must be taken when explosively breaching overhead, roll-down metal doors. There could be very large weapons cache stored in storefronts with roll-down doors to included pre-fabricated improvised explosive devices (IEDs) and piles of mortar rounds of all sizes. Many doors that were breached with MK19 or tank main gun rounds resulted in secondary explosions. The unit commander must determine whether the risk of secondary explosions from explosive breaching outweighs the time/labor involved in mechanical breaching.

The hooligan tools in the breaching kits have tips that are typically too wide for the door jams in Iraq. In a high threat situation, explosive breaches become the best course of action. However, few of our Marines are trained in how to set a breaching charge, even one as simple as the use of detonation cord around a doorknob. An assault breacher's course of the type that used to be conducted by the special operations training groups (SOTGs) should be mandatory training for all military occupation specialty (MOS) 0351s although it would not be practical to add this training to the curriculum at March Air Force Base. As a side note, the outside gates are almost always constructed of metal and have no outside latch or doorknob. The best means of breaching these is to ram them with a HMMWV. The amphibious assault vehicle (AAV), when available, breaks down perimeter walls with ease. Shotguns have proven to be an invaluable breaching tool for internal doors. However, the need to be flexible must be emphasized because tactics will be different for every building, whether it is a mosque, storefront, factory, or house.

Grenades

Additionally, a unit AAR cited the use of M67 fragmentation grenades during a fire fight in urban terrain to defeat the enemy. A depleted enemy squad was protected by a series of unfinished concrete cubicles that stopped 5.56-millimeter and 7.62-millimeter rounds. To destroy this enemy, one 2d Platoon squad had to close to within 10 meters and employ hand grenades. The first two grenades thrown were not held for 2 or 3 seconds and had no effects because enemy soldiers had sufficient time to take cover. The following three grenades were properly employed with devastating effects. Of a total seven enemy dead, only two were confirmed as shot by 5.56-millimeter rounds. The Platoon Commander noted that, while the Marines were almost completely unafraid of enemy fire, they were timid when it came to using grenades. Experience showed that significant improvements could be made in the ways in which we train Marines to use fragmentation grenades. The “prepare to throw” position is a peacetime safety measure that results in negative learning. The position was never used in any combat engagement. Additionally our Marines are trained to hold the grenade in such a manner that prevents the release of the spoon prior to throwing. This is another safety measure designed to ensure that the full 5 seconds are available in training to take cover from a mishandled grenade. One of the major lessons L Company learned during combat was to release the spoon and wait 2 to 3 seconds before throwing to deny the enemy sufficient time to take cover.

Demolitions

Clearing a large, multistory building requires demolitions or other nonmechanical means to open the hundreds of rooms. Additionally, the sheer magnitude of such a task requires well thought out standing operating procedures (SOPs) that maximize economy of force while maximizing combat power and flexibility at the point of attack. Breaking down dozens of doors per floor with hooligan tools, mule kicks, or other expedient means will rapidly exhaust a maneuver force. Engineers with “horse harness” used charges made solely of detonation cord, time fuse, and fuse igniters to safely and efficiently breach hundreds of doors during the assault. The use of demolitions preserved strength in what became an exhausting mission. The geometry of fires on each floor was complicated by the compartmentalization created by the configurations of office spaces unique to each floor. Stacking rifle squads in the hallways increased the risk of fratricide because unusually shaped office spaces and adjoining passageways required multidirectional clearing. The possibility of firing back towards elements positioned in a hallway and the thin construction material of the walls required a positioning that removed friendly forces from the potential line of fire.

When clearing a multistory building, task organize the assault platoons with engineers that prefabricate breaching charges prior to the assault. A good planning figure is 30 rooms per floor for a 200-meter by 200-meter square building. The judicious use of demolitions will save the Marines’ energy for the tiring process of room clearing. If contact is imminent, precede room entry with closed doors with a burst from the SAW or M16. The floors should be cleared with a reinforced rifle squad while the remainder of the platoon remains in an assault position in the stairwell

either above or below the floor being cleared. This will reduce the fratricide risk and isolate the floor. A safe assumption is that each building will have at least two stairwells. These must be secured as maneuver elements assault each floor. When clearing at the ground level, the exact number and location of stairwells should be determined. Note that other stairs may present themselves further into the building. Many multistory buildings will have extensive subterranean areas. Always have a plan to attack downward into the basement or utility floors.

