

OBSTACLES, MINES, AND DEMOLITIONS

Obstacles and mines are used extensively in combat in built-up areas to allow the defender to canalize the enemy, impede his movement, and disrupt his attack.

Section I. OBSTACLES

Obstacles are designed to prevent movement by personnel, to separate infantry from tanks, and to slow or stop vehicles.

C-1. TYPES

Antipersonnel mines, barbed wire, booby traps, and exploding flame devices are used to construct antipersonnel obstacles (Figure C-1, page C-2). (See FM 5-25 for more detailed information.) These obstacles are used to block the following infantry approaches:

- Streets.
- Buildings.
- Roofs.
- Open spaces.
- Dead space.
- Underground systems.

a. The approval authority to booby trap buildings is the Corps commander; however, this authority may be delegated to brigade level. (See FM 20-32 for more information.)

b. The three types of obstacles used in defensive operations are protective, tactical, and supplementary.

(1) Protective obstacles are usually located beyond hand-grenade range (40 to 100 meters) from the defensive position.

(2) Tactical obstacles are positioned to increase the effectiveness of the friendly weapons fire. The tactical wire is usually positioned on the friendly side of the machine gun FPLs.

(3) Supporting obstacles are used to breakup the pattern of tactical wire to prevent the enemy from locating friendly weapons.

c. Dead space obstacles are designed and built to restrict infantry movement in areas that cannot be observed and are protected from direct fires.

d. Antiarmor obstacles are restricted to streets (Figure C-2, page C-4).

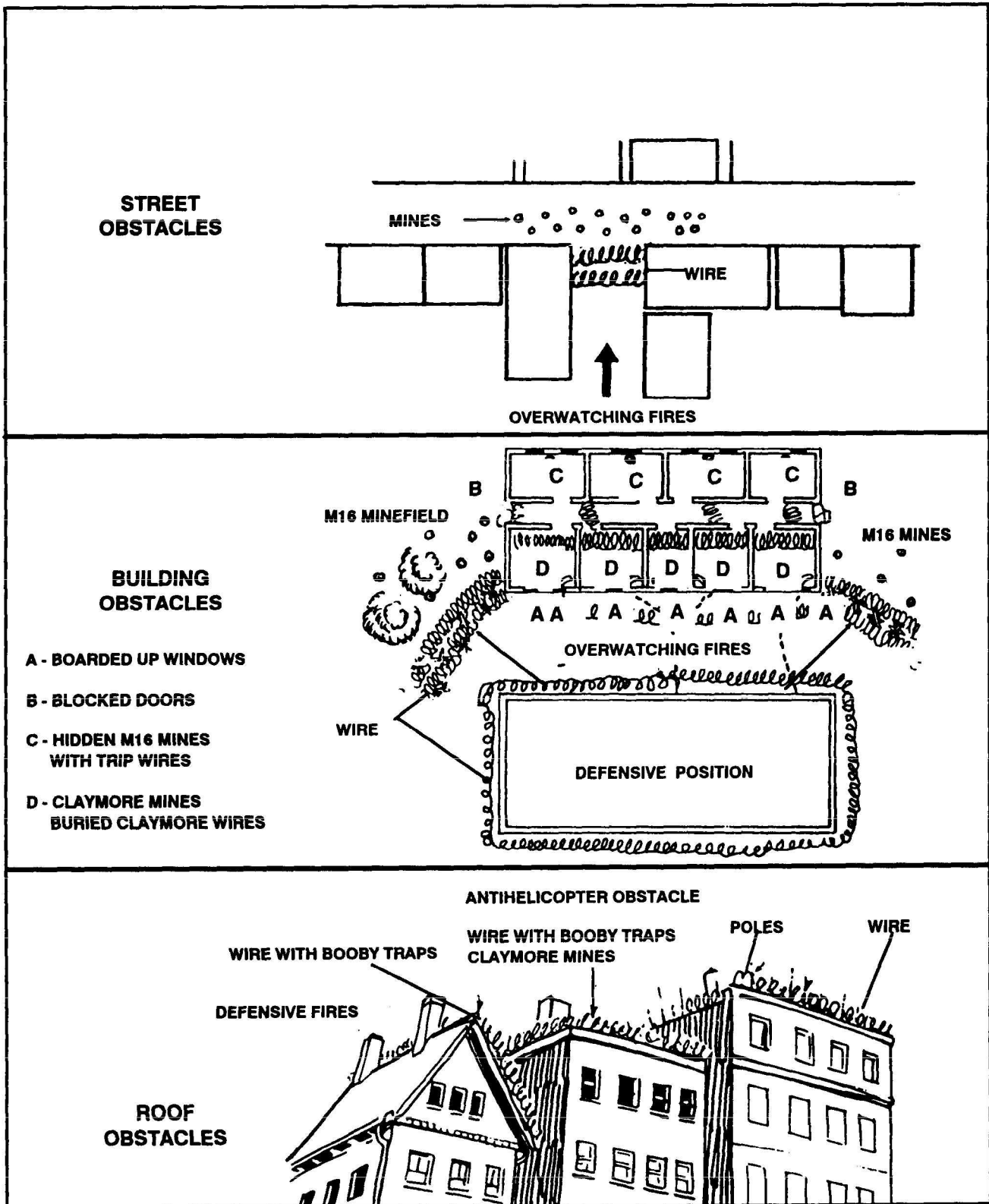


Figure C-1. Antipersonnel obstacles.

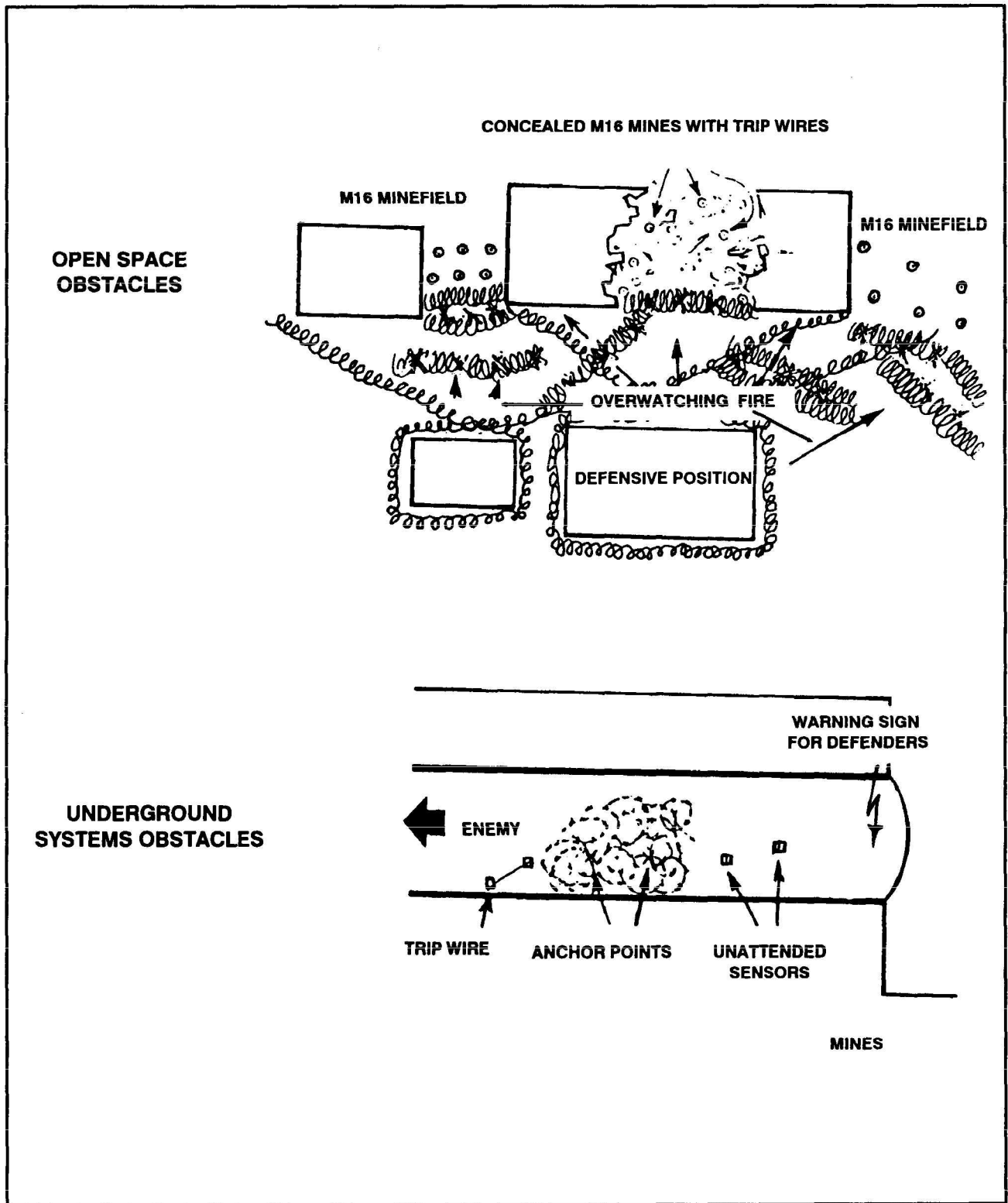


Figure C-1. Antipersonnel obstacles (continued).

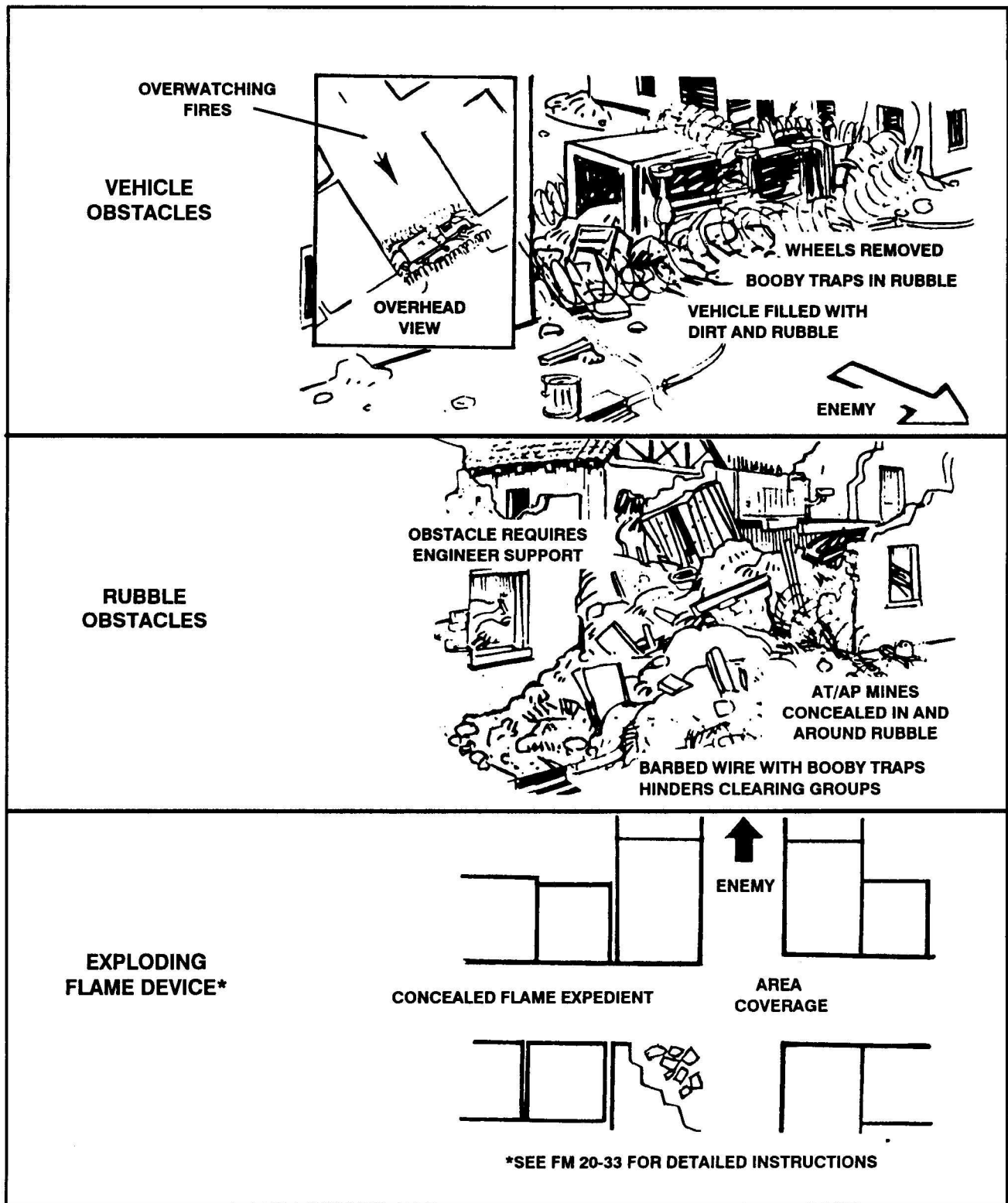


Figure C-2. Antiarmor obstacles.

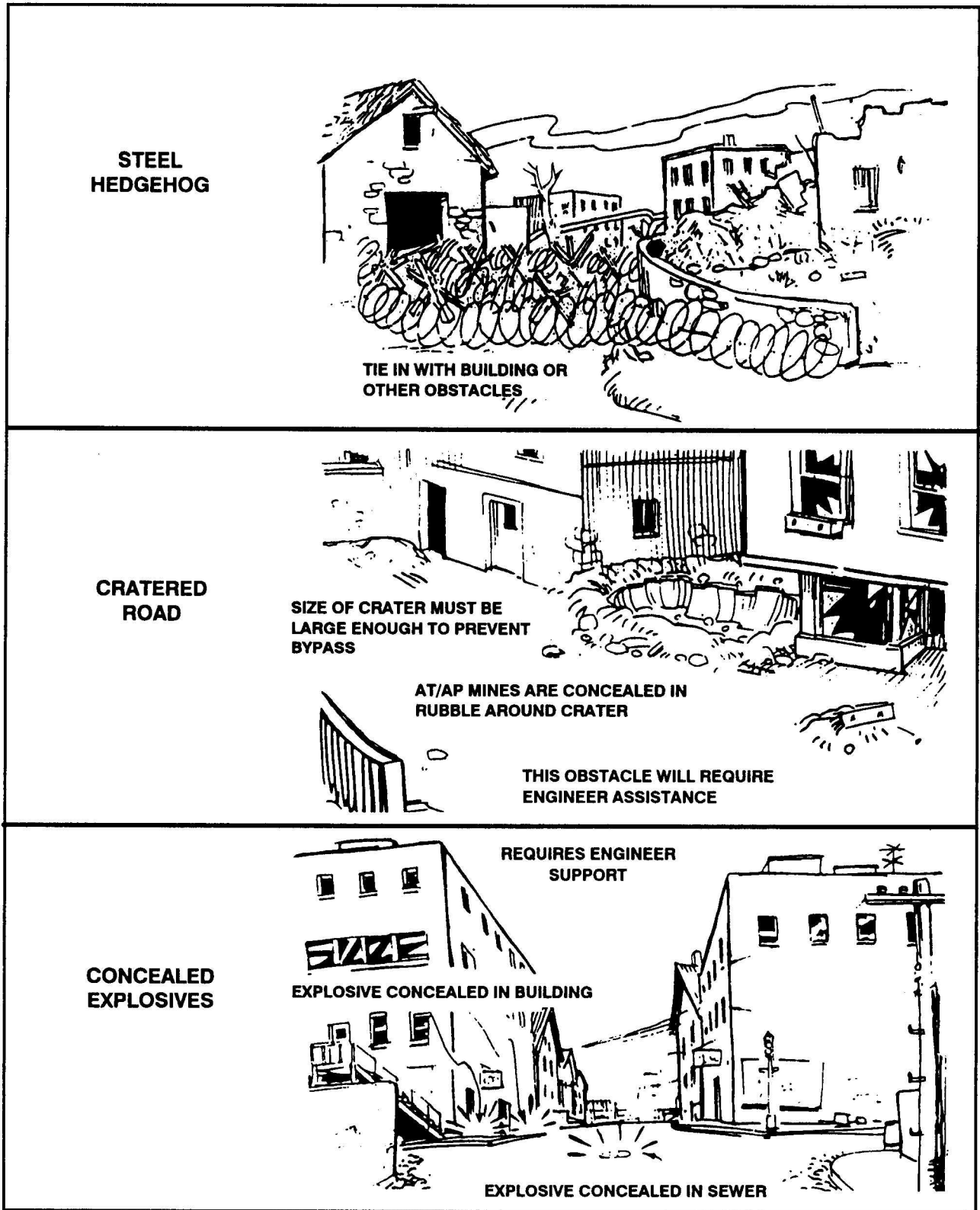


Figure C-2. Antiarmor obstacles (continued).

