

CHAPTER 10

FIRES

Coordinating lethal and nonlethal effects are an extremely important function for fire support officers (FSOs) at all levels. This chapter provides planning considerations and practical TTP for FSOs at the brigade, battalion, and company levels.

10-1. BRIGADE FIRE SUPPORT FOR URBAN OPERATIONS

Fire support (FS) is the use of fires delivered from various means (armed aircraft, land-based or sea-based indirect fire systems, and electronic warfare systems) against ground targets to support land combat operations at both the operational and tactical levels. The direct support (DS) field artillery (FA) battalion commander is the fire support coordinator (FSCoord) for the supported brigade. As such, he is specifically responsible for fire support planning and coordination.

a. The fire support system is made up of five distinct components that function together to give the brigade commander the fire support he needs to accomplish the mission. The components of the fire support system are:

- Command, control, communications, computers and intelligence systems.
- Target acquisition systems.
- Both lethal and non-lethal FS means to support the concept of operations.
- Combat service support.
- Trained personnel in the above areas.

The key to effective FS is the brigade commander's ability to bring the five components of the system to bear throughout his battle space to strike the enemy in an integrated and coordinated manner that is synchronized with the concept of operations. This is the current doctrine of fire support. (Refer to Chapter 2 of FM 6-20-40.)

b. In UO, however, effects must be used as the standard to ensure the five components of fire support adequately supports each phase or mission and defeats the challenges and restrictions presented by urban missions. Effects are determined by munitions, and munitions are limited by delivery platforms. As munitions advance, smart and brilliant munitions with increased range and lethality provide precision and terminal effects on the target. UO argues for allocation of delivered effects rather than allocation of delivery platforms. The selection of a delivery system should reflect, based solely the nature and priority of the target, the effects to be achieved and the rapidity with which they must be produced.

10-2. COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS AND INTELLIGENCE (C4I)

The first component of the fire support system deals with effects. The mix of platforms and munitions brings a wide range of desired effects to the fight. The critical function of automation in the effects management process simplifies and accelerates the management decision. The real time status visibility over all relevant lethal and nonlethal delivery capabilities, together with automated target filtration, target/effects matching, and information presentation mechanisms permitting rapid tactical comparison of available effects against competing requirements, falls on the FSO. The implication for the FSO is

that he must provide the commander robust support from available fires platforms, which are not necessarily *tucked in their back pocket*, but are positioned to best deliver the required effects. Fires platforms can be positioned to optimize the ability of the total system to apply quick and decisive overmatching effects, when and where needed. One of the key organizational enablers that allows the fires community to migrate towards an “effects-based” fires construct is the effects coordination cell (ECC). The ECC is tailored to the mission and controls sensors and delivery systems organic to the force, and coordinates the joint and combined systems resourced to the force.

10-3. MISSION SUPPORT OF OFFENSIVE AND DEFENSIVE OPERATIONS

Fire support planning considerations for offensive and defensive UO are discussed in this paragraph.

a. **Offensive Considerations.** The mission flow for a brigade combat team (BCT) conducting offensive military operations in UO generally includes moving some distance from a line of departure to an urban area. This mission includes:

- Breaching obstacles to enter the urban area.
- Gaining a foothold.
- Defeating enemy forces and seizing a designated area.
- Conducting a follow-on mission.

For the FSO this means integrating fires into a scheme of maneuver involving a battalion task force or larger BCT. This integration includes:

- Supporting movement to contact or air assault (or combination of the two).
- Supporting breaching operations.
- Supporting a deliberate attack to seize objectives in a city or town.
- Providing fires for a follow-on mission.

For the fire support system, the fight begins with fires setting the conditions for interdiction fires 24 hours prior to disrupting enemy forces preparing their defense. This fight continues when units cross the line of departure (LD) rather than at the breach site or in the city or town. Fire support planning for missions involving a deliberate attack on urban terrain objectives must include synchronization of fires during the fight from the LD to the breach site.

b. **Offensive Support.** In the offense, fire support plans should include fires to isolate the objective area, support the assault, and support the clearing action. Fires are delivered to isolate and fix the enemy and deny him the use of avenues of approach into and out of the urban area. Fires are employed to rupture the enemy’s established defenses and screen friendly maneuver, in order to maintain the momentum of the attack. Fire support is also allocated to units involved in clearing operations. Fire support plans should incorporate the employment of aerial observers and unmanned aerial vehicles (UAVs) to compensate for restrictions to observation and to assist in the delivery of deep fires. Procedures for designating the forward line of own troops (FLOT), marking targets, shifting fires, and communicating in the urban environment should also be considered.

c. **Defensive Considerations.** The mission flow for a BCT conducting defensive UO generally includes fires to disrupt and slow the enemy attack. This mission includes:

- Delaying and disrupt armor and mechanized infantry columns.
- Canalization of armor and mechanized infantry.

- Destruction of infrastructure, communications, power, transportation, water, sewer, and so on.

For the FSO this means integrating fires into a defensive plan. The objective of the defense could be to delay and give the force time to execute a rearward movement, or it could be to save the infrastructure of the built up area for future operations. In either case the integration considerations include:

- Fires delivered at maximum ranges along avenues of approach.
- Fires to separate armor and infantry forces.
- Fires to canalize the enemy into killing zones.
- Fires to deny the enemy use of key facilities in the city, such as communications and transportation facilities, or other infrastructure of an urban area.

For the fire support system, the fight relies on external or available assets more than internal and organic assets, though not to their exclusion. Depending on the situation and availability, use of Naval and Air Force assets will provide extended ranges necessary, and prevent any unintended or undesired effects on infrastructure from overpressures or maneuvering artillery in the urban area. Additionally use of available assets does not reveal capabilities the commander has organically, adding surprise and depth to the urban fight from the viewpoint of the aggressor.

d. **Defensive Support.** In the defense, fire support plans address fires to disrupt and slow the enemy attack. Fires are delivered at maximum ranges along avenues of approach to separate armor and infantry forces, to canalize the enemy into killing zones, and to deny the enemy use of key facilities in the city, such as communications and transportation facilities. Defensive fires planned at lower echelons support fighting within the urban area. Defensive fire support plans identify fire support coordination procedures necessary to execute the delivery of fire support.

e. **Assets and Urban Fire Support.** Battle calculus must determine effects (Figure 10-1, page 10-4), which in turn determine systems, ammunition requirements, and coordination measures for fires to support missions like suppress, obscure, secure, reduce obstacles, deny, delay and damage. During urban combat, fire support planning must address unique challenges created by urban operations. They include effects affected by:

- Buildings and structures of varying heights.
- Rules of engagement (ROE) restricting use of indirect fires.
- Noncombatants.
- Observer inability to locate and observe enemy targets.
- Future actions or need to preserve infrastructure.