While K Company, 3d Battalion, 5th Marines was fighting the battle and clearing their sector of the AO, the exposure to enemy fire while attempting to breach the outer perimeter of the houses in their sector proved to be too risky using their current methods. The outer metal doors surrounding many of the homes had flat locks and bolt cutters could not be used nor could detonation cords. A burst of 40-millimeter ammunition could be used but the decision not to waste the ammunition was made. Using the attached AAVs, tanks, or a HMMWV to push open the doors or knock a section of the wall down proved to be very quick and allowed for a larger number of Marines to storm the building. The breaching of the metal roll down storage units was challenging as well. Some of the locks were just too thick for the small bolt cutters to accommodate. A HMMWV with an attached chain was used to rip open the door and this again saved the unit time, ammunition and energy. This method also proved useful for evacuating injured Marines from rooms with barred/gated windows.

Training

There will be circumstances where detailed clearing of houses will be required. Training in these techniques must be continued and reinforced. However, deficiencies in current training for the conduct of breaching and other tactics in military operations in urban terrain (MOUT) were mentioned.

K Company, 3d Battalion, 5th Marines conducted extensive training at Stu Segall Studios, MOUT town (Range 131, Camp Pendleton), and March Air Reserve Base (Division Stability and Support Operations Exercise) prior to deploying. Many of the TTPs that were employed during operations were not learned and rehearsed prior to deployment due to range and training limitations. The limitations of size, building layout, building construction, and range regulations at Range 131 and March Air Reserve Base precluded training to the standards that were required for operations. The training areas were not large enough in size to facilitate a company's maneuver with tracked and wheeled assets. Range regulations largely prohibited the use of explosive breaching. Building construction and a lack of furnishings (including doors with locking mechanisms and windows) prevented the ability to realistically prepare for MOUT operations.

Specifically, units need to have the facilities support to conduct the following additional platoon-sized MOUT training:

- Wheeled and mechanized asset integration, requiring at least three streets amidst five building lanes. Walls and buildings need to be constructed for tanks, AAVs, and HMMWVs to be able to simulate making breaches. Streets should vary in width in order to provide better training for the wheeled/tracked vehicles to maneuver within tightly confined spaces. There is

a need to “dirty up” our MOUT facilities. Add furniture, curtains, vehicles, and trash. This lets individuals hide and cause significant problems searching and clearing rooms. Train to identify and forward items of intelligence value. Facilities need to have doors and windows with bars added and we should be able to do both mechanical and explosive breaching against real doors, both wood and reinforced metal doors with deadbolts. Put furniture in all facilities. Blockade entrances to houses with furniture, forcing the attacking unit to enter into the defender’s preplanned kill zone or be slowed by the blockade.

- Marines need to be trained to remove doorknobs, hinges, and locking mechanisms through explosive means (to include the shotgun). They also need to be trained to make mouse holes through walls inside and outside of structures. The Fort Knox MOUT facility provides an excellent facility for this training. Recommend using this facility as a model for range regulations and methods for cheaply being able to explosively breach mouse holes, walls, loopholes, doors, etc.
- Facility needs to include current open construction at Range 131 (buildings built with space between each structure), as well as tight construction where there is little to no gap between buildings. Building type and construction also needs to vary. Again, platoon-size is needed for both types of construction.
- Buildings need to be fully furnished. Recognize that the furniture will be destroyed. It should not be set up in a neat and orderly manner. We didn’t enter one house that was set up like that.
- A good representation of a day’s work for a platoon tasked to clear in zone is an area 150 meters by 400 meters with three streets and multiple alleys running in a variety of directions.

- An “Urban grenade employment course” should be added to MOUT training. The course could provide practical application instruction with blue bodies through windows and doors, rooftops, and inside houses.