C-2. CONSTRUCTION OF OBSTACLES

Obstacles are constructed in buildings to deny enemy infantry covered routes and weapons positions close to friendly defensive positions. They can be constructed by rubbleing with explosives or flame, by using wire, or by using booby traps within buildings. The building can be prepared as an explosive or flame trap for execution after enemy occupation.

Section II. MINES

Mines in built-up areas should be recorded on a building sketch (Figure C-3) and on a DA Form 1355 or DA Form 1355-1-R. (See M 20-32 for instructions on how to complete these forms.) The sketch should include the number of the building (taken from a city map) and all floor plans. It should also include the type of mine and firing device. When possible, mined buildings should be marked on the friendly side (Figure C-4). Clearing areas or buildings that have been mined is extremely difficult. Therefore, they should be considered "NO GO" areas. This factor must be carefully considered when planning and authorizing the placement of mines. (See Table C-1 for the approving authority for minefield.)

TYPE MINEFIELD	APPROVING AUTHORITY
Protective hasty	Brigade commander (may be delegated down to battalion or company level on a mission basis).
Deliberate	Division or Installation commander.
Tactical	Division commander (may be delegated to brigade level).
Point	Brigade commander (may be delegated to battalion level).
Interdiction	Corps commander (may be delegated to division level).
Phony	Corps commander (may be delegated to division level).
Scatterable long duration (24 hours or more)	Corps commander (may be delegated to division or brigade level).
Short duration (less than 24 hours)	Corps commander (may be delegated to division , brigade, or battalion level).

Table C-1. Minefield employment authority.

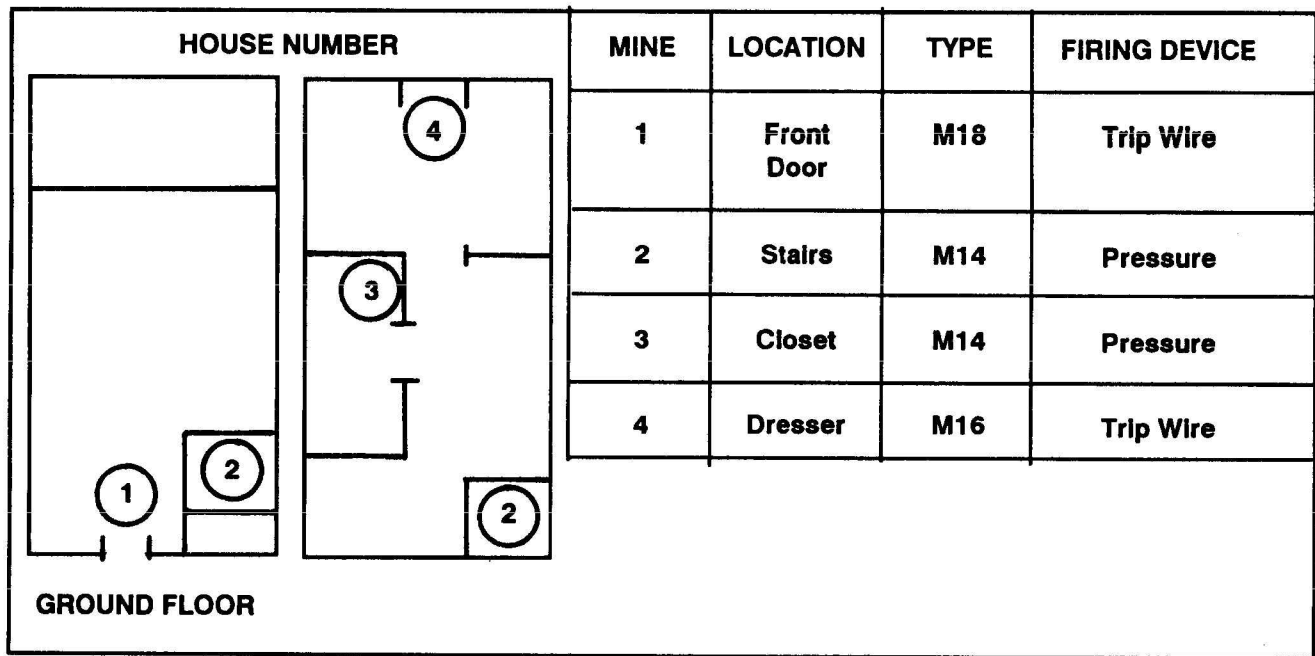


Figure C-3. Building sketch showing mines.

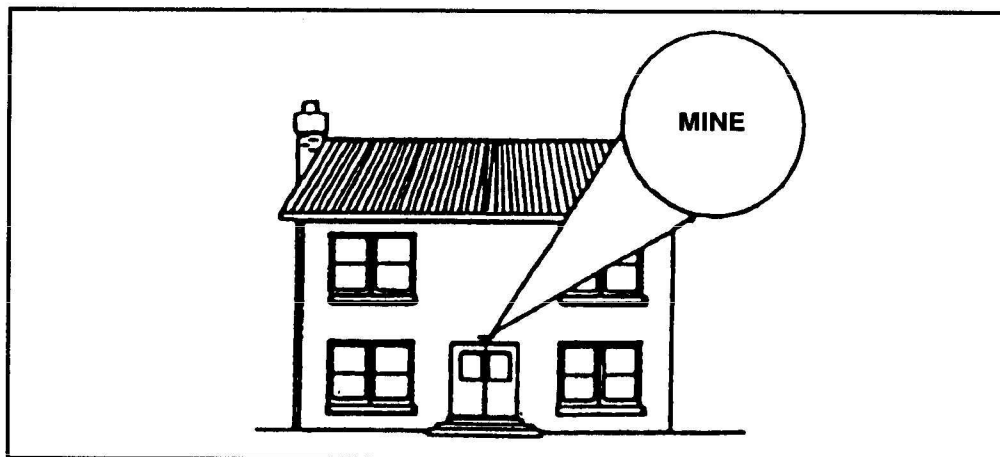


Figure C-4. Marking of mined buildings.

C-3. TYPES

Several types of mines can be employed in built-up areas.

a. The M14 mine should be used with metallic antipersonnel, antitank, or chemical mines to confuse and hinder enemy breaching attempts. It must be carefully employed because its light weight makes it easy to displace (Figure C-5, page C-8). However, its size makes it ideal for obscure places such as stairs and cellars.

b. The M16 mine is ideal for covering large areas such as rooftops, backyards, parks, and cellars. It should be expediently rigged for command detonation by attaching a rope or piece of communications wire to the release pin ring (Figure C-6, page C-8).

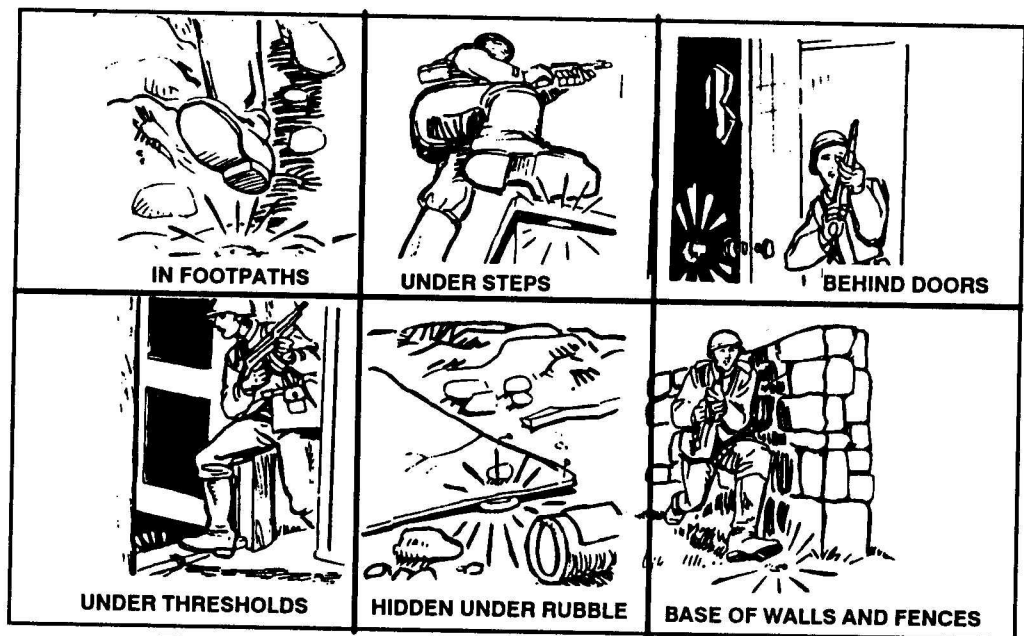


Figure C-5. Emplacing the M14 antipersonnel mine.

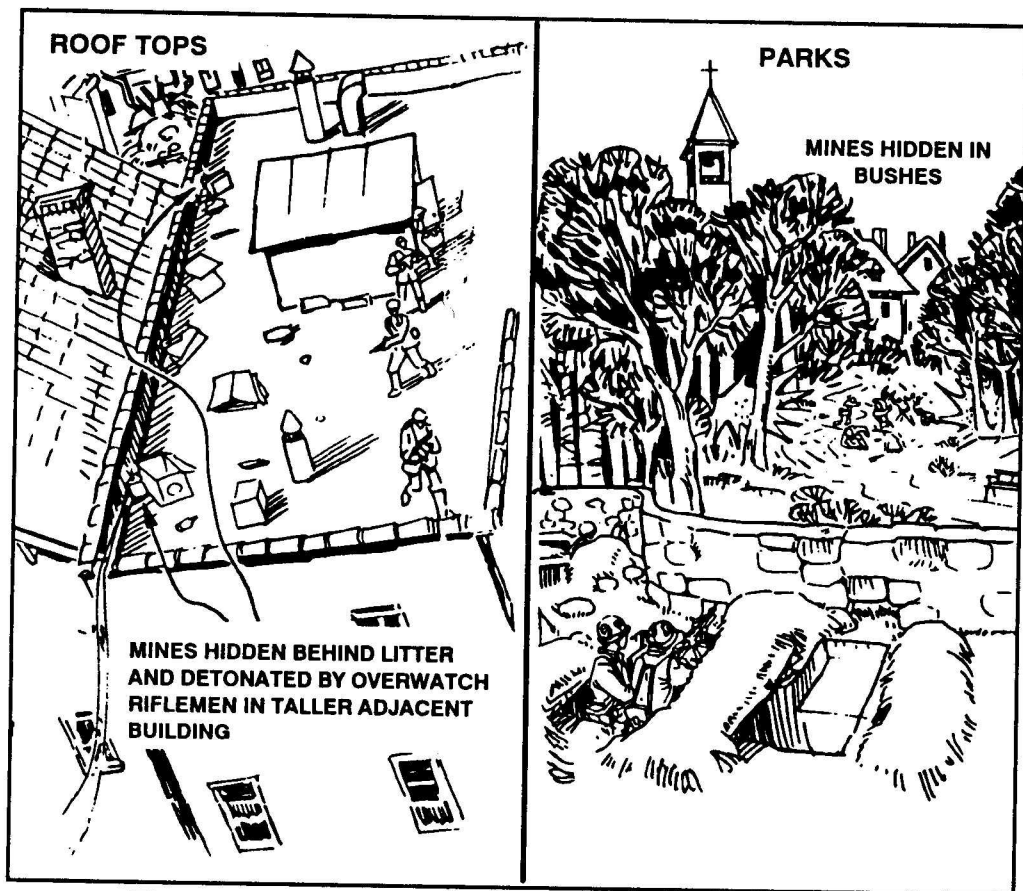


Figure C-6. Emplacements of M16 antipersonnel mines.

c. The M18A1 Claymore mine can be employed during the reorganization and consolidation phase on likely enemy avenues of approach. It does not have to be installed in the street but can be employed on the sides of buildings or any other sturdy structure.

(1) Claymore mines can be used for demolition against thin-skinned buildings and walls, or the 1 1/2 pounds of composition 4 can be removed from the mine and used as an explosive, if authorized.

(2) Claymore mines arranged for detonation by trip wire can be mixed with antipersonnel and antitank mines in nuisance minefield. They can fill the dead space in the final protective fires of automatic weapons (Figure C-7).

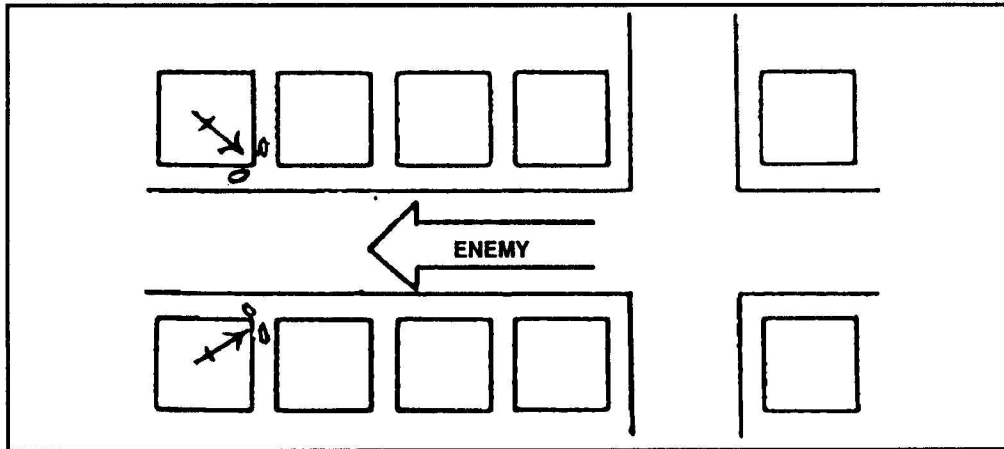


Figure C-7. Claymore mine used to cover dead space of automatic weapons.

(3) Claymore mines can be used several ways in the offense. For example, if friendly troops are advancing on a city, Claymore mines can be used in conjunction with blocking positions to cut off enemy avenues of escape (Figure C-8).