Step 1	Translate commander's guidance into quantifiable effects required to achieve target defeat criteria. The FSO should consult with the S2 for assistance in translating the commander's guidance into a quantifiable number of enemy soldiers and equipment that should be in the target area.
Step 2	Equate the required effects to the required ammunition. Determine from a munitions effects database the number of rounds required to accomplish the essential FS task (suppress, neutralize, or destroy).
Step 3	Determine the available time to conduct attack. Based on the rate of fire of the selected system(s), determine how long it will require to execute the attack.
Step 4	Determine if required ammunition can be delivered in time available.
Step 5	Determine max volleys that can be fired at one target location. Based on the facts and assumptions determined in Step 1, determine the time required for a moving target to pass through a specific point. Determine the number of volleys that can be delivered in that timeframe.
Step 6	Determine the number of attacks needed to deliver required ammunition.
Step 7	Determine if time and space are available to execute attacks.

Figure 10-1. Battle effects calculus.

f. **Planning.** Fire support should be planned through the depth and breadth of the zone of attack for each branch and sequel. For fire support planners (primarily the fire support coordinator [FSCOORD]), brigade and battalion FSOs can provide valuable assistance during the planning process. Additional coordination with the FA battalion S3 and or XO, aviation, ALO, and joint may be required depending on circumstances.

(1) Planning and coordinating fire support for a complex scheme of maneuver must be completed before units cross the line of departure (LD) to conduct air assaults or a movement to contact or approach march en route to the final objective. Planned and synchronized fire support during the movement to contact/approach march toward a town are as important as the fires provided during the attack into the town because they enable the commander to arrive at the objective with maximum maneuver combat power.

(2) During the fight in the city, positioning of FA units, counterfire radar, and observers becomes critical. Ammunition resupply for special munitions (Copperhead) and sustained fires could possibly exceed the FA unit transportation capacity. Planning should also include actions necessary to rapidly transition to the follow-on phase or mission.

(3) The checklists in Figures 10-2 through 10-5, on pages 10-6 through 10-15, provide urban planning considerations broken down by echelon—brigade, battalion, company, and FA battalion S3. Within each echelon, the calculus considerations follow an offensive sequence but could be tailored for defensive sequences.

g. **Effects—Ammunition Considerations.** Planners must understand ammunition effects to achieve desired results and avoid undesired results. Special consideration must be given to shell and fuze combinations when effects of munitions are limited by buildings or ROE. Special considerations must be given to the delivery platform because of angle of fall, canalization of rounds, and blockage of one target by another building. Illuminating or obscuring an enemy position degrades the ability to see him more than his ability to employ his weapons. Other ammunition considerations are:

(1) Mortar smoke is white phosphorous (WP) incendiary.

(2) Variable time (VT) fuzes help clean off building tops, but varying heights of surrounding buildings may cause premature detonation. Observer-adjusted time fuzes may be better against targets among buildings of varying heights.

(3) The MK 399 Mod 1 PD/delay fuze for UO is available for all artillery units. It provides improved penetration through wood frame, reinforced concrete, and multilayered brick structures for high-explosive artillery projectiles. In the UO battle, one role of the artillery is to supply indirect fire, which will typically be at high angles. The objective using the MK 399 Mod 1 fuze would be to penetrate a building or structure and achieve blast effects inside of the target using its delay mode, or to rubble the structure using the PD mode. If a projectile fired with an MK 399 Mod 1 fuze impacts a substantial object (either intentionally or unintentionally), a high-order explosive function may result even when the object is located inside the 400-caliber minimum arming distance from the weapon (138 feet for 105-mm and 203 feet for 155-mm weapon systems). FM 6-50, Chapter 6 clearly outlines a very deliberate and necessary process required to determine the minimum quadrant elevation to safely fire the howitzers. Field artillery units must follow those procedures to ensure targets are not engaged (either in the indirect or direct fire mode) before the round has reached the 400-caliber minimum arming distance from the weapon. Point detonating (PD) fuzes on delay only allow penetration of the first wall or roof.

(4) Calculated minimum safe distances (MSDs) are no longer accurate. Buildings provide cover that reduces MSDs to a few meters. Inaccurate or stray fires can be attributed to projectiles careening or skipping off tall buildings, towers, cables, and so forth.

(5) In the offense, illuminating rounds are planned to burst above the objective to put enemy troops in the light. However expended canisters may fall and cause injuries or hazards undesired and unintended. If the illumination occurs behind the objective, the enemy troops would be in the concealment of shadows rather than in the light. In the defense, illumination is planned to burst behind friendly troops to put them in the shadows and place the enemy troops in the light. Buildings reduce the effectiveness of the illumination by creating uncontrolled shadows and inject the undesirable hazard of fire, which must be put out or left to burn uncontrolled. Use of illumination and obscuring fires on UO objectives favor the defender. Also, the effects of using WP or Illumination may create unwanted smoke screens or limited visibility conditions that could interfere with the tactical plan. WP may also have significant choking effects on personnel, and may cause urban fires.

(6) During suppression, obscuration, securing, and reduction (SOSR) or preparation fires, accurately adjusted, concentrated artillery fire (HE fuze with quick and delay) at breach sites is effective in obstacle reduction. These fires significantly weaken wire obstacles with mines and booby traps. They will not significantly affect metal tetrahedrons or concrete dragon's teeth.

(7) Careful use of VT is required to avoid premature arming. VT, TI, and ICM are effective for clearing enemy positions, observers, and antennas off rooftops. Fuze delay should be used to penetrate fortifications. Indirect fires may create unwanted rubble. The close proximity of enemy and unfriendly troops requires careful coordination. SCATMINE may be used to impede enemy movements. SCATMINE effectiveness is

reduced when delivered on a hard surface. When using HE ammunition in urban fighting, only point detonating fuzes should be used. The use of proximity fuzes should be carefully considered, because the nature of urban areas may cause proximity fuzes to function prematurely. Proximity fuzes, however, are useful in attacking targets such as OPs on tops of buildings.