CHAPTER 2

ORGANIC INFANTRY WEAPONS

81-millimeter and 60-millimeter mortars were fired against insurgent strong points. As the most responsive supporting arm, mortars were used freely generating a high demand for resupply. Unlike artillery that was fired in general support across the battlespace, mortar fire was confined to directly supporting a battalion sector. Because of this, demand for mortar rounds varied widely from sector to sector. Since there was no effective way to redistribute mortar rounds from a less engaged battalion to a more heavily engaged unit, additional rounds were pushed out. The result is a large turn-in by one unit and a perceived shortage by another. At one point the division was forced to order an emergency resupply of 81-millimeter mortar ammunition from the ammunition supply point at Camp Taqaddum. That may not have been necessary if redistribution could have been effected. Marines **need** more training firing mortars in the handheld mode. The enemy was far more advanced in their ability to quickly and accurately employ light mortars in urban terrain. M203s are outstanding weapons in the urban terrain, but the 40-millimeter range and effective casualty radius is minimal compared to the 60-millimeter mortar. Train Marines to think of the 60-millimeter mortar fired in the handheld mode like a large M203 and employ it as such.

The tube launched, optically tracked, wire guided (TOW) II was effective as a point destruction tool against enemy forces defending from buildings. On one occasion, two TOW missiles fired from street-level destroyed defenders on the 10th story of a 12-story office building.

Similar effects were achieved with the Javelin fired in the top-attack mode on rooftop fighting positions and “ladder-well pill-boxes” standard to most Iraqi houses. Also, the shoulder-launched multipurpose assault weapon (SMAW) HE and antiarmor rounds, .50 caliber and TOW rounds were effective in penetrating cement walls that 5.56 and 7.62 could not penetrate. SMAW novel explosive (NE) (thermobaric) rounds were in short supply. NE rounds were highly effective only when shot into enclosed spaces (such as a room) through a window. If the round impacted short or on an external surface and did not enter a closed space, then the effects were minimal to ineffective. The SMAW is an outstanding counterweapon to the rocket-propelled grenade (RPG); however the RPG can be fired from many more positions due to its significantly smaller back blast.

Satchel charges must be carried and quickly employed by rifle squads. Satchels proved very effective against enemy strong points in houses with locations that denied effective tank and rocket/missile fires. Many houses can be leveled with 20 to 30 pounds of C4 in a satchel charge. Marines also found that satchels can be made even more devastating when coupled with propane tanks that can be found in every Iraqi kitchen.

5.56 ball simply did not have the stopping power needed against a determined or drugged-up enemy. Recommend fielding fully automatic M4s with hollow-point rounds for operations in urban terrain. The M4 would be more manageable inside tight spaces. Fully automatic AK47s quickly gain fire superiority over single-shot M16s, and Marines are trained to never fire the M16 in the burst mode—a terrible training mistake. At times, the enemy could sustain up to five shots of 5.56 and continue to fight. Hollow point 5.56 may have a more catastrophic effect against the human body, with or without body armor.

CHAPTER 3

COMBAT SUPPORT

Engineers

D-9 bulldozers received highly favorable reviews. A D-9 cleared a row of buildings effectively within an extremely short period of time. The infantry company commander seemed to prefer this asset to others (D-7, armored combat earth mover) as it could reduce the largest structures and survive most small arms fire engagements. The D-9 proved to be an extremely capable asset in house clearing. It was instrumental to coining the tactical task of “Recon by Destruction” wherein the enemy’s location is identified by the destructive removal of his hidden strong points. Many enemy carcasses surrounded by weapons were found in rubble left behind by the D-9.

Communication with the D-7/D-9 was difficult and often required the rifle platoon to sacrifice one of its PRRs for responsive and timely communications. When engineers are attached to rifle platoons, key leaders need to ensure that the engineer is familiar with established platoon SOPs and his role when in contact. Grunts need to understand that the engineer is not a 0311 and cannot be assumed to have the requisite infantry skills.