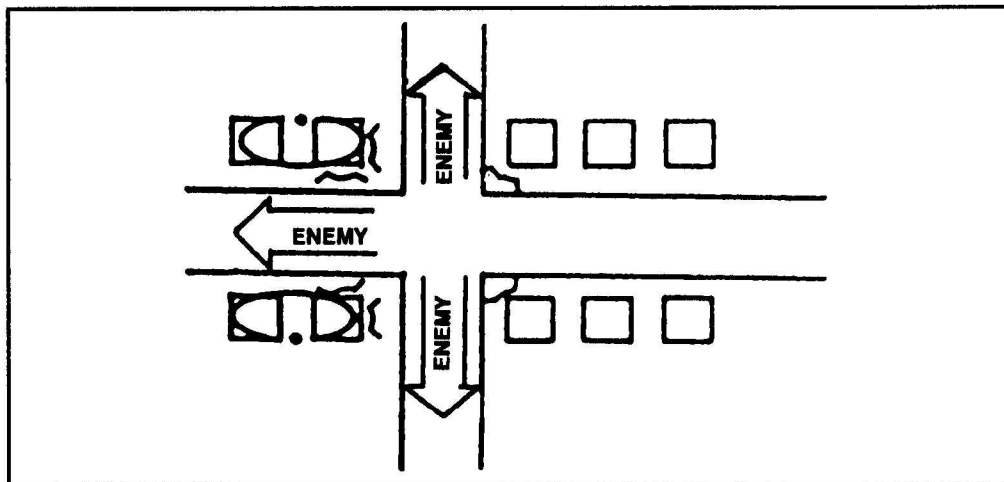


Figure C-8. Claymore mines used to block enemy avenues of escape.

- d. The M15, M19, and M21 antitank mines are employed (Figure C-9)—
- In conjunction with other man-made obstacles and covered with fire.
 - As standard minefield in large open areas with the aid of the M57 dispenser.
 - In streets or alleys to block routes of advance in narrow defiles.
 - As command detonated mines with other demolitions.

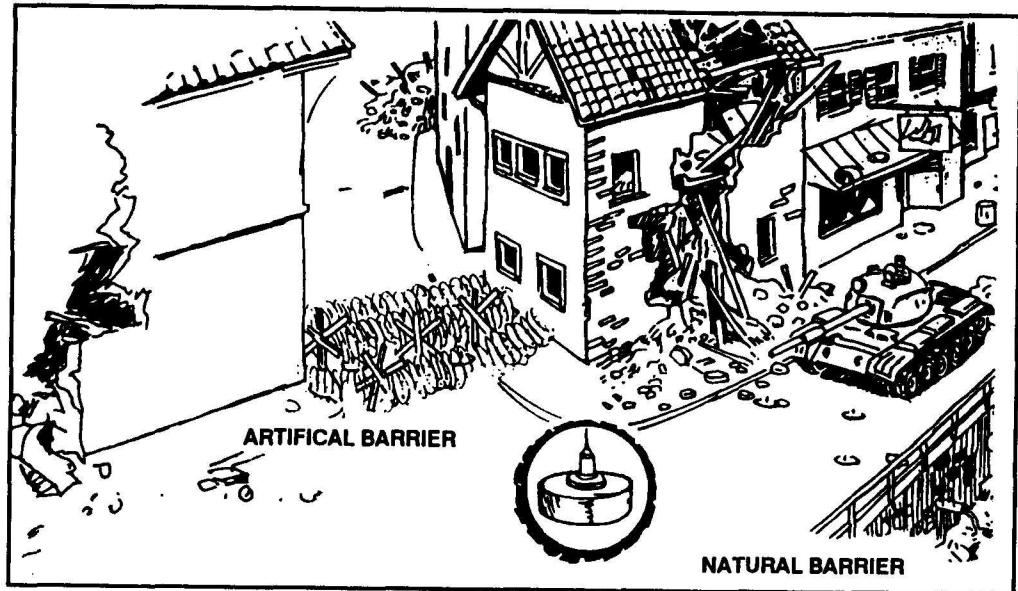


Figure C-9. Emplacement of antitank mines.

C-4. ENEMY MINES AND BOOBY TRAPS

Buildings contain many areas and items that are potential hiding places for booby traps—for example, doors, windows, telephones, stairs, books, canteens, and so on.

When moving through a building, soldiers must not pick up anything—food, valuables, enemy weapons, and so on. Such items could be rigged with pressure devices that explode when they are moved. Soldiers must be well dispersed so that if a booby trap explodes, the number of casualties will be few. Many different types of mines and booby traps could be encountered during combat in built-up areas (Figure C-10).

- a. The equipment used in clearing operations is—
- Mine detectors.
 - Probes.
 - Grappling hooks.
 - Ropes.
 - C4 explosives.
 - Flak vests.
 - Eye protection.
 - Engineer tape.

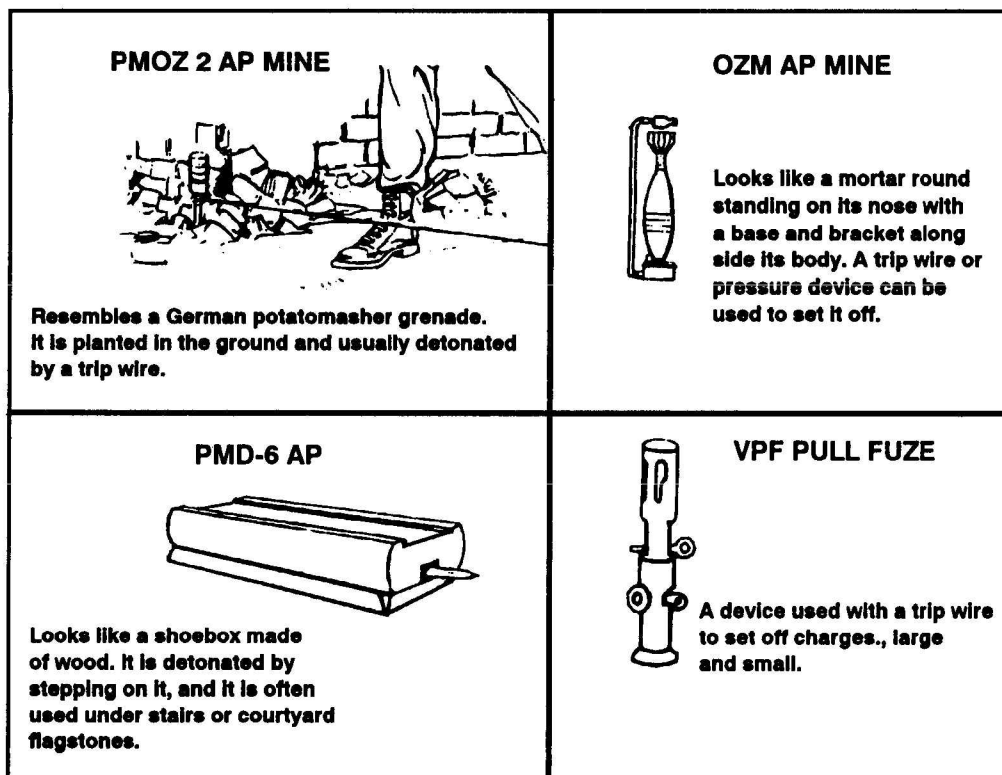


Figure C-10. Threat mines and booby traps.

b. If available, scout dogs should be used to "alert" soldiers to trip wires or mines.

c. To detect trip wires, soldiers can use a 10-foot pole with 5 feet of string tied on one end. He attaches a weight to the loose end of the string, which snaps on the trip wire. This allows the lead man to easily detect a trip wire (Figure C-11).

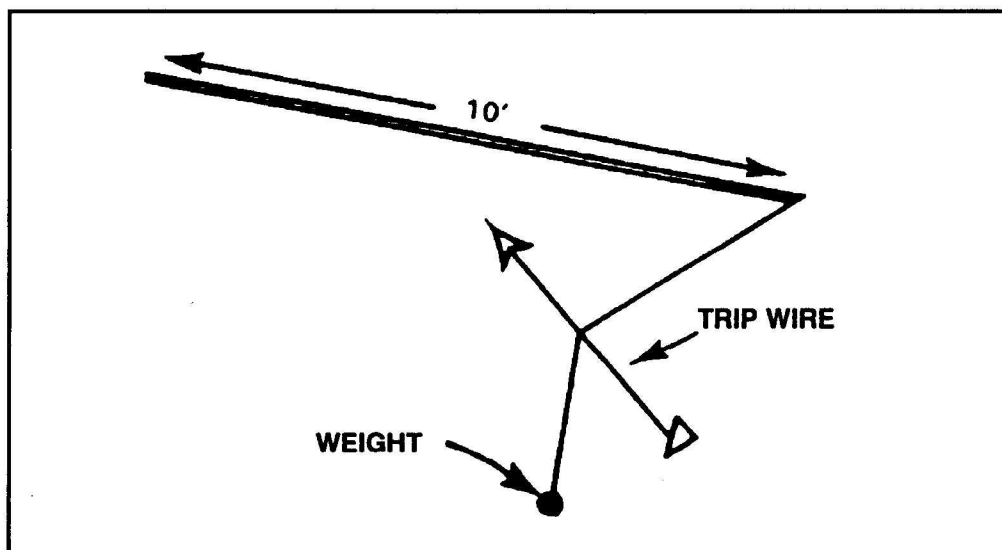


Figure C-11. Trip wire detection.

d. Many standard antipersonnel mines are packed in boxes and crates. If a soldier discovers explosive storage boxes, he should sketch them and turn the sketchover to the platoon leader or S2.

e. Most booby traps should be neutralized by explosive ordnance disposal (EOD) personnel. If EOD teams are not available, booby traps can be blown in place. Personnel should be protected by adequate cover. If the booby trap is in a building, all personnel should go outside before the booby trap is destroyed. Engineer tape placed around the danger area is one method of marking booby traps. If tape is not available, strips ripped from bedsheets can be used. If possible, a guide should lead personnel through booby-trapped areas. Prisoners and civilians can be a good source of information on where and how booby traps are employed. Figure C-10 shows some of the types of Threat mines and booby traps that could be encountered.

Section III. DEMOLITIONS

Demolitions are used more often during combat in built-up areas than during operations in open natural terrain. Demolition operations should be enforced by the engineers that support the brigade, battalion task force, and company team. However, if engineers are involved in the preparation and execution of the barrier plan, infantrymen can prepare mouseholes, breach walls, and rubble buildings themselves, assisted and advised by the brigade, task force, or team engineer.

C-5. OFFENSIVE USE

When assaulting or clearing a built-up area, demolitions enable the maneuver commander to create an avenue of approach through buildings. As discussed earlier in the text, the infantry commander forms his personnel into assault teams and overwatch teams for seizing and clearing buildings.

a. Every other man in an assault team should carry demolitions, and other selected personnel should carry blasting caps. In a fire team, one man should carry the demolitions. The same man should not carry both the explosives and the blasting caps. As the demolitions are expended by the assault teams, they should be replaced by explosives carried by the overwatch force.

b. One of the most difficult breaching operations faced by the assault team is the breaching of masonry and reinforced concrete walls. When demolitions must be used, composition C4 is the ideal charge to use. Normally, building walls are 15 inches thick or less. Assuming that all outer walls are constructed of reinforced concrete, a rule of thumb for breaching is to place 10 pounds of C4 against the target between waist and chest height. When detonated, this normally blows a hole large enough for a man to go through. The amounts of TNT required to breach concrete are shown in Figure C-12.

c. However, metal reinforcing rods cannot be cut by this charge. Once exposed, they can be removed by using saddle or diamond charges on the rods. Hand grenades should be thrown into the opening to clear the area of enemy (see FM 5-25, Chapter 3).

REINFORCED CONCRETE		
THICKNESS OF MATERIAL	TNT	SIZE OF OPENING
Up to 10 CM (4 inches)	5 KG (11 lbs)	10 to 15 CM (4 to 6 inches)
10 to 15 CM (4 to 6 inches)	10 KG (22 lbs)	15 to 25 CM (6 to 10 inches)
15 to 20 CM (6 to 8 inches)	20 KG (44 lbs)	20 to 30 CM (8 to 12 inches)
NONREINFORCED CONCRETE MASONRY		
THICKNESS OF MATERIAL	TNT	SIZE OF OPENING
Up to 35 CM (14 inches)	1 KG (2.2 lbs)	35 CM (14 inches)
35 to 45 CM (14 to 18 inches)	2 KG (4.4 lbs)	45 CM (18 inches)
45 to 50 CM (18 to 20 inches)	3 KG (6.6 lbs)	50 CM (20 inches)

Figure C-12. TNT required to breach concrete.

d. Mouseholes provide the safest method of moving between rooms and floors. They can be created with C4. Since C4 comes packaged with an adhesive backing or can be emplaced using pressure-sensitive tape, it is ideal for this purpose. When using C4 to blow a mousehole in a lath and plaster wall, one block or a strip of blocks should be placed on the wall from neck-to-knee height. Charges should be primed with detonating cord or electrical blasting caps to obtain simultaneous detonation, which will blow a hole large enough for a man to fit through.

C-6. DEFENSIVE USE

The use of demolitions in defensive operations is the same as in offensive operations. When defending a built-up area, demolitions are used to create covered and concealed routes through walls and buildings that can be used for withdrawals, reinforcements, or counterattacks. Demolitions are also used to create obstacles and clear fields of fire.

a. Infantrymen use demolitions for creating mouseholes and constructing command-detonated mines. Expedient C4 satchel charges can be concealed in likely enemy weapons, in firing positions, or on movement routes. Expedient-shaped charges (effective against lightly armored vehicles) can also be emplaced on routes of mounted movement when integrated into antiarmor ambushes.

b. The engineers must furnish technical assistance for selective rubbleing. Normally, buildings can be rubbleed by using shaped charges or C4 on the supports and major beams of buildings.

c. Charges should be placed directly against the surface that is to be breached (Figure C-12), unless a shaped charge is used. Whenever possible, demolitions should be tamped to increase their effectiveness. Tamping materials could be sandbags, rubble, or desks and chairs (Figure C-13).

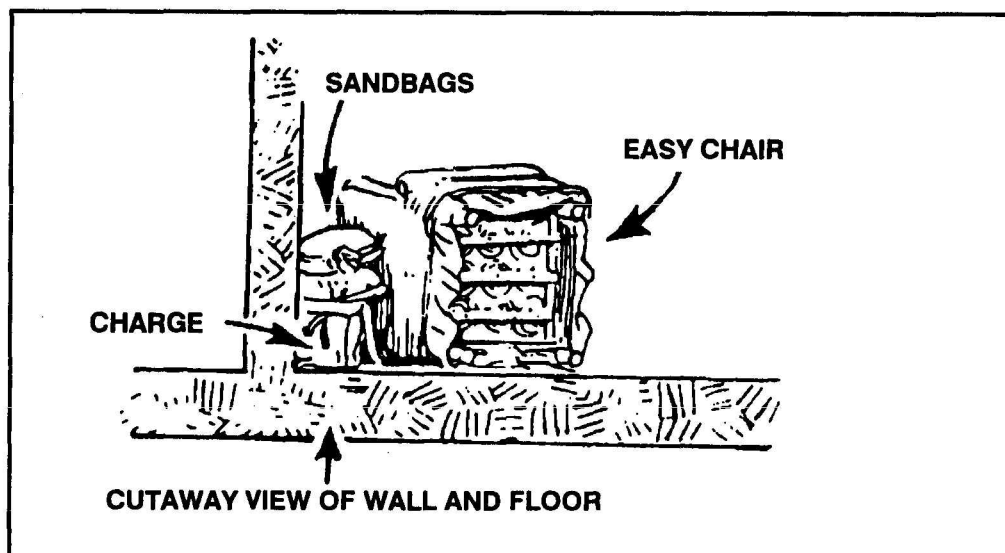


Figure C-13. Chair used to tamp breaching charge.

d. For most exterior walls, tamping of breaching charges could be impossible due to enemy fire. Thus, the untamped charge requires twice the explosive charge to produce the same effect as an elevated charge (Figure C-14).