MISSION ANALYSIS/BATTLE CALCULUS

- _____ What is the mission flow for maneuver units' movement to contact, air assault, breaching operations, deliberate attack into city for each COA?
- _____ What is the FA organization for combat?
- _____ What other assets are available (mortars, attack aviation, CAS, NGF, AC-130)?
- _____ Prepare asset matrix listing all artillery and other assets, ranges of each, ammunition available, time available, controlling HQ.
- _____ Essential fire support tasks (EFSTs) by mission for each COA? Refine "method" of EFSTs--highlight special ammunition requirements: SCATMINE, dimensions/duration of smoke, preps, destruction/reduction fires.
- _____ HPTs? According to S2 collection plan, what will find each HPT?
- _____ Calculus--are more assets needed to accomplish all EFSTs and attack each HPTs? (By mission for each COA)
- _____ By mission for each COA, draft fire support plan = fires paragraph ____, FSEM ____, target list scheme of fires and priority of fires worksheet ____.
- _____ Does the S2 R&S plan cover each HPT by mission for each COA?
- _____ Plan critical friendly zones (CFZs).
- _____ Brief draft fire support plan for each COA during war-gaming and COA selection.
- _____ Upon COA selection, send fire support WARNO (fires paragraph, FSEM, target list, TSM) to subordinate FSOs and DS battalion S3.
- _____ Finalize plan/clean up products/add to order.
- _____ Rehearse.

FIGHT FROM LD TO BREACH SITE

- _____ Disseminate the friendly scheme of maneuver and EFSTs for this phase to FS and FA leaders.
- _____ Identify all fire support assets available for this phase.
- _____ What are probable locations and azimuths of fire of enemy indirect fire systems?
- _____ Identify counterfire radar positions that give the best aspect to detect enemy indirect fire.
- _____ What FA unit has the counterfire mission?
- _____ Are maneuver forces tasked to locate and destroy enemy mortars?
- _____ By shell/fuze type, how much FA ammunition is needed to fire scheduled/preplanned fires? How much is available for emergency missions?
- _____ What is the communications link to each asset tasked to assess effects on each HPT attacked by FA or another fire support asset?
- _____ Will FA units displace during this phase? What is the trigger?
- _____ Positioning of DFSCoord/Bde FSE/ALO/COLTS during this phase.
- _____ Other information needed by the battalion FSOs and DS FA, S3 from the brigade FSE?

Figure 10-2. Example brigade fire support officer planning checklist.

BREACHING OPERATIONS

- _____ What are the indirect fire rules of engagement?
- _____ Disseminate the friendly scheme of maneuver and EFSTs for this phase to FS and FA leaders.
- _____ What fire support assets are available?
- _____ By shell/fuze type, how much FA ammunition is available for SOSR fires? How much is needed to fire all scheduled/preplanned fires?
- _____ Specify who is controlling SOSR fires. Specifically at the main breach point, have a primary and alternate observer.
- _____ Where are COLTs positioned? TACPs?
- _____ Is there a deception breach?

THE URBAN FIGHT

- _____ What are the indirect fire rules of engagement? What is on the restricted target list?
- _____ Disseminate the friendly scheme of maneuver and EFSTs for this phase to FS and FA leaders.
- _____ Determine FS assets available for this phase. Who controls each?
- _____ Specify who positions COLTs.
- _____ Where will FA units and counterfire radar be positioned?
- _____ Determine radar zones and cueing agents needed in the objective city.
- _____ Identify the locations of underground fuel and industrial storage tanks, gas distribution lines, storage tanks, and gas lines above ground (locations needed for friendly unit warning since below-MSD fires may produce secondary explosions).
- _____ Determine how the enemy is reinforcing buildings--sandbagging rooftops and upper floors, adding internal bracing/structural support, sandbagging walls.
- _____ Determine which maps will be distributed to FS and FA personnel. Map references must be the same as numbers assigned to specific buildings.
- _____ Determine how fire support personnel determine 8-digit grid coordinates with altitudes to targets in urban areas.
- _____ Identify the general construction or composition of buildings, road surfaces, and barrier obstacles that require breaching. Identify buildings that have basements.
- _____ Identify buildings or structures requiring large-caliber weapon/howitzer direct fire before assaulting.
- _____ Locate the dead space areas where tall building masking prevents indirect fire from engaging targets. Locate "urban canyon" areas where aircraft cannot engage targets between tall buildings.
- _____ Identify buildings that provide the best OPs for enemy and friendly observers. Identify buildings providing vantage points for employment of laser designators.
- _____ Locate possible firing points for 81-/82-/107-/120-mm mortars, for towed howitzers, for SP howitzers. Which positions permit 6400-mil firing?
- _____ Identify enemy mortar capability. Does enemy have a large number of 60-mm or smaller "knee" mortars?
- _____ Identify areas of the city that are likely to be affected by the incendiary effects of detonating artillery and mortar rounds.
- _____ Determine the best positions outside the objective city for employing G/VLLDs and other ground designators.
- _____ Identify targets and trigger points for blocking fires outside the city.
- _____ Have the effects of certain weapon systems and munitions available (Hellfire, Copperhead, Maverick, 155 DPICM, VT, CP, and so forth).
- _____ Integrate TF mortars into the scheme of fires.
- _____ Plan and refine CFZs.

Figure 10-2. Example brigade fire support officer planning checklist (continued).

THE FOLLOW-ON MISSION

_____ Disseminate the friendly scheme of maneuver and EFSTs for the follow-on mission (or sustained combat and occupation in the objective city) to FS and FA leaders.

_____ Identify fire support assets available for follow-on missions.

_____ Identify ammunition requirements for follow-on missions.

_____ Determine optimal FA and radar position areas to support follow-on missions.

Figure 10-2. Example brigade fire support officer planning checklist (continued).

MISSION ANALYSIS/BATTLE CALCULUS

_____ Review the brigade fire support WARNO.

_____ What is the mission flow for the battalion--movement to contact, air assault, breaching operations, deliberate attack into city?

_____ What fire support assets are available to support the battalion (FA, mortars, attack aviation, CAS, NGF, AC-130)?

_____ Prepare a fire support asset matrix (nondoctrinal) listing all artillery and other systems, ranges of each, ammunition available, time available, and controlling HQ.

_____ Identify essential fire support tasks (EFSTs) for battalion fire support personnel for each phase of the mission.

_____ What are the HPTs? What asset is tasked to find each of the HPTs? What asset is tasked to assess effects when an HPT is attacked?

_____ Determine how much ammunition by shell/fuze type is needed to accomplish all scheduled or preplanned fires. How much is available for emergency missions?

_____ Determine if enough fire support assets are available to attack all HPTs and provide on-call fire support during each phase of the mission. What additional assets are needed?