Due to the unstable nature of the city terrain, especially in southern Queens, the D-9 often became stuck during building reduction operations and organic assets (another D-9, tank, AAV, AAV-R7, etc.) were not capable enough to recover the D-9. Eventually, the combat service support battalion (CSSB) dispatched its M-88 to support some D-9 recoveries although it did

not seem as skilled in recovery as a tank company M-88 (on 24 Nov 04, a tank company M-88 was dispatched to recover a downed tank and ended up recovering two D-9s that the CSSB M-88 was unable to recover).

Amphibious Assault Vehicles

The AAV up-gunned weapons system (UGWS) provided accurate, high-volume fire in support of building entry. Armor piercing .50 caliber files from the AAVs was invaluable when providing suppression through brick and concrete buildings. The AAV was successfully used to mechanically breach and push down structures such as reinforced doors, brick fences, walls, etc., thus creating entry points for the infantry. The front left and right corners of the AAV were used to make physical contact with building structures. It is not recommended that the rear of the vehicle be used since it may damage the ramp in the closed position or damage the prop buckets. On almost every occasion, the bow plane made contact with the structures during breaching attempts. The force caused cracking in the area of where the bow plane connects to the bow plane cylinder. If operating in a MOUT environment and away from waterborne operations for an extended period of time, it may be beneficial to remove the bow plane and cylinder to avoid damage. Tracks are an uncomfortable fit in tight urban spaces, and are extremely vulnerable and attractive to RPG attack. Downed power lines proved difficult in urban maneuvers close to residences with tracks.

Tanks

The M1A1 tank was used very effectively to create breaching points into buildings by physically pushing down infrastructure. Marine tankers would traverse the main gun to the side and utilize the tank hull to create breach points. Care must be taken to prevent gun tube damage and minimize rubble from covering the driver's vision blocks. Use of the rear of the tank to create breach points is not recommended as it causes damage to the grille doors and tank/infantry phone. Tanks in mechanical breaching must also exercise caution to ensure the front of the hull is used at a 90-degree angle or else risk damaging the fenders.

Tankers utilized the front slope and rear hull of the M1A1 tank to knock down buildings and walls. These techniques caused significant damage to the front headlights, fenders, rear grille doors, tank/infantry phone, and number 7 skirts. As a result, a Marine welder designed, welded, and mounted an M1A1 tank-breaching beam that mounts to the front of the tank. No modifications to the tank were required to mount this system. The breaching beam was tested on a building with outstanding results. No damage was sustained to the tank and it successfully destroyed the building. Additionally, the tank driver reported no obscuration of his view from the driver's hole. All material was taken from destroyed Iraqi infrastructure in Fallujah.

Mine plows were a nonfactor, as only one was available for the entire tank company [that entered this lesson] at the start of the offensive (two more arrived later but were designed for the M1A2). The tank that had the mine plow mounted ended up setting the plow down after the second day of operation as it severely restricted maneuver in an already restricted environment. The tank company commander stated that Pearson Blades

would have been useful, as tanks were asked to knock down walls many times, especially when the D-9 was down or not available.

Marine infantrymen working with tank sections utilized various methods to talk tankers onto enemy targets inside buildings. Infantrymen utilized organic weapons systems to shoot at positions they wanted destroyed with tank main gun. This required the tankers to observe the impacts, which at times were difficult when fully buttoned-up in the tank. The most common method was for tankers to engage a building with a coaxially mounted M240G and have the infantrymen call for adjustments from the impacts. Once targets were identified with the coaxially mounted M240G, they were engaged with tank main gun. An additional method utilized to some success was for the infantry to direct tankers onto targets based on the orientation of the gun tube in relation to the tank hull. Refinements were made utilizing the aforementioned technique.

Grunt phones were often times destroyed or inoperable, making communications with the tank Marines inside very difficult and centralized to the Platoon Commander only. After a Marine dangerously exposes himself to retrieve the grunt phone, it is disappointing to not be able to establish communications.

Marine tankers developed techniques to maximize the effects of the tank's organic weapons. When engaging fortified enemy positions less than 1 kilometer away, tankers would initially engage with tank main gun and then immediately suppress the target with machine guns. The machine gun suppression ensured that the enemy could not attempt to leave a building or an area once a main gun round was fired. If a main gun round was fired at the first floor the suppression was shifted to the second floor to engage insurgents.