METHODS OF PLACEMENT				
THICKNESS OF CONCRETE				
	FEET	POUNDS OF TNT	POUNDS OF C4	POUNDS OF TNT
2	14	11	28	21
2 1/2	27	21	54	41
3	39	30	78	59
3 1/2	62	47	124	93
4	93	70	185	138
4 1/2	132	99	263	196
5	147	106	284	211
5 1/2	189	141	376	282
6	245	186	490	366

Figure C-14. Breaching reinforced concrete.

e. When enemy fire prevents an approach to the wall, the breaching charge must be attached to a pole and slid into position for detonation at the base of the wall untamped (Figure C-15). Small-arms fire will not detonate C4 or TNT; the charge must be primed with detonating cord. Soldiers must take cover before detonating the charge.

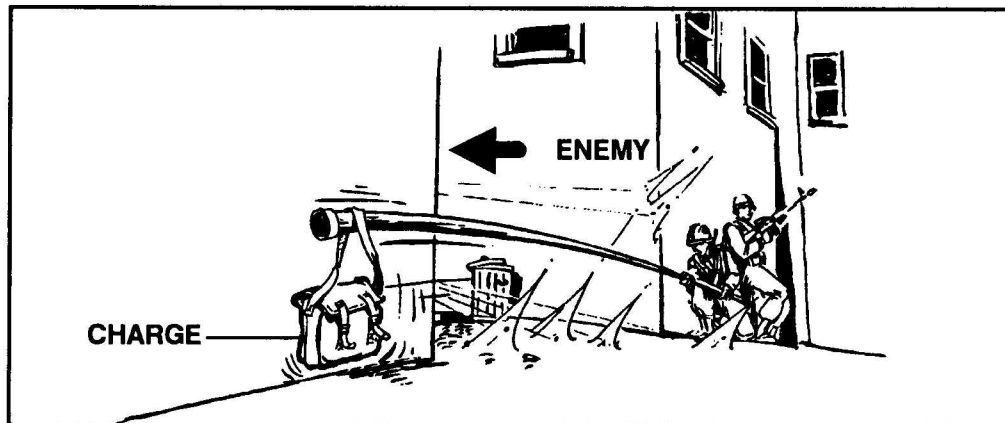


Figure C-15. Charge placement when small-arms fire cannot be suppressed.

f. The internal walls of most buildings function as partitions rather than load-bearing members. Therefore, smaller explosive charges can be used to breach them. In the absence of C4 or other military explosives, internal walls can be breached by using one or more hand grenades or a Claymore mine (Figure C-16). These devices should be tamped to increase their effectiveness and to reduce the amount of explosive force directed to the rear.

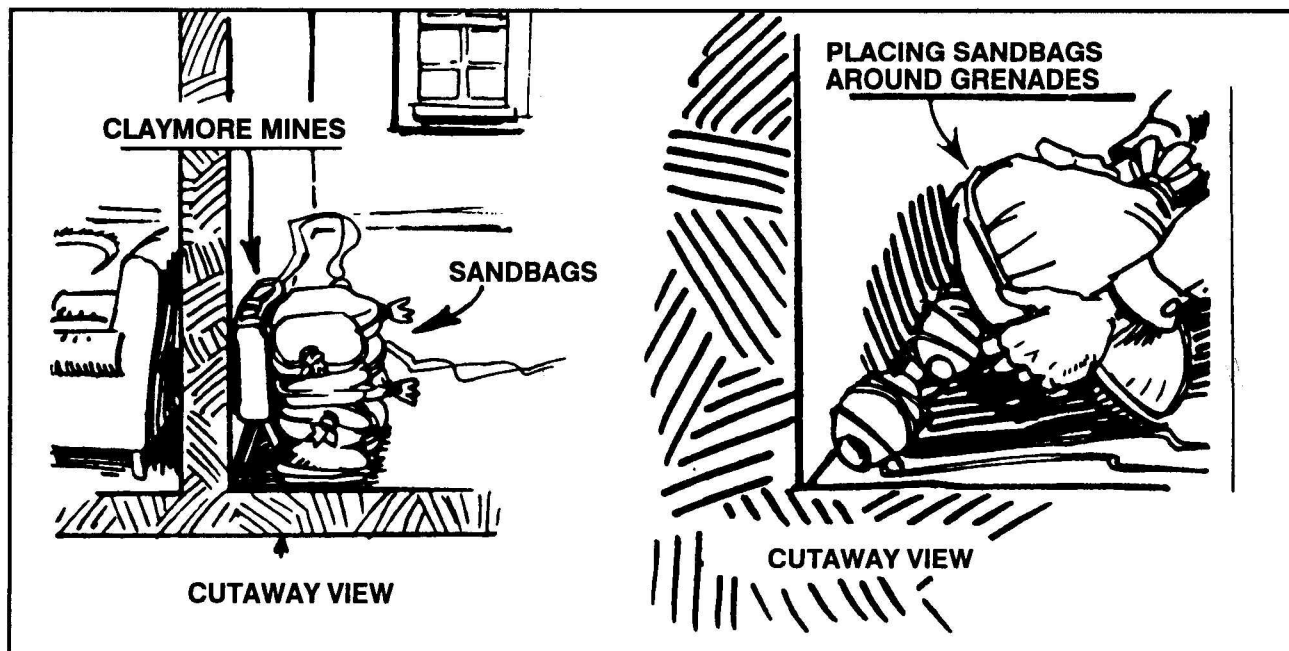


Figure C-16. Tamping of a Claymore mine and hand grenades to breach internal walls.

g. The Molotov cocktail (Figure C-17) is an expedient device for disabling both wheeled and tracked vehicles. It is easy to make since the materials are readily available. The results are most effective because of the close engagement in built-up areas. The objective is to ignite a flammable portion of the vehicle such as the fuel or ammunition that it is transporting. The following materials are needed to make a Molotov cocktail:

- Container-bottle or glass container.
- Gas (60 percent).
- Oil (40 percent).
- Rag for use as a wick.

The gas and oil are mixed thoroughly (60 percent gas to 40 percent oil). The rag is soaked with the mixture, and then the mixture is placed into the bottle. The rag is then inserted in the opening of the bottle as a wick. When a target is sighted, the wick is lit and the bottle is thrown hard enough to break.

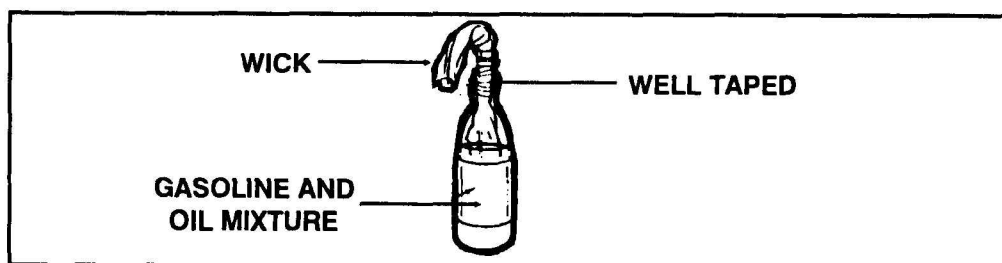


Figure C-17. Molotov cocktail.

WARNING

Ensure that a safe distance is maintained when throwing the Molotov cocktail. Caution troops against dropping the device. Throw it in the opposite direction of personnel and flammable materials. Do not smoke while making this device.

h. The bunker bomb (Figure C-18) is an expedient explosive flame weapon best used against fortified positions or rooms. This expedient munition should be used with a mechanical rather than an electrical firing system. The following materials are required to make a bunker bomb:

- 1 small-arms ammunition container.
- 1 gallon of gasoline.
- 50 feet of detonating cord.
- 1 nonelectric blasting cap.
- 1 M60 fuse igniter.
- 7 1/2 feet of M700 time fuse.
- 3 ounces of M4 thickening compound.
- 1 M49 trip flare or M34 WP grenade.

(1) **Step 1.** Fill the ammunition can 3/4 full with thickened flame fuel and secure the lid.

(2) **Step 2.** "Hasty whip" the device with 15 turns around the center of the container using 44 feet of detonating cord. Leave 2-foot "pigtails" for attaching the igniter and fuse igniter.

(3) **Step 3.** Tape the igniter (M49 trip flare or M34 WP grenade) to the container handle.

(4) **Step 4.** Place one detonating cord pigtail end under the igniter spoon handle. Tape it in place.

(5) **Step 5.** Attach the M60 fuse igniter and the nonelectrical blasting cap to the M700 time fuse.

(6) **Step 6.** Attach the nonelectrical firing system to the other pigtail by making a loop in the detonating cord and attaching the blasting cap to it.

(7) **Step 7.** Remove the safety pin from the igniter (M49 trip flare or M34WP grenade). The device is ready to be fired.

WARNING

Never carry the device by the handle or igniter. Remove the igniter safety pin only when it is time to use the device. Use extreme care when handling or carrying nonelectrical firing systems. Protect blasting caps from shock and extreme heat. Do not allow the time fuse to kink or become knotted. Doing so may disrupt the powder train and may cause a misfire. Prime detonating cord and remove the time fuse igniter safety pin only when it is time to use the device.

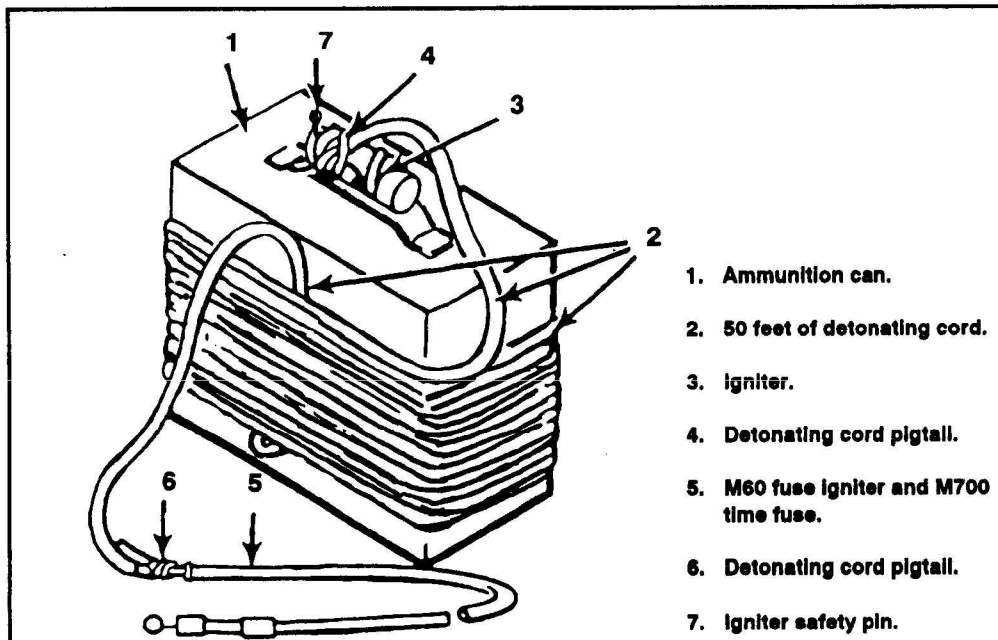


Figure C-18. Bunker bomb made from an ammunition can.

C-7. SAFETY

The greatest danger to friendly personnel from demolitions is the debris thrown by the explosion. Leaders must ensure that protective measures are enforced. The safe distance listed in Table C-2 indicates the danger of demolition effects.

- a. The following are the rules for using demolitions:
 - Keep the blasting machine under the control of an NCO.
 - Wear helmets at all times while firing explosives.
 - Handle misfires with extreme care.
 - Clear the room and protect personnel when blowing interior walls.
- b. Some charges should be prepared, minus detonators, beforehand to save time—for example, 10- or 20-pound breaching charges of C4, expedient-shaped charges in No.10 cans.
 - Use C4 to breach hard targets (masonry construction).
 - Do not take chances.
 - Do not divide responsibility for explosive work.
 - Do not mix explosives and detonators.
 - Do not carry explosives and caps together.

POUNDS OF EXPLOSIVE	SAFE DISTANCE IN METERS	POUNDS OF EXPLOSIVE	SAFE DISTANCE IN METERS
1 to 29	300	150	514
30	311	175	560
35	327	200	585
40	342	225	609
45	356	250	630
50	369	275	651
60	392	300	670
70	413	325	688
80	431	350	705
90	449	375	722
100	465	400	737
125	500	425 and over	750
NOTE: These distances will be modified in combat when troops are in other buildings, around corners, or behind intervening walls.			

Table C-2. Minimum safe distances for personnel in the open.

APPENDIX D

SUBTERRANEAN OPERATIONS

Knowledge of the nature and location of underground facilities is of great value to both the urban attacker and defender. To exploit the advantages of underground facilities, a thorough reconnaissance is required. This appendix describes the techniques used to deny the enemy use of these features, the tactical value of subterranean passage techniques, and the psychological aspects of extended operations in subterranean passages.

D-1. TACTICAL VALUE

In larger cities, subterranean features include sunken garages, underground passages, subway lines, utility tunnels (Figure D-1), sewers, and storm drains. Most of these features allow the movement of many troops. Even in smaller European towns, sewers and storm drains permit soldiers to move beneath the fighting and surface behind the enemy.

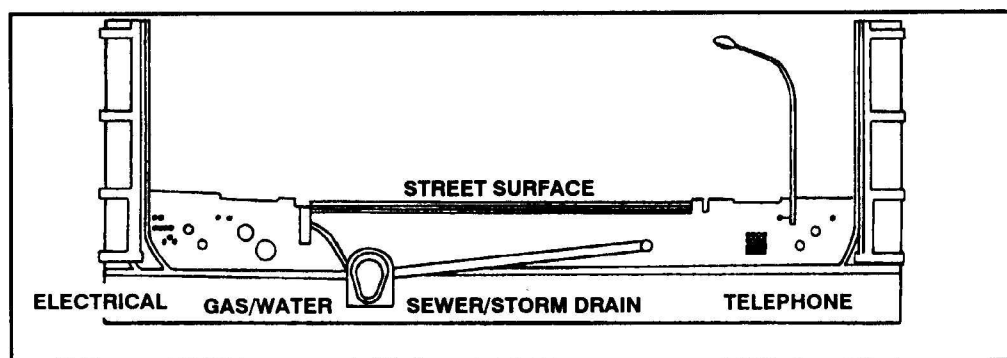


Figure D-1. Tunnels.

a. Subterranean passages provide the attacker with covered and concealed routes into and through built-up areas. This enables the enemy to launch his attack along roads that lead into the city while infiltrating a smaller force in the defenders rear. The objective of this attack is to quickly insert a unit into the defenders rear, thereby, disrupting his defense and obstructing the avenues of withdrawal for his forward defense.

b. Depending upon the strength and depth of the defense, the attack along the subterranean avenue of approach could easily become the main attack. Even if the subterranean effort is not immediately successful, it forces the defender to fight on two levels and to extend his resources to more than just street-level fighting.

c. The existence of subterranean passages forces the defender to defend the built-up area above and below ground. Passages are more of a disadvantage to the defender than the attacker. However, subterranean passages also offer some advantages. When thoroughly reconnoitered and controlled by the defender, subterranean passages provide excellent covered and concealed routes to move reinforcements or to launch counterattacks. They also provide ready-made lines of communication for the movement of supplies and evacuation of casualties, and provide places to cache supplies for

forward companies. Subterranean passages also offer the defender a ready-made conduit for communications wire, which protects it from tracked vehicles and indirect fires,

D-2. DENIAL TO THE ENEMY

Subterranean passages are useful to the defender only to the extent that the attacker can be denied their use. The defender has an advantage in that, given the confining, dark environment of these passages, a small group of determined soldiers in a prepared position can defeat a numerically superior force.

a. Tunnels afford the attacker little cover and concealment except for the darkness and any man-made barriers. The passageways provide tight fields of fire and amplify the effect of grenades. Obstacles at intersections in the tunnels set up excellent ambush sites and turn the subterranean passages into a deadly maze. These obstacles can be quickly created using chunks of rubble, furniture, and parts of abandoned vehicles interspersed with M18A1 Claymore mines.

b. A thorough reconnaissance of the subterranean or sewer system must be made first. To be effective, obstacles must be located at critical intersections in the passage network so that they trap attackers in a kill zone but allow defenders freedom of movement (Figure D-2).