_____ Identify special ammunition requirements (SCATMINE, Copperhead, dimensions/duration of obscuration fires, DPICM, concrete piercing fuzes, preparations, reduction/destruction fires).

_____ Develop a communication plan to defeat range and compatibility problems between fire support personnel and FA units or other assets during each phase.

_____ Identify special equipment needs, especially for breaching operations and the fight in the city--COLT or other laser designator, climbing rope, wire gloves, axes or sledge hammers, kneepads, goggles.

_____ Determine what types of maps fire support personnel will use. (During the fight in the city, fire support personnel must be able to locate targets by 8-digit grid coordinates.)

_____ Develop observer plan for each phase--observer positioning and observer/target link-up--which should include primary, backup observer and trigger.

_____ Develop and disseminate products (fires paragraph, FSEM, target list, TSM) to subordinate FSOs, battalion mortars, DS FA battalion S3, and other supporting fire support elements.

_____ Conduct fire support rehearsal, and participate in FA technical rehearsal.

Figure 10-3. Example battalion fire support officer planning checklist.

FIGHT FROM LD TO BREACH SITE

- _____ Disseminate battalion scheme of maneuver and EFSTs to FS and FA leaders.
- _____ Identify all fire support assets available and method of control of each.
- _____ Does the battalion have priority of fires? Allocate priority targets and FPFs to companies.
- _____ Plan targets on known and suspected enemy positions and obstacles along the route (SEAD if conducting an air assault).
- _____ Ensure all reconnaissance elements are included in the fire support plan.
- _____ By shell/fuze type, how much FA ammunition is needed to fire scheduled/pre-planned fires? How much is available for emergency missions?
- _____ What is the communication link to each fire support asset supporting the battalion?
- _____ What is the communication link to each asset tasked to assess effects on each HPT attacked by FA or another fire support asset?
- _____ Will FA units displace during this phase? What is the trigger?
- _____ What is the battalion mortar employment plan?
- _____ Positioning of the battalion FSE/ALO.
- _____ Other information needed by the company FSOs, DS FA battalion S3, FSE, and brigade FSE.

THE BREACHING OPERATION

- _____ What are the indirect fire rules of engagement?
- _____ Disseminate the battalion scheme of maneuver and EFSTs for this phase to FS and FA leaders. Is the battalion mission inside (breach, clear, and secure in city) or outside (isolate) the objective city?
- _____ What fire support assets are available?
- _____ What type of breaching operation is being conducted? Time required?
- _____ Specify who is initiating and controlling SOSR fires.
- _____ By shell/fuze type, how much FA ammunition is available for SOSR fires? How much is needed to fire all scheduled/preplanned fires? What are the dimensions/duration of obscuration fires?
- _____ Develop the air/ground observer plan to adjust obscurants.
- _____ Positioning of the battalion FSE/ALO or TACP/COLT, if under battalion control.
- _____ What is the communication link between all FA units or fire support assets and the observers controlling the assets?
- _____ Is the control of any fire support asset being handed over from one observer to another? What is the trigger point to initiate the handover?

THE URBAN FIGHT

- _____ What are the indirect fire rules of engagement?
- _____ Disseminate the battalion scheme of maneuver and EFSTs for this phase to the FS and FA leaders.
- _____ Determine who controls each fire support asset.
- _____ Exchange fire plan and observer plan with adjacent battalions.
- _____ Determine exact locations for battalion mortars; submit to brigade FSE.
- _____ Develop observer plan; identify special requirements (laser designator positions, observer positions to overwatch trigger points, observer positions in tall buildings).
- _____ Disseminate maneuver graphics to FS and FA leaders to preclude fratricide.
- _____ Identify uses of obscurants in city.
- _____ Identify targets and trigger points for interdiction fires against counterattack force.

Figure 10-3. Example battalion fire support officer planning checklist (continued).

- _____ Identify the locations of underground fuel and industrial storage tanks, gas distribution lines, storage tanks, and gas lines above ground (locations needed for friendly unit warning because below-MSD fires may produce secondary explosions).
- _____ Determine how the enemy is reinforcing buildings--sandbagging rooftops and upper floors, adding internal bracing/structural support, sandbagging walls.
- _____ What maps are battalion fire support personnel using? How is the maneuver building numbering system going to be translated into 8-digit grid coordinates for building locations?
- _____ Identify the general construction or composition of buildings, road surfaces, and barrier obstacles that require breaching. Identify buildings that have basements.
- _____ Identify buildings or structures requiring large-caliber weapon/howitzer direct fire before assaulting. Will an escalating response matrix be used?
- _____ Locate dead space areas where tall building masking prevents indirect fire from engaging targets. Locate "urban canyon" areas where aircraft cannot engage targets between tall buildings.
- _____ Identify buildings providing the best OPs for friendly and enemy observers. Identify buildings providing vantage points for employment of laser designators.
- _____ Locate firing points for battalion mortars and supporting howitzers. Which positions provide 6400-mil firing capability?
- _____ Identify areas of the city most likely to be affected by the incendiary effects of detonating artillery and mortar rounds.
- _____ Identify routes/roads in the objective city that permit/do not permit artillery convoy (prime mover, howitzer, ammunition carrier) travel.
- _____ Identify buildings/structures capable of hiding artillery prime movers, howitzers, and ammunition carriers.
- _____ Do enemy forces in the city use or have access to laser designators, pointers, spotlights, or other light sources that may be used to incapacitate observation devices and NVGs?
- _____ Where are radio communications dead spaces? Is a communications visibility plot available?
- _____ Determine where use of obscurants will favor friendly forces, and where it will favor the enemy.
- _____ Determine where building masking, overhead power lines, structures or towers will degrade GPS accuracy.
- _____ Will electrical lines in the objective city be "hot?"
- _____ Will dense/congested structures containing metal and electrical lines affect compasses and gyro-based directional equipment?
- _____ Determine weather effects in and around the objective city--low industrial fog and smoke; updrafting winds caused by tall, congested buildings; temperature increase caused by buildings/pavement/industrial activity.
- _____ Will there be a need for artillery illumination?
- _____ Determine likely enemy azimuths of fire for indirect systems.
- _____ Will friendly local or US/allied personnel with in-depth knowledge of the objective city layout be available to accompany/assist fire support personnel?
- _____ If required, could observers conduct howitzer/mortar registration?
- _____ What is the sniper threat against fire support personnel, especially those occupying OPs in tall buildings? What is the mine/booby trap threat?
- _____ Will buildings or structures require fire support personnel to carry/use equipment not normally carried--field expedient antennas, climbing rope, wire gloves, axes or sledge hammers, kneepads, goggles, or B/LPS?
- _____ Will enemy forces attempt to limit friendly use of indirect fires by using civilians as "human shields?"