In addition, infantry units utilized their attached tank assets to clear buildings of IEDs and snipers. M1A1 tank main gun rounds were effective at detonating buildings booby trapped and rigged with IEDs. The high explosive power and over pressurization created by tank main gun destroyed IEDs or caused secondary detonations.

During Operation Al-Fajr, enemy insurgents utilized mosques and minaret towers to engage assaulting US forces. The ability of Marine tank crews to acquire and accurately engage snipers holed-up in minarets and multi-level buildings neutralized this threat on numerous occasions. Frequently minarets required multiple tank main gun impacts to achieve desired results. The materials and masonry utilized in the construction of mosques and minarets was far superior to that of the civilian building infrastructure. As such, tank crews utilized as many as 10 or more tank main gun rounds to achieve desired effects on the mosques and minarets.

For 120-millimeter tank main gun ammunition, the overall assessment from the majority of the tank commanders was that the high explosive antitank (HEAT) round was the most potent and versatile round for the urban environment. High explosive obstacle reduction (HE-OR) by design is an obstacle-reducing round made specifically for the urban environment. However, in terms of breaching power, HEAT was by far the round of choice compared to the others. Because most of Fallujah is constructed from cement, the shaped charge of the HEAT round provided more explosive punch and overpressure than the steel-nosed HE-OR. HEAT also had better effects on reducing obstacles such as concrete barriers. In view of the minimum arming distance of the HEAT round and the nature of the close engagements (due to terrain, most tank engagements were closer than that minimum arming distance), the canister round would have been even more

useful in engaging enemy hunkered inside buildings. This round has over 1,000 tungsten steel balls and is designed to take out entire squads of enemy formations with one round. Compared to the other 120-millimeter rounds (multipurpose antitank [MPAT], high explosive obstacle reduction with tracer [HE-OR-T], and HEAT), this round is armed as soon as it leaves the gun tube. It is essentially a 120-millimeter shotgun shell

MPAT rounds provided effective results for breaching if it was employed utilizing certain techniques. Based on ammunition availability, tankers utilized the MPAT round during urban combat operations in Fallujah. Tank crews quickly identified that due to the smaller high velocity warhead of the MPAT, when compared to the HEAT, it was passing through multiple structures creating limited fragmentation effect and breach holes only 12 inches in diameter. Crews experimented with different techniques and found that when the MPAT was fired in ground mode at infrastructure less than the minimum required arming distance, it created larger breach holes capable of allowing infantrymen to enter. Additionally, when the MPAT was fired at a building in the air mode at less than the required arming distance, it achieved similar results.

C Company tanks fired close to 3,000 main gun rounds, over 150,000 7.62-millimeter, and over 77,000 .50 caliber rounds. Marine tankers discovered that the effects of 120-millimeter tank main gun ammunition were greater when it was shot at the sides of windows in buildings containing insurgents. The detonation of tank rounds on the “window frames” provided an additional brick and mortar fragmentation into the room increasing the effects of the round. Tank rounds that were fired directly through windows often passed through the rear walls limiting the effects of fragmentation. When shooting the corners of buildings in order to engage insurgents seeking cover in these vicinities, simi-

lar success at creating effects with secondary fragmentation was discovered.

Insurgents adjusted their tactics against Marine tank crews by taking positions in fortified buildings and infrastructure. Insurgents discovered that M1A1 tank ammunition easily penetrated buildings made of brick. Buildings constructed of concrete masonry, provided greater protection so insurgents quickly utilized this infrastructure to establish strong points. Insurgents adjusted tactics by engaging Marine tanks and then retreating into the inner rooms of buildings to avoid the effects of main gun over pressurization and fragmentation. Tank ammunition effects were minimized from the initial impact of the buildings outside wall. Tankers countered this tactic by shooting main gun directly into door openings and windows to maximize ammunition penetration into the inner rooms and causeways of infrastructure. Occasionally tank crews found it difficult to penetrate deep into some buildings without expending significant quantities of 120-millimeter tank main gun ammunition. Tankers discovered that creating fires inside hardened buildings by using coaxially mounted M240 and .50 caliber weapons systems smoked out the enemy or suffocated them in place. Shooting into mattresses, rugs, and furniture provided desired and effective results. The tank .50 caliber needs a thermal sight, this weapon is very accurate out to 1,800 meters but due to a lack of a night sight difficult to employ at night.