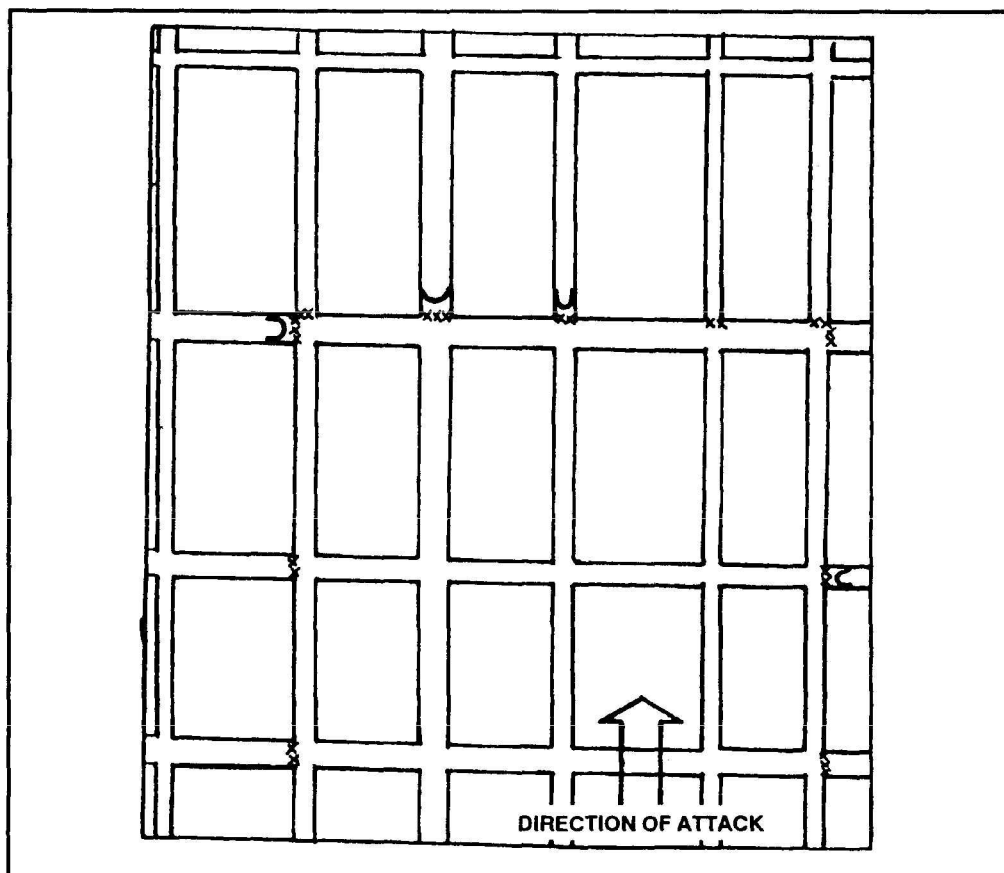


Figure D-2. Defense of a sewer system.

D-3. SUBTERRANEAN RECONNAISSANCE TECHNIQUES

The local reconnaissance mission (platoon or company area of responsibility) should be given to a squad-size element (six or seven personnel). Enough soldiers are in a squad to gather the required data without getting in each other's way in the confines of the tunnel. Only in extremely large subterranean features should the size of a patrol be increased.

a. The patrol unit leader should organize his patrol with two riflemen—one tasked with security to the front (the point man) and one tasked with security to the rear (Figure D-3). The patrol leader moves directly behind the point man, and navigates and records data collected by the patrol. The grenadier should follow the patrol unit leader, and the demolitions man should follow the grenadier. Two riflemen should be left as a security post at the point of entry. They are responsible for detecting enemy who come upon the patrol unit's rear and for serving as the communications link between the patrol unit leader and his higher headquarters.

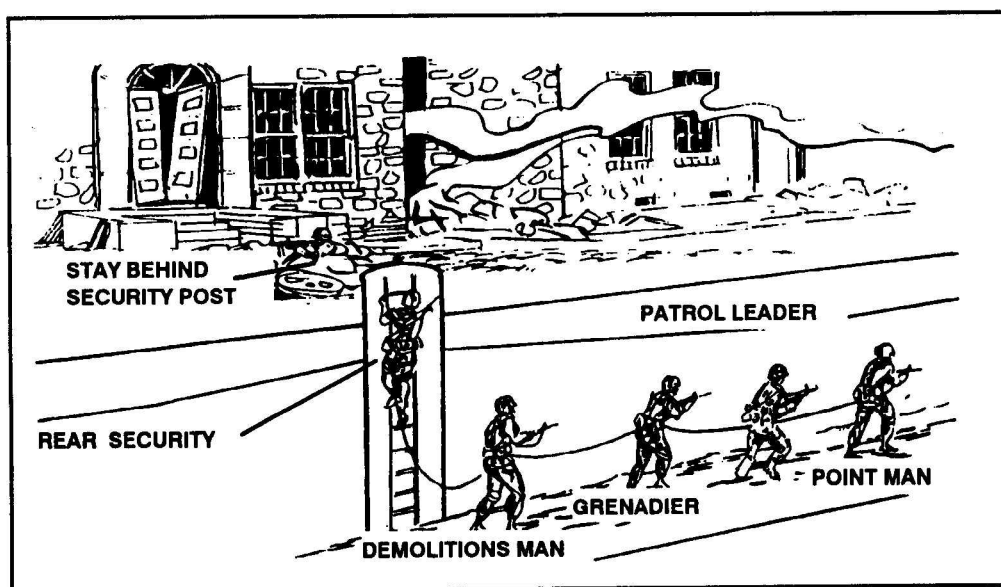


Figure D-3. Organization of the patrol unit.

b. The patrol unit leader should carry a map, compass, street plan, and notebook in which he has written the information he must gather for the platoon leader. The grenadier should carry the tools needed to open manhole covers. If the patrol is to move more than 200 to 300 meters or if the platoon leader directs, the grenadier should also carry a sound-powered telephone (TA-1) and wire dispenser (XM-306A) for communications. (Radios are unreliable in this environment). The point man should be equipped with night vision goggles to maintain surveillance within the sewer.

c. All soldiers entering the sewer should carry a sketch of the sewer system to include magnetic north, azimuths, distances, and manholes. They should also carry protective masks, flashlights, gloves, and chalk for marking features along the route. The patrol should also be equipped with a 120-foot safety rope to which each man is tied. To improve their footing in slippery sewers and storm drains, the members of the patrol unit should wrap chicken wire or screen wire around their boots.

d. A constant concern to troops conducting subterranean patrol is chemical defense. Enemy chemical agents used in tunnels are encountered in dense concentrations, with no chance of dispersement. The M8 automatic chemical agent alarm system, carried by the point man, provides instant warning of the presence of chemical agents. M8 detector paper can also be used to detect chemical agents. At the first indication that harmful gases are present, the patrol should mask.

e. In addition to enemy chemical agents, noxious gases from decomposing sewage can also pose a threat. These gases are not detected by the M8 chemical agent alarm system, nor are they completely filtered by the protective mask. Physical signs that indicate their presence in harmful quantities are nausea and dizziness. The patrol leader should be constantly alert to these signs and know the shortest route to the surface for fresh air.

f. Once the patrol is organized and equipped, it moves to the entrance of the tunnel, which is usually a manhole. With the manhole cover removed, the patrol waits 15 minutes before entry to allow any gases to dissipate. Then the point man descends into the tunnel to determine whether the air is safe to breathe and if movement is restricted. The point man should remain in the tunnel for 10 minutes before the rest of the patrol follows. If he becomes ill or is exposed to danger, he can be pulled out by the safety rope.

g. When the patrol is moving through the tunnel, the point man moves about 10 meters in front of the patrol leader. Other patrol members maintain 5-meter intervals. If the water in the tunnel is flowing faster than 2.5 meters per second or if the sewer contains slippery obstacles, those intervals should be increased to prevent all patrol members from falling if one man slips. All patrol members should stay tied into the safety rope so that they can easily be retrieved from danger. The rear security man marks the route with chalk so other troops can find the patrol.

h. The patrol leader should note the azimuth and pace count of each turn he takes in the tunnel. When he encounters a manhole to the surface, the point man should open it and determine the location, which the patrol leader then records. The use of recognition signals (Figure D-4) prevents friendly troops from accidentally shooting the point man as he appears at a manhole.

i. Once the patrol has returned and submitted its report, the platoon leader must decide how to use the tunnel. In the offense, the tunnel could provide a covered route to move behind the enemy's defenses. In the defense, the tunnel could provide a covered passage between positions. In either case, the patrol unit members should act as guides along the route.

j. If the tunnel is to be blocked, the platoon should emplace concertina wire, early warning devices, and antipersonnel mines. A two-man position established at the entrance of the sewer (Figure D-5) provides security against enemy trying to approach the platoon's defense and should be abandoned when the water rises. It should be equipped with command-detonated illumination. While listening for the enemy, soldiers manning this position should not wear earplugs (they should be put in ears just before firing). The confined space amplifies the sounds of weapons firing to a dangerous level. The overpressure from grenades, mines, and booby traps exploding in a sewer or tunnel can have adverse effects on friendly troops such as ruptured eardrums and wounds from flying debris. Also, gases found in sewers can be ignited by the blast effects of these munitions. For these

reasons, small-arms weapons should be employed in tunnels and sewers. Friendly personnel should be outside of tunnels or out of range of the effects when mines or demolitions are detonated. Soldiers should mask at the first sign of a chemical threat.



Figure D-4. Recognition signals.

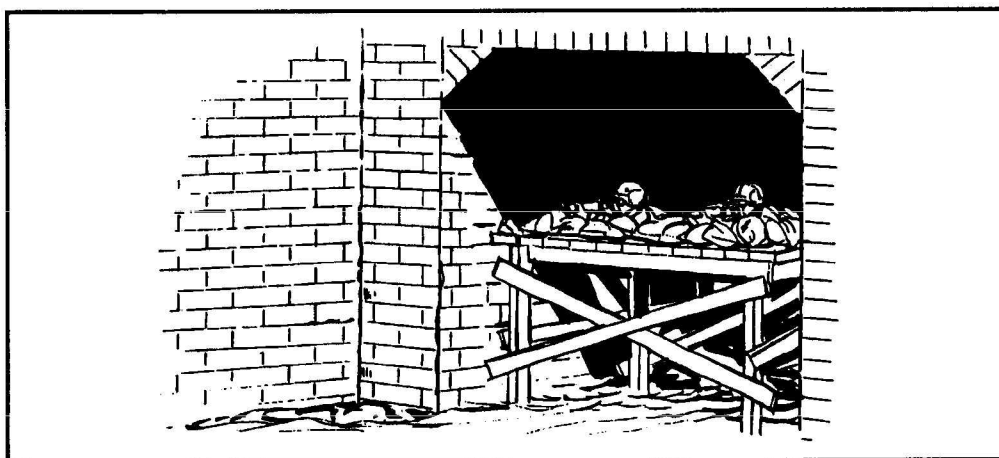


Figure D-5. Two-man position established at the entrance to a sewer.

D-4. PSYCHOLOGICAL CONSIDERATIONS

Combat operations in subterranean passages are much like night combat operations. The psychological factors that affect soldiers during night operations reduce confidence, cause fear, and increase a feeling of isolation. This feeling of isolation is further magnified by the tight confines of the tunnels. The layout of tunnels could require greater dispersion between positions than is usual for operations in wooded terrain.

a. Leaders must enforce measures to dispel the feelings of fear and isolation experienced by soldiers in tunnels. These measures include leadership training, physical and mental fitness, sleep discipline, and stress management.

b. Leaders maintain communication with soldiers manning positions in the tunnels either by personal visits or by field telephone. Communications inform leaders of the tactical situation as well as the mental state of their soldiers. Training during combat operations is limited; however, soldiers manning positions below ground should be given as much information as possible on the organization of the tunnels and the importance of the mission. They should be briefed on contingency plans and alternate positions should their primary positions become untenable.

c. Physical and mental fitness can be maintained by periodically rotating soldiers out of tunnels so they can stand and walk in fresh air and sunlight. Stress management is also a factor of operations in tunnels. Historically, combat in built-up areas has been one of the most stressful forms of combat. Continuous darkness and restricted maneuver space cause more stress to soldiers than street fighting.

APPENDIX E

FIGHTING POSITIONS

A critical platoon- and squad-level defensive task in combat in built-up areas is the preparation of fighting positions. Fighting positions in built-up areas are usually constructed inside buildings and are selected based on an analysis of the area in which the building is located and the individual characteristics of the building.

E-1. CONSIDERATIONS

Leaders should consider the following factors when establishing fighting positions.

a. **Protection.** Leaders should select buildings that provide protection from direct and indirect fires. Reinforced concrete buildings with three or more floors provide suitable protection, while buildings constructed of wood, paneling, or other light material must be reinforced to gain sufficient protection. One- to two-story buildings without a strongly constructed cellar are vulnerable to indirect fires and require construction of overhead protection for each firing position.

b. **Dispersion.** A position should not be established in a single building when it is possible to occupy two or more buildings that permit mutually supporting fires. A position in one building, without mutual support, is vulnerable to bypass, isolation, and subsequent destruction from any direction.

c. **Concealment.** Buildings that are obvious defensive positions (easily targeted by the enemy) should not be selected. Requirements for security and fields of fire could require the occupation of exposed buildings. Therefore, reinforcements provide suitable protection within the building.

d. **Fields of Fire.** To prevent isolation, positions should be mutually supporting and have fields of fire in all directions. Clearing fields of fire could require the destruction of adjacent buildings using explosives, engineer equipment, and field expedients.

e. **Covered Routes.** Defensive positions should have at least one covered route that permits resupply, medical evacuation, reinforcement, or withdrawal from the building. The route can be established by one of the following:

- Through walls to adjacent buildings.
- Through underground systems.
- Through communications trenches.
- Behind protective buildings.

f. **Observation.** The building should permit observation of enemy avenues of approach and adjacent defensive sectors.

g. **Fire Hazard.** Leaders should avoid selecting positions in buildings that are a fire hazard. If flammable structures must be occupied, the danger of fire can be reduced by wetting down the immediate environment, laying an inch of sand on the floors, and providing fire extinguishers and fire fighting equipment. Also, routes of escape must be prepared in case of fire.

h. **Time.** Time available to prepare the defense could be the most critical factor. If enough time is not available, buildings that require extensive preparation should not be used. Conversely, buildings located in less desirable areas that require little improvement could probably become the centers of defense.