Figure 10-3. Example battalion fire support officer planning checklist (continued).

THE FOLLOW-ON MISSION

_____ Disseminate the battalion scheme of maneuver and EFSTs for the follow-on mission (or sustained combat and occupation in the objective city) to FS and FA leaders.

_____ Identify fire support assets available and ammunition requirements for follow-on missions.

Figure 10-3. Example battalion fire support officer planning checklist (continued).

MISSION ANALYSIS/BATTLE CALCULUS

_____ What is the mission flow for the company--movement to contact, air assault, breaching operations, deliberate attack into city?

_____ What fire support assets are available to support the company (FA, battalion and company mortars, attack aviation)?

_____ Prepare a fire support asset matrix listing all artillery and other systems available, ranges of each, ammunition available, time available, and controlling HQ.

_____ Refine essential fire support tasks (EFSTs) for company fire support personnel for each phase of the mission.

_____ Where are the HPTs in the company sector? What asset will find each HPT? What asset will assess effects when an HPT is attacked?

_____ Determine if enough fire support assets are available to attack all HPTs and provide on-call fire support during each phase of the mission. What additional assets are needed?

_____ Determine how much ammunition by shell/fuze type is needed to accomplish all scheduled or preplanned fires. How much is available for emergency missions?

_____ Identify special ammunition requirements (SCATMINE, Copperhead, dimensions/duration of obscuration fires, DPICM, concrete piercing fuzes, preps, reduction/destruction fires).

_____ Develop radio plan to talk to platoon FO parties, the battalion FSE, supporting FA units, mortars, and other assets. This plan must defeat range and compatibility problems. Is planning digital and execution voice?

_____ Identify special equipment needs for fire support personnel, especially for breaching operations and the fight in the city--COLT or other laser designator, climbing rope, wire gloves, axes or sledge hammers, goggles or B/LPS.

_____ Determine how observers will locate targets by 8-digit grid coordinates during the fight in the city.

_____ Develop observer plan for each phase--observer positioning and observer/target link-up.

_____ Participate in fire support and FA technical rehearsals.

Figure 10-4. Example company fire support officer planning checklist.

FIGHT FROM LD TO BREACH SITE

- _____ Disseminate company scheme of maneuver and EFSTs to FS and FA leaders.
- _____ Identify fire support assets available and method of control.
- _____ How many priority targets and FPFs does the company have?
- _____ Plan targets on known and suspected enemy positions and obstacles along the route.
- _____ By shell/fuze type, how much FA and mortar ammunition is needed to fire scheduled/preplanned fires? How much FA and mortar ammunition is available for emergency missions?
- _____ What is the communication link to each fire support asset supporting the company?
- _____ What is the communication link to each asset assessing effects on each HPT in the company sector?
- _____ What are the battalion and company mortar employment plans?
- _____ Positioning of the company FIST.
- _____ Other information needed by platoon FOs, company and battalion mortars, DS FA battalion S3, and FSE.

THE BREACHING OPERATION

- _____ What are the indirect fire rules of engagement?
- _____ Disseminate company scheme of maneuver and EFSTs for this phase to the FS and FA leaders.
- _____ What fire support assets are available?
- _____ What type of breaching operation is being conducted? Time required?
- _____ How are SOSR fires initiated and controlled?
- _____ By shell/fuze type, how much FA and mortar ammunition is needed for SOSR fires? For all scheduled/pre-planned fires? What are the dimensions/duration of obscuration fires?
- _____ What is the communication link between FA units and mortars and the observers controlling the assets?
- _____ Is the control of any fire support asset being handed over from one observer to another? What is the trigger point to initiate the handover?

THE URBAN FIGHT

- _____ What are the indirect fire rules of engagement?
- _____ Disseminate the company scheme of maneuver and offsets for this phase to the FS and FA leaders.
- _____ Determine who controls each fire support asset.
- _____ Exchange fire plan and observer plan with adjacent companies.
- _____ Determine how company mortars will be employed (direct lay or deliberate emplacement), firing points, and azimuths of fire. Pass to battalion FSE for consideration during development of the radar deployment order.
- _____ Develop observer plan--OPs in specific buildings, location of laser designators, overwatch of trigger points, and so forth.
- _____ Identify locations of hazardous sites--below and above-ground fuel and industrial storage tanks, gas distribution lines, and so forth., that may produce secondary explosions caused by detonating mortar or artillery rounds.
- _____ Identify which buildings or structures the enemy is fortifying--sandbagging the rooftop or upper floors, adding internal bracing/structural support, sandbagging walls.

Figure 10-4. Example company fire support officer planning checklist (continued).

- _____ Identify method fire support will use to identify targets using 8-digit grid coordinates (city map of maneuver building diagram versus military tactical map with UTM grid coordinates). 8-digit grid coordinate accuracy is needed for engaging targets in a city.
- _____ Identify the general construction or composition of buildings, road surfaces, and barrier obstacles that require breaching. Identify buildings with basements.
- _____ Identify buildings or structures requiring large-caliber weapon/howitzer direct fire before assaulting. Will an escalating response matrix be used?
- _____ Locate dead space and “urban canyon” areas where tall-building masking prevents indirect fire and aircraft from engaging targets.
- _____ Identify buildings providing the best OPs for friendly and enemy observers and employment of laser designators.
- _____ Locate firing point for company mortars and howitzers. Do they allow 6400-mil firing capability?
- _____ Identify areas of the city where incendiary effects of detonating artillery and mortar rounds will start fires.
- _____ Identify routes artillery convoy (prime mover, howitzer, and ammunition carrier) travel, and buildings capable of hiding this equipment.
- _____ Does the enemy possess laser designators, pointers, spotlights, or other light sources capable of incapacitating observation devices and NVGs?
- _____ Where are radio communication dead spaces?
- _____ Where does building masking, overhead power lines, structures, or towers degrade GPS, gyro-based directional devices, and compass functioning?
- _____ Will use of obscurants and artillery or mortar illumination favor friendly units or the enemy?
- _____ Will friendly local or US/allied personnel with in-depth knowledge of the objective city layout accompany or assist fire support personnel?
- _____ If required, could observers observe howitzer/mortar registrations?
- _____ What is the sniper threat against fire support personnel occupying OPs in tall buildings? What is the mine/booby trap threat?
- _____ Will buildings or structures require fire support personnel to carry/use equipment not normally carried-field expedient antennas, climbing rope, wire gloves, axes or sledge hammers, kneepads, goggles?
- _____ Will enemy forces attempt to limit friendly use of indirect fires by using civilians as “human shields?”