Marine tank commanders report the importance of utilizing open terrain in the MOUT environment because it allowed tank platoons and sections to maximize firepower on enemy strong points. During Operation Al-Fajr certain districts within the city had open terrain to support this TTP. This included parks, industrial areas, riverside property, and traffic circles. Marine tankers report that platoon and section volleys with tank main gun pro-

duces the most effective results on enemy positions and strong points in urban combat. Additionally, platoon and section volleys ensured that obscuration time did not affect other tank crews trying to engage targets since all tanks simultaneously fired. Massed fires provided highly successful killing effects due to increased explosive energy, over pressure, fragmentation, and shock power. Overall, grunts took great pride and security in having the tanks attached at the platoon level, though both units need more training together prior to actual combat.

Artillery

Many expressed surprise that artillery proved useful in an urban environment. Artillery was responsive, routinely answering adjust fire missions in less than 5 minutes. Danger close missions were conducted in an urban setting several times with no trepidation of the maneuver commander. On several occasions, a forward observer (FO) called for fire on a single building, quickly received those fires, and had effects on that building with minimal collateral damage. During a preparation in the attack on Salman Pak, the battalion fire support coordinator fired un-observed fires on enemy buildings, deriving the target information from maps and satellite imagery. Upon survey of the effects after the battle, the fire support coordinator noted damaged and destroyed buildings at the desired locations. The only collateral damage were shrapnel effects on buildings 370 meters away. Confidence in the artillery in support of infantry maneuver was bolstered significantly.

During Operation Al-Fajr, the companies needed the ability to engage specific buildings in close proximity to friendly positions. Air was the preferred method as they could use laser-

guided weapons, however, it could take up to 45 minutes to have air on station engaging targets. Because artillery was readily available, the company fire support teams began adapting their artillery calls for fire. Generally the FOs were able to get their adjusting rounds to hit the target building after two or three adjustments. They were finding that after one 155-millimeter round fuzed on delay hit the building, the enemy inside either withdrew or was incapacitated to the point that the company could then attack the building.

When engaged by riflemen in numerous buildings, the FOs found that they could get adjusting rounds on their target building and then using additional adjusting rounds, destroy specific buildings that they were taking fire from. The FOs would not begin another mission, but would walk their adjustments from building to building. At times the battery would interpret these as random corrections on the same mission. Once the fire support coordination center explained how the FOs were working, the battery began to dedicate one tube to that company and freeing the rest of the battery to fire other missions. If the FO called a “fire for effect,” they would still use just one tube to fire (generally four rounds) in order to minimize the error of the rounds. This allowed the FOs to engage point targets with artillery in close proximity to friendlies without the time associated with directing CAS on target.

Marine Corps Order 8010, *Class V(W) Planning Factors for Fleet Marine Corps Combat Operations*, does not address the expenditure of ammunition in urban operations. The division used the recent battle in Najaf as a starting point and estimated firing a maximum of 1,500 high explosive (HE) rounds. The actual expenditure was over 6,000 HE rounds. (*Note: Actions in Najaf covered a 27-day period, with most offensive operations over 21 days.*)

Close Air Support

Prior to the operation, a building numbering system was created, with a phase-line network, and target reference points (TRPs) throughout the city. All elements of 3d Battalion, 5th Marines and its attachments from other Services were given these references to use during the operation. All squadrons were given the references, and 10 digit grids for them. An aircraft could check in, and received a modified 9-line in which the target description was “Building 615E” and he already had a 10-digit grid and a map reference. Or, during the direction of aircraft, a forward air controller (FAC) could pass “Northwest of the intersection of phase lines Fran and Henry there is a three-story building. Call contact,” and hear the aircrew respond with “Contact” and 99 percent of the direction of aircraft was complete. This type of standardization was a critical factor in the success of an operation conducted in a complicated urban environment with a wide variety of friendly forces. However, large parts of the city of Fajlujah were not covered in as much detail (building numbers per block) as the parts of the city that were of interest in the initial phases of the invasion. This caused a decrease in battle efficiency several days into the attack as well as during follow on stability and support operations.