E-2. PREPARATION

Preparation of fighting positions depends upon proper selection and construction.

a. **Selecting Positions.** Each weapon should be assigned a primary sector of fire to cover enemy approaches. Alternate positions that overwatch the primary sector should also be selected. These positions are usually located in an adjacent room on the same floor. Each weapon must be assigned a supplementary position to engage attacks from other directions, and an FPL Figure E-1).

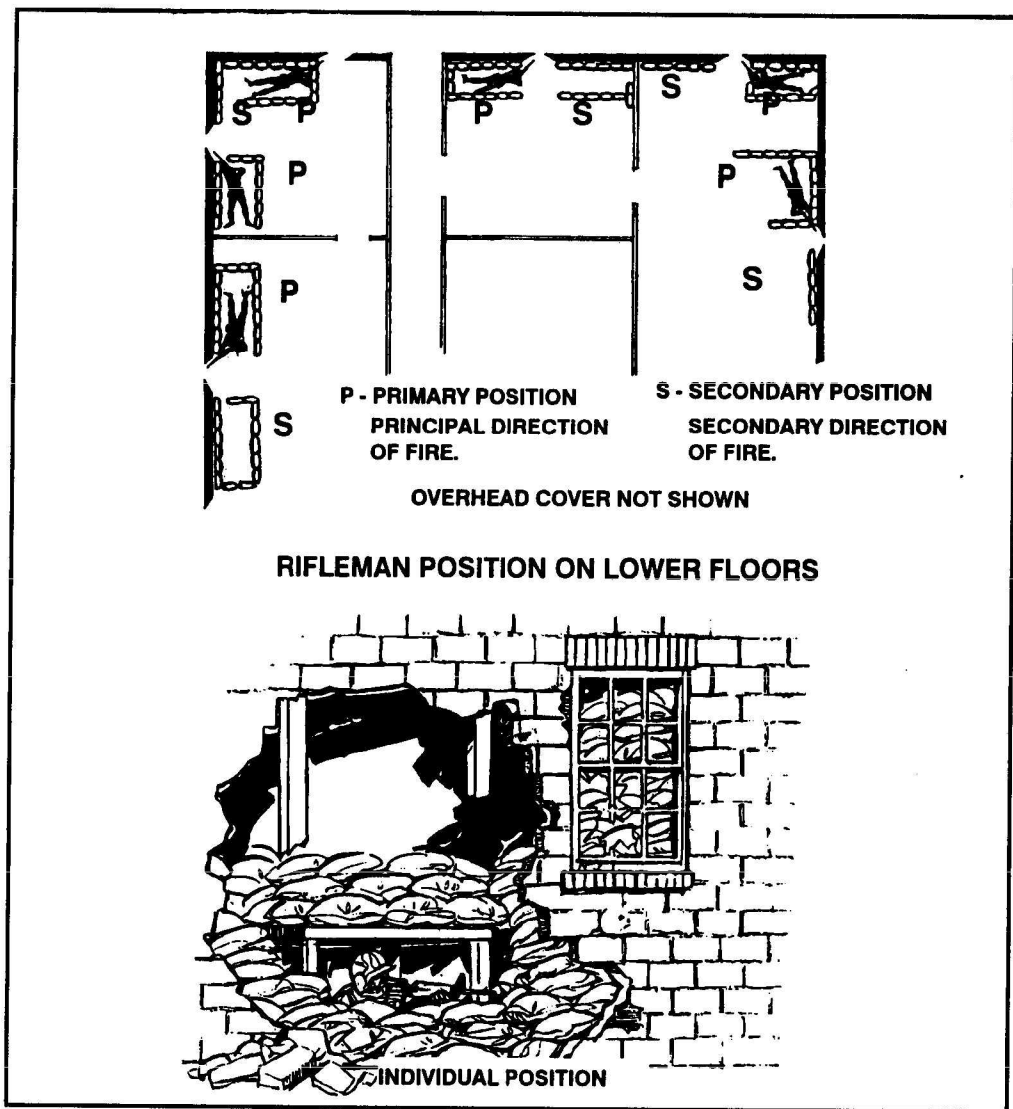


Figure E-1. Weapon positions.

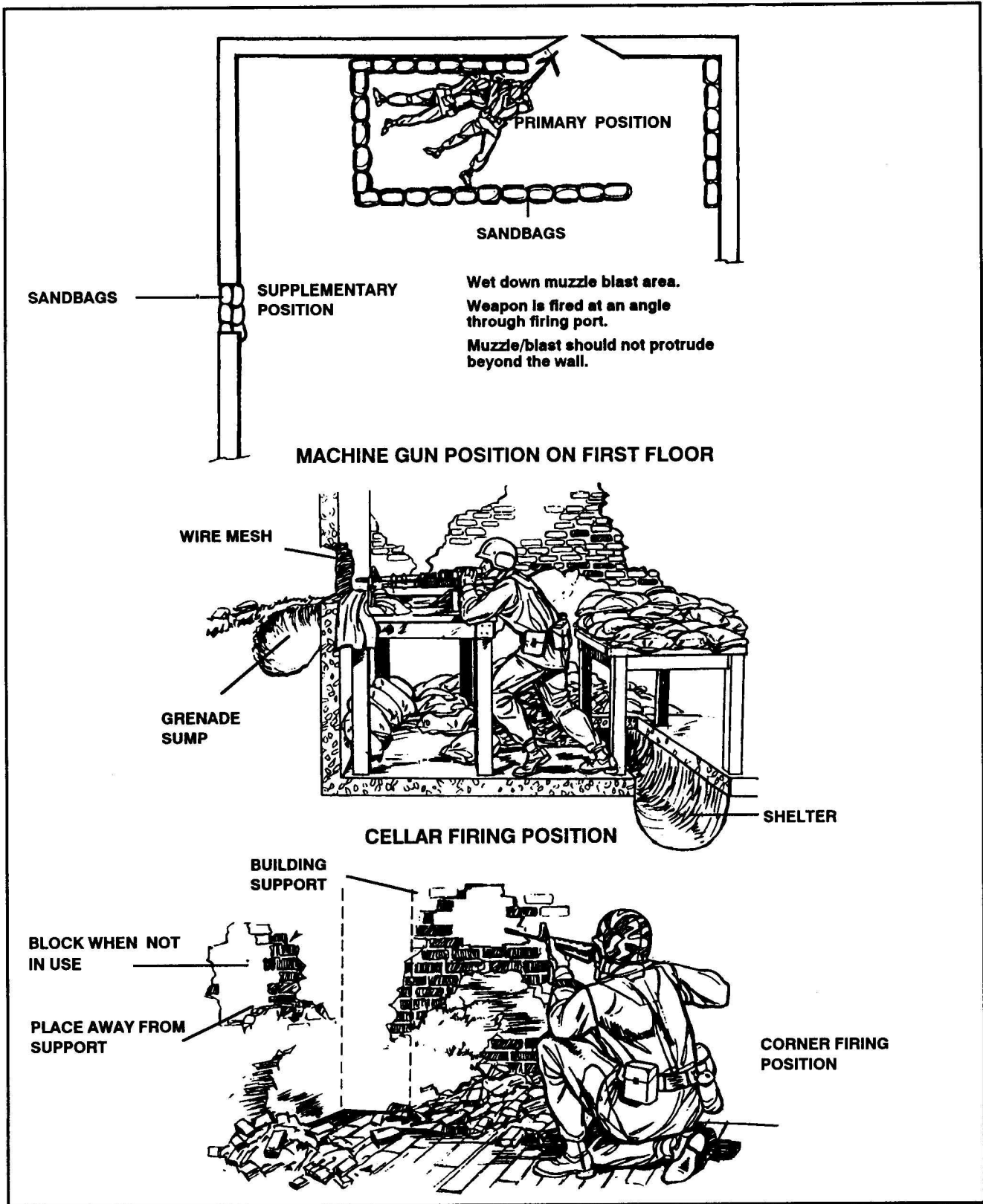


Figure E-1. Weapon positions (continued).

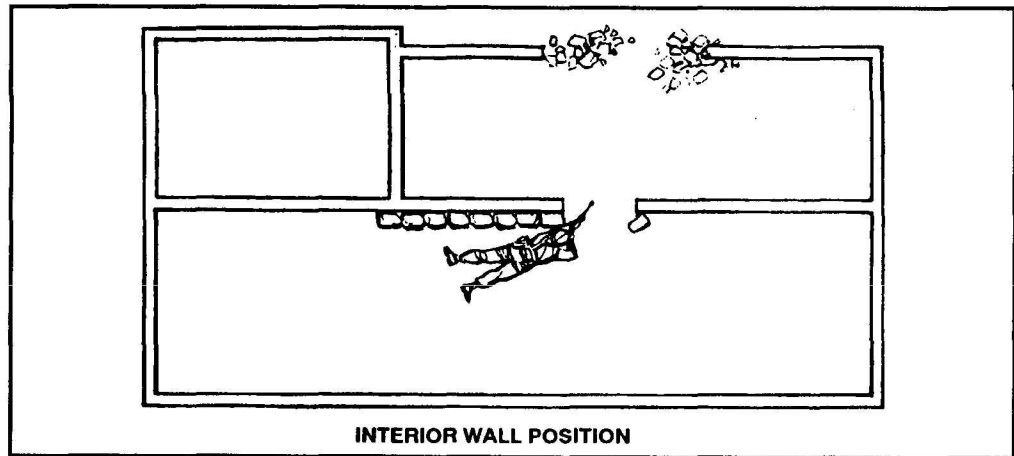


Figure E-1. Weapon positions (continued).

b. Building Positions. There are many ways to establish a fighting position in a building.

(1) *Window position.* Soldiers should kneel or stand on either side of a window. To fire downward from upper floors, tables or similar objects can be placed against the wall to provide additional elevation, but they must be positioned to prevent the weapon from protruding through the window. Leaders should inspect positions to determine the width of sector that each position can engage (Figure E-2).



Figure E-2. Window position.

(2) *Loopholes.* To avoid establishing a pattern of always firing from windows, loopholes should be prepared in walls. Soldiers should avoid firing directly through loopholes to enhance individual protection.

(a) Several loopholes are usually required for each weapon (primary, alternate, and supplementary positions). The number of loopholes should be carefully considered because they can weaken walls and reduce protection. Engineers should be consulted before an excessive number of loopholes are made. Loopholes should be made by punching or drilling holes in walls and should be placed where they are concealed. Blasting loopholes can result in a large hole, easily seen by the enemy.

(b) Loopholes should be cone-shaped to obtain a wide arc of fire, to facilitate engagement of high and low targets, and to reduce the size of the exterior aperture (Figure E-3). The edges of a loophole splinter when hit by bullets, therefore, protective linings, such as an empty sandbag held in place by wire mesh, will reduce spalling effects. When not in use, loopholes should be covered with sandbags to prevent the enemy from firing into or observing through them.

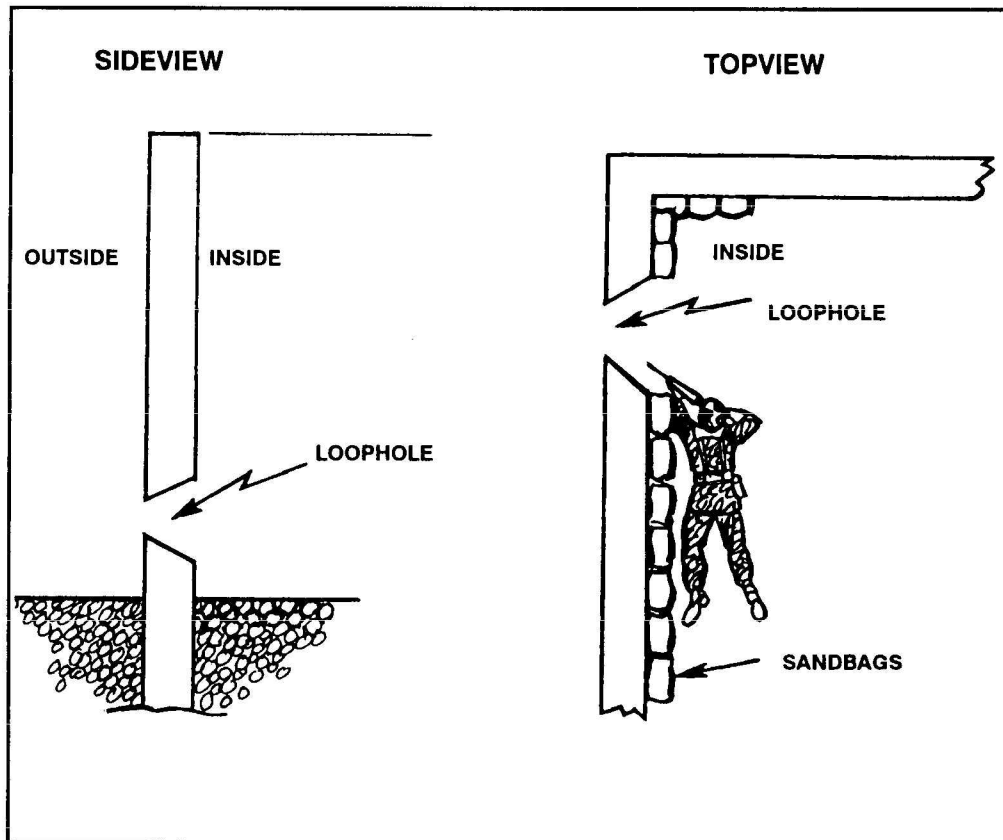


Figure E-3. Cone-shaped loopholes.

(c) Loopholes should also be prepared in interior walls and ceilings of buildings to permit fighting within the position. Interior loopholes should overwatch stairs, halls, and unoccupied rooms, and be concealed by pictures, drapes, or furniture. Loopholes in floors permit the defender to engage enemy personnel on lower floors with small-arms fire and grenades.

(d) Although walls provide some frontal protection, they should be reinforced with sandbags, furniture filled with dirt, or other expedients. Each position should have overhead and all-round protection (Figure E-4).



Figure E-4. Position with overhead and all-round protection.

c. Other Construction Tasks. Other construction tasks in basements, on ground floors, and on upper floors will need to be performed.

(1) *Basements and ground floors.* Basements require preparation similar to that of the ground floor. Any underground system not used by the defender that could provide enemy access to the position must be blocked.

(a) *Doors.* Unused doors should be locked, nailed shut, and blocked and reinforced with furniture, sandbags, or other field expedients. Outside doors can be booby trapped by engineers or other training personnel.

(b) *Hallways.* If not required for the defender's movement, hallways should be blocked with furniture and tactical wire (Figure E-5). If authorized, booby traps should be employed.

(c) *Stairs.* Defenders should block stairs not used by the defense with furniture and tactical wire (see Figure E-5) or remove them. If possible, all stairs should be blocked and ladders should be used to move from floor to floor and then removed when not being used. Booby traps should also be employed on stairs.

(d) *Windows.* All glass should be removed. Windows not used should be blocked with boards or sandbags.

(e) *Fighting Positions.* Fighting positions should be made in floors. If there is no basement, fighting positions can give additional protection from heavy direct-fire weapons.