THE FOLLOW-ON MISSION

- _____ Disseminate company scheme of maneuver and EFSTs for the follow-on mission (or sustained combat and occupation in the objective city) to FS and FA leaders.
- _____ Identify fire support assets and ammunition available for follow-on missions.

Figure 10-4. Example company fire support officer planning checklist (continued).

MISSION ANALYSIS/BATTLE CALCULUS

- _____ Review the brigade fire support WARNO.
- _____ What is the mission flow for maneuver units--movement to contact, air assault, breaching operations, deliberate attack into city - for each COA?
- _____ What is FA organization for combat?
- _____ Essential field artillery tasks (EFATs) by phase for each COA.
- _____ Calculus--how much ammunition by shell/fuze type is needed for each EFST?
- _____ Determine special ammunition requirements--SCATMINE, Copperhead, DPICM, concrete piercing fuzes, smoke and WP, RAP, Charge 8, or Red Bag. Coordinate ammunition resupply as early as possible. Ammunition resupply is an EFAT!
- _____ What are the radar zone and cueing requirements by phase?
- _____ Determine artillery position areas required by phase. Will they be secure? Coordinate for position areas, movement times, and security support (if needed).
- _____ Determine radar position areas required by phase. Will they be secure? Coordinate for position areas, movement times, and security support (if needed).
- _____ Artillery and radar positioning should facilitate rapid transition from one phase to the next or to a follow-on mission. Targets for the next phase or mission should be within range of firing units according to ammunition available.
- _____ Develop communication, MET and survey plan. How will extended ranges and communications dead spaces in the objective city be defeated?
- _____ Develop and disseminate FASP.
- _____ Participate in fire support rehearsal (maneuver rehearsal if conducted), and conduct FA technical rehearsal.
- _____ Are missions planned and executed digitally, planned digitally, and executed by voice communications, or a mix?

FIGHT FROM LD TO BREACH SITE

- _____ EFATs for this phase.
- _____ Ensure firing units in position ready to fire in support of scheme of maneuver.
- _____ Rehearse all scheduled/preplanned fires. Ammunition for SOSR fires (suppression, reduction or obscuration fires during obstacle breaching) must be available and readied for sustained fires.
- _____ Ensure inactive firing units follow active missions, or are laid on priority targets that support the scheme of maneuver.
- _____ Determine triggers for ammunition resupply and repositioning of firing units during this phase.
- _____ Positioning of battalion TOC/TAC during this phase of the operation.
- _____ Identify communications links to all supported unit observers during this phase.
- _____ What unit is the counterfire HQ?
- _____ Determine radar zones and cueing schedule for this phase? Who are cueing agents? What are their triggers?
- _____ Determine other information required from DFSCOORD, brigade and battalion FSEs.

Figure 10-5. Example direct support field artillery battalion S3 planning checklist.

THE BREACHING OPERATION

- _____ EFATs for this phase.
- _____ Ensure firing units in position ready to fire in support of breach.
- _____ Ensure required ammunition for SOSR fires is ready to sustain scheduled suppression or smoke fires.
- _____ Are registrations required to assure accuracy of SOSR fires?
- _____ Determine if amount of ammunition is available for emergency fires.
- _____ Identify triggers for ammunition resupply or repositioning of firing units during this phase.
- _____ Is counterfire radar positioned at the optimum aspect angle to detect enemy indirect fire trajectories?
- _____ Determine and identify triggers for activation/deactivation of radar zones. Are radar zones activated to protect the breaching forces and prevent fratricide of friendly mortars?
- _____ Are observer/designators at proper observer target angle (Angle T) to designate for Copperhead?
- _____ Location of TOC/TAC during this phase.
- _____ Other information needed from the DFSCoord, brigade and battalion FSEs.

THE URBAN FIGHT

- _____ EFATs for this phase.
- _____ Is the brigade system to clear fires in place and functioning?
- _____ What are the communications links to supported unit observers?
- _____ Position areas must adequately cover the objective city and blocking targets outside the city to interdict reinforcement/escape.
- _____ Identify routes for artillery convoy travel in and around objective city.
- _____ Determine triggers for ammunition resupply and repositioning of firing units.
- _____ What unit has the counterfire mission?
- _____ Determine and identify triggers for activation/deactivation of radar zones.
- _____ Determine the sniper/mine/booby trap threats to firing units, if position in or very near the objective city. Are firing unit howitzer sections identified to fire "Killer Junior" or direct fire, self-defense missions?
- _____ Are all inactive firing units laid on priority targets to support the scheme of maneuver?
- _____ Are registrations required to ensure accurate fires into the objective city?
- _____ Does MET data collection account for atmospheric conditions in and around the city--updrafting winds around tall buildings, temperature increases caused by smog, buildings and pavement, industrial activity?
- _____ Is survey available to give accurate firing unit positions, and, when possible, accurate building/landmark locations in the objective city?
- _____ Location of battalion TOC/TAC during this phase.
- _____ Other information needed from the DFSCoord, brigade and battalion FSEs.

THE FOLLOW-ON MISSION

- _____ EFATs for the follow-on mission (or sustained combat and occupation in the objective).
- _____ Determine triggers for ammunition resupply and repositioning of firing units.
- _____ Determine trigger for repositioning of radar and for activation/deactivation of radar zones.
- _____ Location of battalion TOC.

Figure 10-5. Example direct support field artillery battalion S3 planning checklist (continued).