Effects of air were tremendous, often causing catastrophic destruction to target buildings, but occasionally CAS was slow. In an urban environment it could take 15 to 30 minutes to talk CAS onto the target, and then an additional 15 to 30 minutes to receive clearance due to geometry issues with adjacent units. Despite the time requirement, air is a tremendous asset and should be utilized at all opportunities. It may take an hour to get a bomb on target, but it would often reduce the target, whereas

an infantry assault would have taken several hours to accomplish the same goal and would have sustained casualties. It is often the better policy to pull back troops, isolate and drop air than to charge into enemy strong points.

During Operation Al-Fajr a need was identified for a helo precision-guided munition that could destroy a target in a building without destroying the entire structure. The AGM-114 Hellfire is the weapon of choice in this endeavor. There are currently three warhead options available to the Hellfire: shaped charge, blast fragment, and metal augmented charge. During Operation Al-Fajr, Hellfire were employed on many instances against specific portions of buildings (i.e., upper left window) to destroy a suspected enemy position in a particular room of a building. Rather than sending a GBU-12 or GBU-38 against the building, the ground combat element elected to utilize a lower collateral damage Hellfire missile with precise and destructive effects.

Targets that were engaged were either buildings themselves, or enemy hiding in buildings. Buildings were generally concrete/masonry with mild reinforcement and were extremely sturdy by Western standards. To completely destroy a normal-sized residential target building and everyone/everything inside it, at least a 500-pound bomb with a delay fuze was required. Anything smaller than that would only damage the structure, and while it might have effects on enemy hiding inside, it would by no means guarantee destruction. However, when GBU-12s and GBU-38s were used to engage such targets (even two and three story buildings), success rate for destroying the structures and everything inside was nearly 100 percent when they had accurate hits. Proper fuzing is critical. Instantaneously fuzed weapons on structures caused far less damage to the structure itself, and the explosion would also send much more shrapnel and debris flying much further out (increasing the potential for fratricide for close

strikes). Marines under cover (inside fortified concrete buildings) were safe during CAS strikes from 125 to 250 meters from the target—a technique, but not the preferred method. However, when the same type building was engaged with a 500-pound delay fuzed weapon, the bulk of the explosion was concentrated inside the building and the destructive force was maximized within the structure. Occasionally this effect occurred to such a degree that a FAC thought the weapons had actually failed (heard the bombs whistle in to the target and impact but no audible explosion was detected). After closer inspection, the FAC realized that the lack of the usual “explosion” sound and flying debris was due to the fact that the bomb focused all its destructive power within the structure itself, and the effects were amazing. If a GBU-12 hit its precise target, collateral damage to surrounding houses was minimal. Some missions required larger bombs (i.e. 2,000 pounds), but the ordnance was not available or not approved for the drop. It would also be advantageous if the Marine Corps had its own AC-130 gun ships.

GLOSSARY

AAR	after action report
AAV	amphibious assault vehicle
AO	area of operations
CAS	close air support
CONUS	continental United States
CSSB	combat service support battalion
FAC	forward air controller
FO	forward observer
HE	high explosive
HEAT	high explosive antitank
HE-OR	high explosive obstacle reduction
HE-OR-T	high explosive obstacle reduction with tracer
HMMWV	high mobility multipurpose wheeled vehicle
IED	improvised explosive device
LMS	Lesson Management System
MCCLL	Marine Corps Center for Lessons Learned
MOS	military occupational specialty
MOUT	military operations in urban terrain
MPAT	multipurpose antitank
NE	novel explosive
ROE	rules of engagement
RPG	rocket-propelled grenade
SDZ	surface danger zone
SOP	standing operating procedure
SOTG	special operations training group
SMAW	shoulder-launched multipurpose assault weapon
TOW	tube launched, optically tracked, wire guided
TRP	target reference point
TTP	tactics, techniques, and procedures
UGWS	up-gunned weapons system