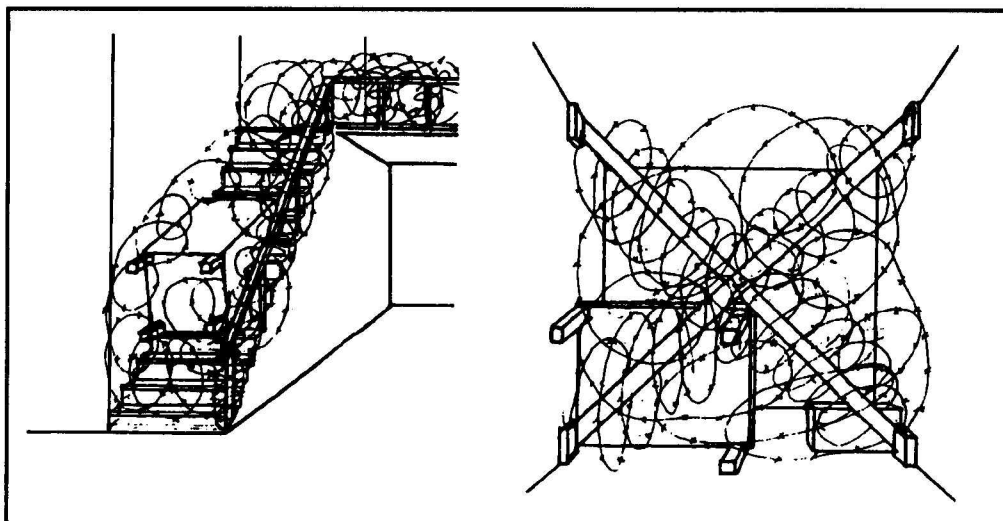


Figure E-5. Blocking hallways and stairs.

(f) *Ceilings.* Support that can withstand the weight of rubble from upper floors should be placed under ceilings (Figure E-6).

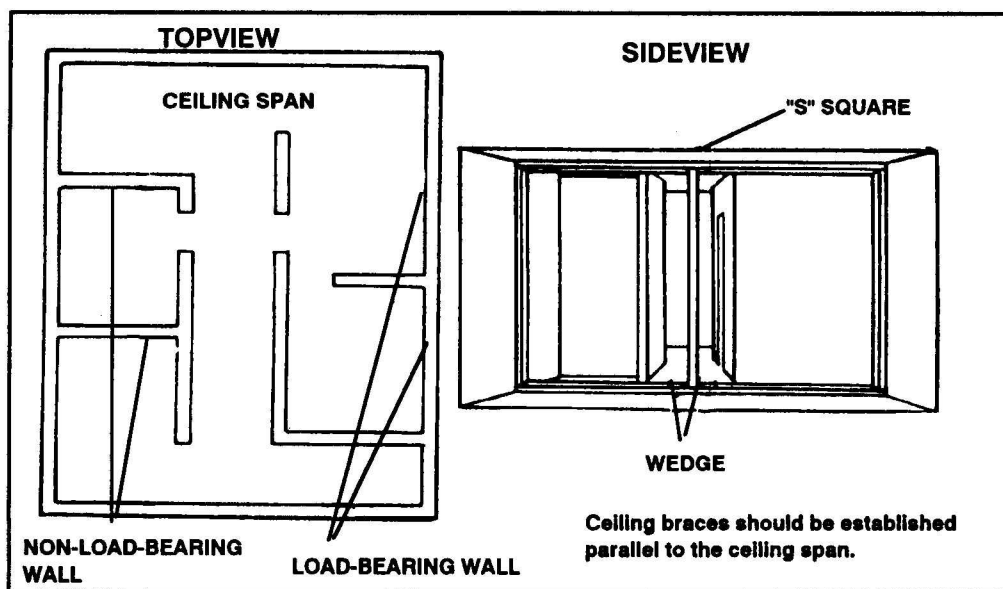


Figure E-6. Ceiling reinforcement.

(g) *Unoccupied room.* Rooms not required for defense should be blocked with tactical wire or booby trapped.

(2) *Upper floors.* Upper floors require the same preparation as ground floors. Windows need not be blocked, but they should be covered with wire mesh, which blocks grenades thrown from the outside. The wire should be loose at the bottom to permit the defender to drop grenades.

(3) *Interior routes.* Routes are required that permit defending forces to move within the building to engage enemy forces from any direction. Escape

routes should also be planned and constructed to permit rapid evacuation of a room or the building. Small holes (called mouse holes) should be made through interior walls to permit movement between rooms. Once the defender has withdrawn to another level, such holes should be clearly marked for both day and night identification. All personnel must be briefed as to where the various routes are located. Rehearsals should be conducted so that everyone becomes familiar with the routes (Figure E-7).



Figure E-7. Movement between floors.

(4) *Fire prevention.* Buildings that have wooden floors and raftered ceilings require extensive fire prevention measures. The attic and other wooden floors should be covered with about 1 inch of sand or dirt, and buckets of water should be positioned for immediate use. Fire fighting materials (dirt, sand, fire extinguishers, and blankets) should be placed on each floor for immediate use. Water basins and bathtubs should be filled as a reserve for firefighting. All electricity and gas should be turned off. Fire breaks can be created by destroying buildings adjacent to the defensive position.

(5) *Communications.* Telephone lines should be laid through adjacent buildings or underground systems, or buried in shallow trenches. Radio antennas can be concealed by placing them among civilian television antennas, along the sides of chimneys and steeples, or out windows that direct FM communications away from enemy early-warning sources and ground observation. Telephone lines within the building should be laid through walls and floors.

(6) *Rubbling*. Rubbling parts of the building provides additional cover and concealment for weapons emplacements, and should be performed only by trained engineers.

(7) *Rooftops*. Positions in flat-roofed buildings require obstacles that restrict helicopter landings. Rooftops that are accessible from adjacent structures should be covered with tactical wire or other expedients, and must be guarded. Entrances to buildings from rooftops can be blocked if compatible with the overall defensive plan. Any structure on the outside of a building that could assist scaling the buildings to gain access to upper floors, or to the rooftop, should be removed or blocked.

(8) *Obstacles*. Obstacles should be positioned adjacent to buildings in order to stop tanks and to delay infantry.

(9) *Fields of fire*. Fields of fire should be improved around the defensive position. Selected buildings can be destroyed to enlarge fields of fire. Obstacles to antitank guided missiles, such as telephone wires, should be cleared. Dead space should be covered with mines and obstacles.

E-3. ARMORED VEHICLE POSITIONS

Fighting positions for tanks and infantry fighting vehicles are essential to a complete and effective defensive plan in built-up areas.

a. **Armored Vehicle Positions.** Armored vehicle positions are selected and developed to obtain the best cover, concealment, observation, and fields of fire, while retaining the vehicle's ability to move.

(1) If fields of fire are restricted to streets, hull-down positions should be used to gain cover and to fire directly down streets (Figure E-8). From those positions, tanks and BFVs are protected and can rapidly move to alternate positions. Buildings collapsing from enemy fires are a minimal hazard to the armored vehicle and crew.

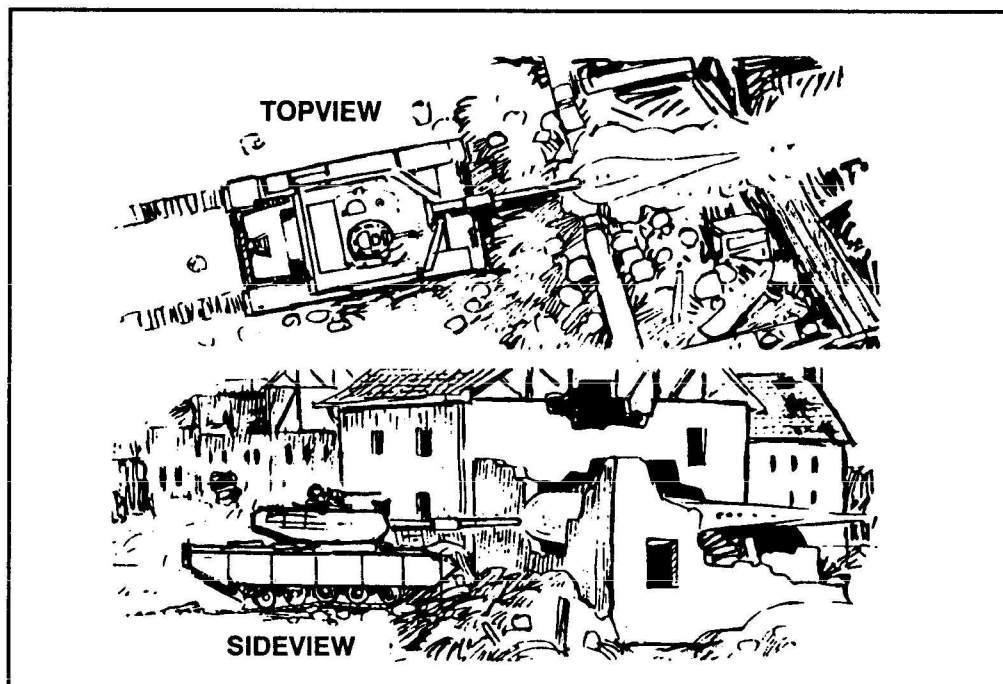


Figure E-8. Hull-down position.

(2) The hide position (Figure E-9) covers and conceals the vehicle until time to move into position for engagement of targets. Since the crew will not be able to see advancing enemy forces, an observer from the vehicle or a nearby infantry unit must be concealed in an adjacent building to alert the crew. The observer acquires the target and signals the armored vehicle to move to the firing position and to fire. After firing, the tank or BFV moves to an alternate position to avoid compromising one location.

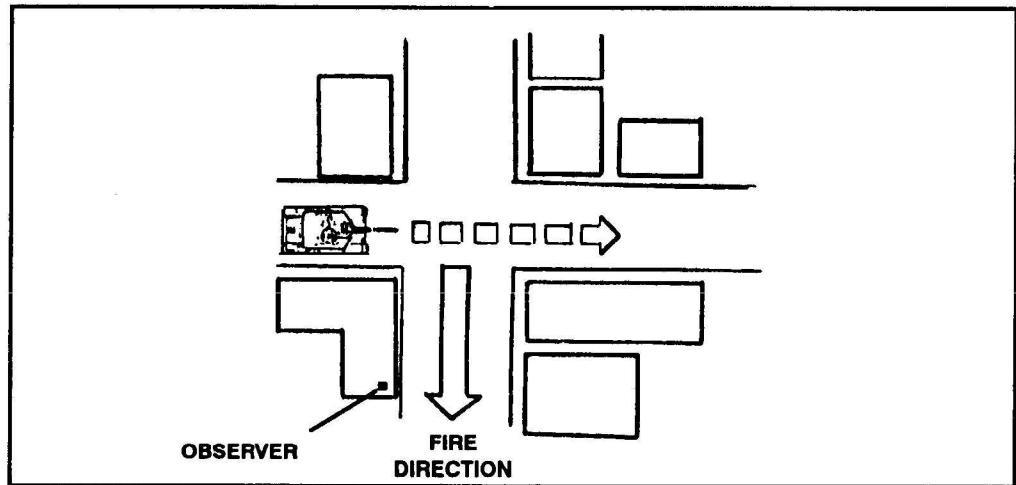


Figure E-9. Hide position.

(3) The building hide position (Figure E-10) conceals the vehicle inside a building. If basement hide positions are inaccessible, engineers must evaluate the building's floor strength and prepare for the vehicle. Once the position is detected, it should be evacuated to avoid enemy fires.

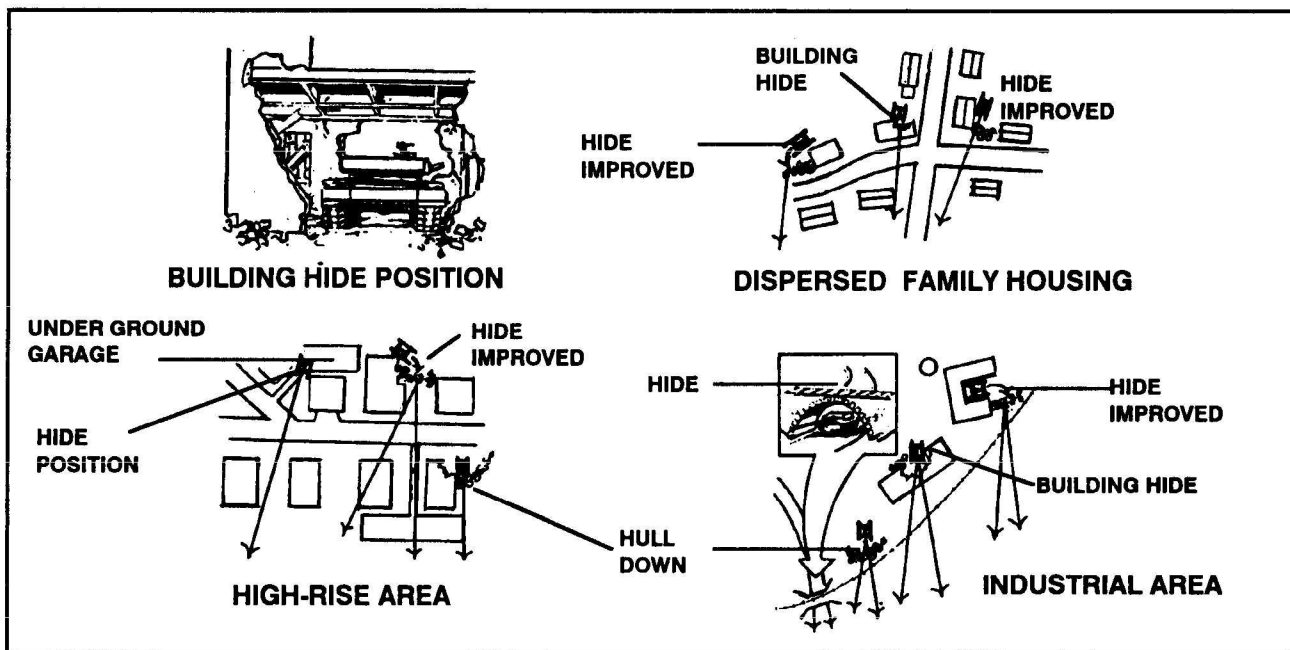


Figure E-10. Building hide position.

E-4. ANTITANK GUIDED MISSILE POSITIONS

Antitank guided missiles must be employed in areas that maximize their capabilities in the built-up area. The lack of a protective transport could require the weapon to be fired from inside or behind a building or behind the cover of protective terrain (Figure E-11).

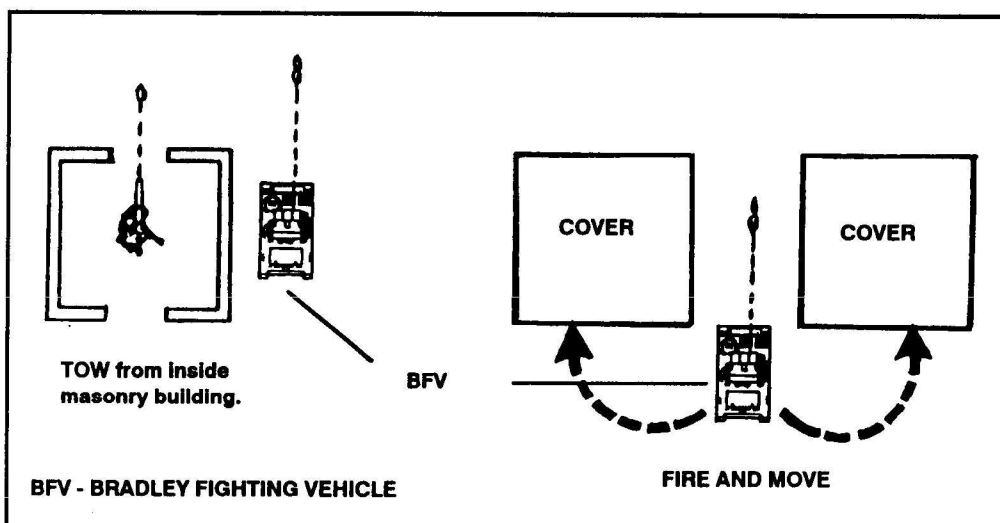


Figure E-11. Antitank guided missiles positions.

a. When ATGMs are fired from a vehicle or from street level or bottom floor fighting positions, rubble can interfere with missile flight. When firing down streets, missiles must have at least 30 inches of clearance over rubble. Other obstacles to missile flight include trees and brush, vehicles, television antennas, buildings, power lines and wires, walls, and fences.

b. A LAW is best suited for built-up areas because its 10-meter minimum arming distance allows employment at close range. LAWs and other light and medium antitank weapons are not effective against the front of modern battle tanks. Because tanks have the least armor protection on the top and rear deck, and the tank presents a larger target when engaged from above, LAWs should fire down onto tanks.