10-4. ACQUISITION PLATFORMS

If ground observation is limited, consider the use of aerial observers. FOs may be placed on upper floors of buildings to improve visibility. They are vulnerable if positioned on rooftops. Adjustment of fires is difficult. FOs should identify size and location of dead space (area in which indirect fires cannot fall). Dead space is generally five times the height of buildings for low-angle fire and one-half the height of buildings for high-angle fire. Radars may become more effective because of the increased use of high-angle fires. Radars lose effectiveness if sited too close behind tall buildings.

a. If Copperhead and other laser-guided munitions are used, OH-58Ds, AH-64s, and Combat Observation Lasing Teams (COLTs) need a series of well-defined numbered aerial attack-by-fire (ABF) positions or observation posts. These aerial attack positions must meet the angle-T requirements (800 mils for Copperhead, 1065 mils for Hellfire, and so on) for key buildings and terrain features (bridges, parks, military installations) throughout the city (Figure 10-6). Considerations for use of laser designators in urban terrain include the following:

- Tall structures may degrade the effectiveness of the designator.
- Maintaining a continuous laser track on moving targets is difficult.
- The presence of highly reflective surfaces such as windows may refract laser energy and or pose a hazard to friendly troops.
- The presence of highly absorptive surfaces such as open windows or tunnels may degrade designator effectiveness.
- Because of a fluid FLOT, designators may have to reposition more often.

b. Structures and urban infrastructure will reduce radio ranges. Use of wire, messenger, and visual signals should be increased. Antennas should be remoted on upper floors to increase their range. They are vulnerable if positioned on rooftops. Existing civilian telephone systems should be used for unsecured communication. Wire should be routed through sewers and buildings for protection. Generators should be placed near existing walls outside occupied buildings.

(1) Observers with maneuver elements will encounter ground obstacles—broken glass, rubble piles, burning buildings, smoke, downed electrical lines, mines, snipers, to name a few—that will impede movement. They cannot rapidly reposition and will have limited visibility. Observers maneuvering outside the city can help fill gaps.

(2) Observers will locate targets by the maneuver unit building numbering system for a particular city. Building numbers must be translated into grid coordinates for FA units and mortar fire direction centers (FDCs). City tourist maps, inaccurate 1:12.5K, and smaller scale maps may be used. This increases the difficulty of determining accurate target grid coordinates.

(3) Global positioning system (GPS) functioning is greatly degraded in cities with tall buildings (since these buildings mask satellite coverage).

(4) Observation Posts (OPs) should be positioned to observe these fires, and trigger points must be identified.

(5) Tactical air control party (TACP) and enlisted tactical air controller (ETAC) positions require visibility, not just on the target, but also of the surrounding terrain and sky to allow for terminal control of close air support (CAS)/ground attack aircraft.

(6) Air and naval gunfire liaison companies (ANGLICOs) have been inactivated. Elements designated to observe and adjust naval gunfire and control Navy and Marine CAS/ground attack aircraft have the same positioning requirements as TACPs and ETACs.

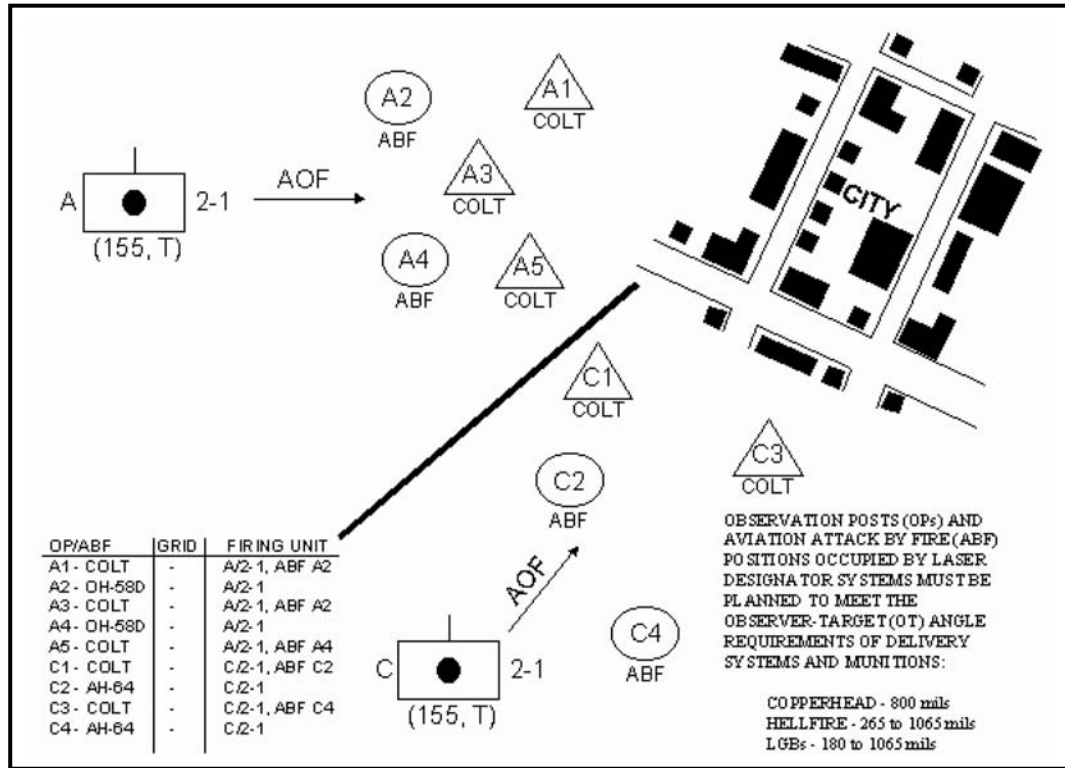


Figure 10-6. Observer positioning for laser-guided munitions.

10-5. METEOROLOGICAL AND SURVEY REQUIREMENTS

Accurate meteorological (MET) information and surveys are required, as most targets are point targets.

a. Conventional surveying is hampered by decreased line of sight. Map spotting is difficult in large cities. Establishment of multiple survey control points (SCPs) should be anticipated. Artillery may be used in the direct fire role for precision operations. Survey datum from geodetic markers around cities, especially in developing countries, is considered unreliable (different datum, different calculation techniques, geodetic markers that have been moved or tampered with). If SCPs cannot be extended from known, reliable surveys, use hasty techniques before using datum found around the cities.

b. MET conditions in cities are different than surrounding terrain (ambient heat radiated from buildings, industrial smog conditions common to cities in developing countries, and deviation in winds to extremely high altitudes caused by large urban areas). The precision for indirect fires during urban combat may increase the need or frequency of MET measurements.

10-6. DELIVERY ASSETS

Appendix A of FM 6-20-40 has extensive and current information on delivery systems and munitions available for them. The key piece of information that must be remembered when viewing this data from UO perspective is that the risk estimates were based on open field environment and must be adapted for the urban environment. As mentioned at the beginning of the chapter, effects will drive the fire support effort, which will be focused on munitions that provide the desired effect and then limited by the delivery systems available to deliver those munitions without incurring undesired effects.

10-7. TACTICAL AIR

A unit may be supported by USAF, USN, USMC, or allied fighters and attack aircraft while fighting in urban areas.

a. The employment of CAS depends on the following.

(1) ***Shock and Concussion.*** Heavy air bombardment provides tactical advantages to an attacker. The shock and concussion of the bombardment reduce the efficiency of defending troops and destroy defensive positions.

(2) ***Rubble and Debris.*** The rubble and debris resulting from air attacks may increase the defender's cover while creating major obstacles to the movement of attacking forces.

(3) ***Proximity of Friendly Troops.*** The proximity of opposing forces to friendly troops may require the use of precision-guided munitions and may require the temporary disengagement of friendly forces in contact. The AC-130 is the air weapons platform of choice for precision UO as the proximity of friendly troops precludes other tactical air use.

(4) ***Indigenous Civilians or Key Facilities.*** The use of air weapons maybe restricted by the presence of civilians or the requirement to preserve key facilities within a city.

(5) ***Limited Ground Observation.*** Limited ground observation may require the use of airborne FAC.

b. CAS maybe employed during offensive operations to support the isolation of the city by interdicting entry and exit routes. It can be used to support attacking units by reducing enemy strong points with precision guided munitions. Or it may conduct tactical air reconnaissance and to provide detailed intelligence of enemy dispositions, equipment, and strengths.

c. CAS maybe employed during defensive operations to strike enemy attack formations and concentrations outside the urban area. TACP concerns, such as identification of IPs, communications difficulties, and how to provide terminal control of aircraft when TACP cannot observe aircraft due to buildings, may require setting up numerous communication relays or retransmission sites (with assistance of signal officer) or splitting CP operations with the forward CP controlling one area of the fight, while the main CP controls the other area of the fight.

10-8. NONLETHAL MEANS

The divisional MI battalion directly supports the division commander and G2 by providing dedicated multidiscipline battlefield IEW support to the division and its subordinate maneuver brigades. At the brigade level the focus is on the intelligence products and services needed by commanders to plan, fight, and win battles at the tactical level. In addition to the GS intelligence support provided by the MI battalion, the brigade

will normally receive a DS MI company from the MI battalion. The DS MI company capabilities include:

- Automated multidiscipline intelligence and information processing.
- Analytical control team.
- UAV control.
- Interrogation of prisoners of war and limited document exploitation.
- CI support.
- C2 of organic and reinforcing IEW assets.
- JSTARS coverage and product dissemination.

IEW is integrated into unit operations regardless of the type of unit, level of war, or the scope of the mission. IEW complements other destructive systems in the context of overall strategy. When IEW is synchronized with lethal fires, the friendly commander gains agility by slowing the reaction time of his adversary.

10-9. ARTILLERY USED IN DIRECT FIRE

“Having discovered on the first day that some apartment buildings and air-raid shelters could withstand the fire of tanks and tank destroyers, Colonel Corley [Commander, 3rd Bn, 26th Inf Regt] called for a 155mm self-propelled rifle. Early the next morning the big weapon proved its worth in the first test when one shot leveled one of the sturdy buildings. Impressed, the regimental commander, Colonel Seitz, sent one of the big rifles to support his other battalion as well.”

Charles B. MacDonald
The Siegfried Line Campaign,
US Army in World War II

Division or joint task force commanders in coordination with their FSCOORD and the force artillery commander will determine the parameters under which field artillery assets may be used as direct fire platforms for support to ground maneuver units. Normally, field artillery will only be employed in direct fire under high-intensity conditions of urban combat where tanks, BFVs, and other direct fire systems may not be available or able to have an effect on the target. Subordinate maneuver commanders in coordination with their respective fire support officers (FSOs) will then direct the employment of individual howitzer sections to support the unit in contact. This paragraph will provide TTP for the use of howitzer sections in direct fire at the company level and below.

a. **General.** Large-caliber artillery rounds provided by direct fire are effective for destroying targets in buildings. If available, self-propelled 155-mm howitzers can use direct fire to destroy or neutralize bunkers, heavy fortifications, or enemy positions in reinforced concrete buildings (Figure 10-7, page 10-20). The self-propelled artillery can be used to clear or create avenues of approach. Towed artillery can be used in a direct fire role but is not the preferred artillery for UO, because it does not have ballistic crew protection. This should not preclude its use if the situation calls for it and the commander is willing to accept increased risk for crew casualties. When artillery is used in the direct fire role, infantry must be provided to the howitzer for security.



Figure 10-7. Artillery in direct-fire role.

b. **Commander's Intent.** The maneuver commander's intent must be clearly understood to ensure proper application of artillery support. The FSCOORD will use the commander's guidance to develop the ammunition requirements and restrictions; for example, "Killer Junior" for maximum fragmentation, PD fuzes set on delay or CP fuzes to penetrate structures, WP for incendiary effects, and so forth. Subordinate artillery commanders should identify their most proficient direct fire sections.

c. **Command and Control.** Artillery may be placed in tactical control (TACON) to maneuver commanders, for example a platoon of three guns may be TACON to a company, a battery TACON to a battalion. As systems, howitzers should be controlled through the FSO since he knows the capabilities and limitations of the system. The company team commander then has the option to control the system as a company support by fire asset or to place the system in support of the platoon leader requiring the direct fire support. For example, the company team commander may designate a platoon to isolate the objective through a support by fire mission. The howitzer system would receive its fire commands from the infantry platoon leader that is given this mission. Control of the howitzer system would not normally go below platoon level.

d. **Other Considerations.** Other considerations for using artillery in direct fire are:

(1) **Communications.** A dedicated FM radio frequency between the controlling maneuver headquarters speaking directly to the howitzer section will be necessary to control fires and prevent fratricide.

(2) **Protection.** Each howitzer must be protected by infantry; for example, a BFV and a squad of dismounted mechanized infantry, or a squad of light infantry with antiarmor weapons. The infantry must provide local security and prevent enemy ground assault, sniper fire, and antitank fire (such as RPG).

(3) **Positions.** The infantry will need to reconnoiter and occupy positions where the howitzer can provide fire support. These positions must be free from enemy direct fire but still allow direct fire by the howitzer on the target. Self-propelled artillery systems provide minimal ballistic protection from fragmentation for the crew. Although these systems seem formidable, they provide less crew protection than a BFV and contain large amounts of onboard ammunition and propellant. They are susceptible to catastrophic destruction by heavy automatic weapons, light cannon, and antitank fire. Towed artillery

systems provide no protection for crew members. The howitzer should provide the necessary support and then move to an alternate position to avoid being identified by the enemy. Overwatching infantry should always move ahead of and with the howitzer to prevent enemy ambushes.