E-6. SNIPER POSITIONS

Snipers contribute to combat in built-up areas by firing on selected enemy soldiers. An effective sniper organization can trouble the enemy far more than its cost in the number of friendly soldiers employed.

a. General areas (a building or group of buildings) are designated as sniper positions (Figure E-12, page E-12), but the sniper selects the best position for engagement. Masonry buildings that offer the best protection, long-range fields of fire, and all-round observation are preferred. The sniper also selects several secondary and supplementary positions to cover his areas of responsibility.

b. Engagement priorities for snipers are determined by the relative importance of the targets to the effective operations of the enemy. Sniper targets usually include tank commanders, direct fire support weapons' crewmen, crew-served weapons' crewmen, officers, forward observers, and radiotelephone operators.

c. Built-up areas often limit snipers to firing down or across streets, but open parts permit engagements at long ranges. Snipers can be employed to cover rooftops, obstacles, dead space, and gaps in FPFs.

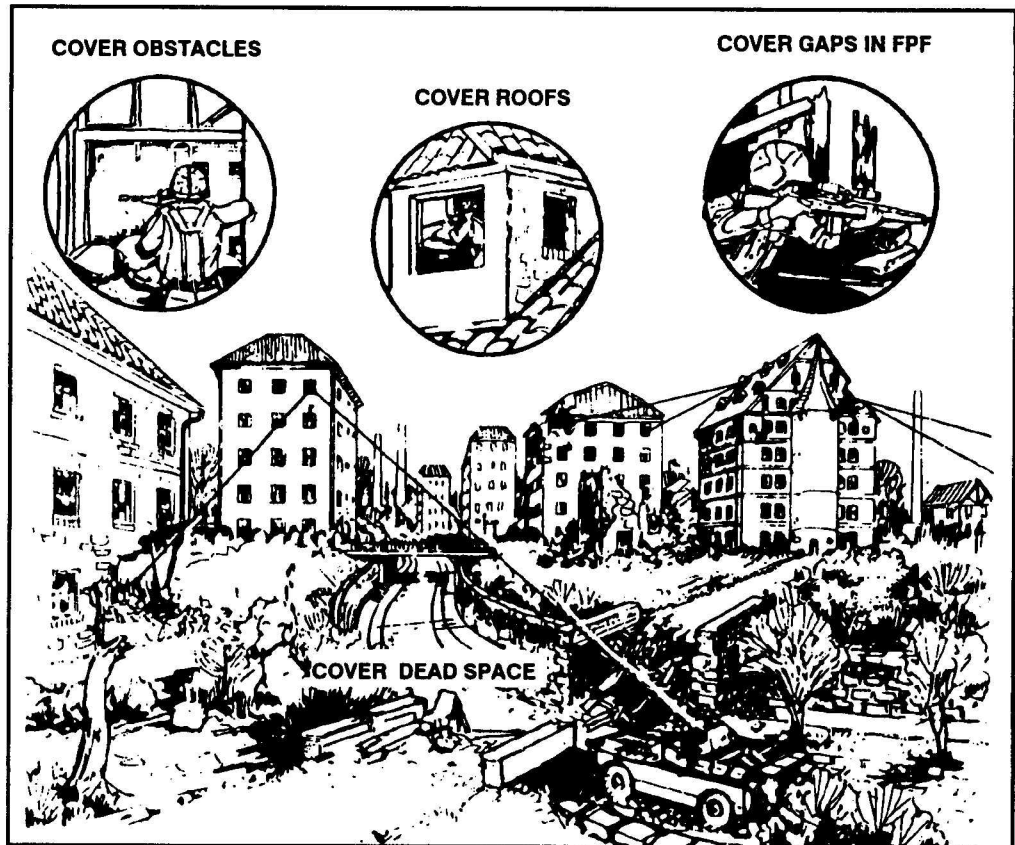


Figure E-12. Sniper positions.

ATTACKING AND CLEARING BUILDINGS

At platoon and squad level, the major offensive tasks for combat in built-up areas are attacking and clearing buildings, which involves suppressing fires, advancing infantry assault forces, assaulting a building, and reorganizing the assault force.

F-1. REQUIREMENTS

Regardless of a structure's characteristics or the type of built-up area, there are four interrelated requirements for attacking a defended building: fire support, movement, assault, and reorganization. Proper application and integration of these requirements reduce casualties and hasten accomplishment of the mission. The application is determined by the type of budding to be attacked and the nature of the surrounding built-up area. For example, medium-size towns have numerous open spaces, and larger cities have high-rise apartments and industrial and transportation areas, which are separated by parking areas or parks. Increased fire support is required to suppress and obscure enemy gunners covering the open terrain and spaces between buildings. Conversely, the centers of small-and medium-size towns, with twisting alleys and country roads or adjoining buildings, provide numerous covered routes that can decrease fire support requirements.

F-2. FIRE SUPPORT

Fire support and other assistance to advance the assault force are provided by a support force. This assistance includes—

- Suppressing and obscuring enemy gunners within the objective building(s) and adjacent structures.
- Isolating the objective building(s) with direct or indirect fires to prevent enemy withdrawal, reinforcement, or counterattack.
- Breaching walls en route to and in the objective structure.
- Destroying enemy positions with direct-fire weapons.
- Securing cleared portions of the objective.
- Providing replacements for the assault force.
- Providing resupply of ammunition and explosives.
- Evacuating casualties and prisoners.

a. The size of the support force is determined by the type and size of the objective building(s); whether the adjacent terrain provides open or covered approaches; and the organization and strength of enemy defenses.

b. The support force could consist of only one infantry fire team with M60 machine guns, M249s, M203 grenade launchers, and M202 multishot flame weapons. In the case of Bradley-equipped units, the BFV may provide support with the 25-mm gun as the rifle team assaults. In situations involving a larger assault force, a platoon or company reinforced with tanks, engineers, and self-propelled artillery may be required to support movement and assault by an adjacent platoon or company.

c. After seizing objective buildings, the assault force reorganizes and may be required to provide supporting fires for a subsequent assault. Each weapon is assigned a target or area to cover. Individual small-arms weapons place fires on likely enemy weapon positions—loopholes, windows, roof areas. Snipers are best employed in placing accurate fire through loopholes or engaging long-range targets. The M202s and M203s direct their fires through windows or loopholes.

d. LAWs and demolitions are employed to breach walls, doors, barricades, and window barriers on the ground level of structures. Tank main guns and BFV 25-mm guns engage first-floor targets and breach walls for attacking infantry. Tank machine guns engage suspected positions on upper floors and in adjacent structures. In addition to destroying or weakening structures, tank main gun projectiles cause casualties by explosive effects and by hurling debris throughout the interior of structures.

e. Artillery and mortars use time fuzes to initially clear exposed personnel, weapons, observation posts, and radio sites from rooftops. They then use delayed fuze action to cause casualties among the defenders inside the structure from shrapnel and falling debris. Artillery can also be used in the direct-fire mode much like the tank and CEV.

F-3. MOVEMENT

The assault force (squad, platoon, or company) minimizes enemy defensive fires during movement by—

- Using covered routes.
- Moving only after defensive fires have been suppressed or obscured.
- Moving at night or during other periods of reduced visibility.
- Selecting routes that will not mask friendly suppressive fires.
- Crossing open areas (streets, space between buildings) quickly under the concealment of smoke and suppression provided by support forces.
- Moving on rooftops that are not covered by enemy direct fires.

a. In lightly defended areas, the requirement for speed may dictate moving through the streets and alleys without clearing all buildings. Thus, the maneuver element should employ infantry to lead the column, closely followed and supported by BFVs or tanks.

b. When dismounted, rifle elements move along each side of the street, with leading squads keeping almost abreast of the lead tanks. When not accompanied by tanks or BFVs, rifle elements move single file along one side of the street under cover of fires from supporting weapons. They are dispersed and move along quickly. Each man is detailed to observe and cover a certain area such as second-floor windows on the opposite side of the street.

F-4. ASSAULT

The assault force, regardless of size, must quickly and violently execute its assault and subsequent clearing operations. Once momentum has been gained, it is maintained to prevent the enemy from organizing a more determined resistance on other floors or in other rooms. The small-unit leaders should keep the assault force moving, yet not allow the operation to become disorganized.

a. An assault in a built-up area involves the elementary skills of close combat. Leaders must—

- Be trained in the required techniques to defeat the enemy in a face-to-face encounter.
- Keep themselves in excellent physical condition.
- Have confidence in their abilities.

b. The composition of the assault force varies depending on the situation; however, the considerations for equipping the force remain the same. The criteria for the size of any party are the availability of equipment and personnel, and the tactical situation. The assault force for a squad should consist of 2 three-man teams carrying only a fighting load of equipment and as much ammunition as possible, especially grenades (Figure F-1). A three-man support team provides suppressive fire for the assault force. The assault teams use maneuver techniques to clear a building room by room.

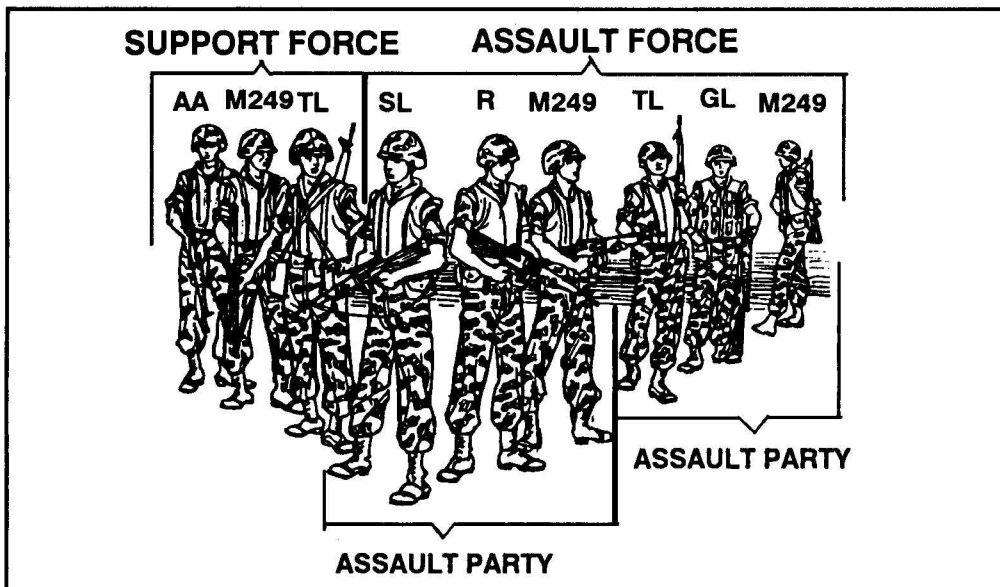


Figure F-1. Rifle squad.

c. The M249 is normally employed with the support element but can also be used with the assault force to gain the advantages of its more powerful round. The Dragon may not be carried by the assault force due to its weight versus its expected effectiveness against the building being assaulted. The squad leader is located with the element from which he can best control the squad. If the squad is understrength or suffers casualties, priority is given to keeping the assault force up to strength at the expense of the support force (see Tables F-1 and F-2).

SUPPORT FORCE	ASSAULT FORCE
3 - 7.62-mm (Coaxial) 2 - M249s	(Each squad organized into two- or three-man assault/support parties).
1 - Dragon	2 - 7.62-mm (4 - M249s)
1 - M202	* 2 - Dragons
LAWs	LAWs
4 - 25-mm guns	Hand grenades
* Dependent upon Dragon's effectiveness against building being attacked.	

Table F-1. Bradley platoon.

SUPPORT FORCE	ASSAULT FORCE
2 - 7.62-mm	LAWs
2 - Dragons	Hand grenades
1 - M202	* 1 - Dragon
4 - M249s	2 - M203s
4 - M203s	2 - M249s
LAWs	
* Dependent upon Dragon's effectiveness against building being attacked.	

Table F-2. Alternative with an infantry rifle platoon.

F-5. CLEARING

Entry at the top and fighting downward is the preferred method of clearing a building (Figure F-2). Clearing a building is easier from an upper story since gravity and building construction become assets to the assault force when throwing hand grenades and moving from floor to floor. This method is only feasible, however, when access to an upper floor or rooftop can be gained from the windows or roofs of adjoining, secured buildings; or, when enemy air defense weapons can be suppressed and troops transported to the rooftops by helicopter. Helicopters should land only on those buildings that have special heliports on the roofs or parking garages. Soldiers can rappel onto the roof or dismount as the helicopter hovers a few feet above the roof. Troops then breach the roof or common walls with explosives and use ropes to enter the lower floors. Stairs are guarded by friendly security elements when not used.

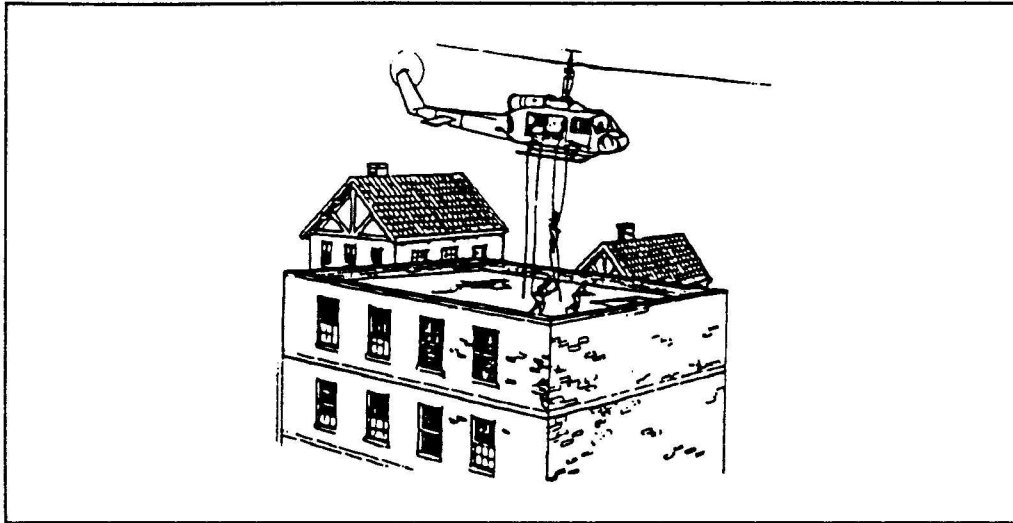


Figure F-2. Helicopters used to clear buildings.

a. Although the top-to-bottom method is preferred for clearing a building, assaulting the bottom floor and clearing upward is a common method in all areas except where buildings form continuous fronts. In this situation, the assault force attempts to close on the flank(s) or rear of the building. The assault team clears each room on the ground floor and then, moving up, begins a systematic clearance of the remaining floors.

b. Preferably, entry is gained through walls breached by explosives or gunfire. Assault teams avoid windows and doors since they are usually covered by fire or are boobytrapped. If tanks are attached to the company, they can breach the wall by main gunfire for one entry point (Figure F-3).

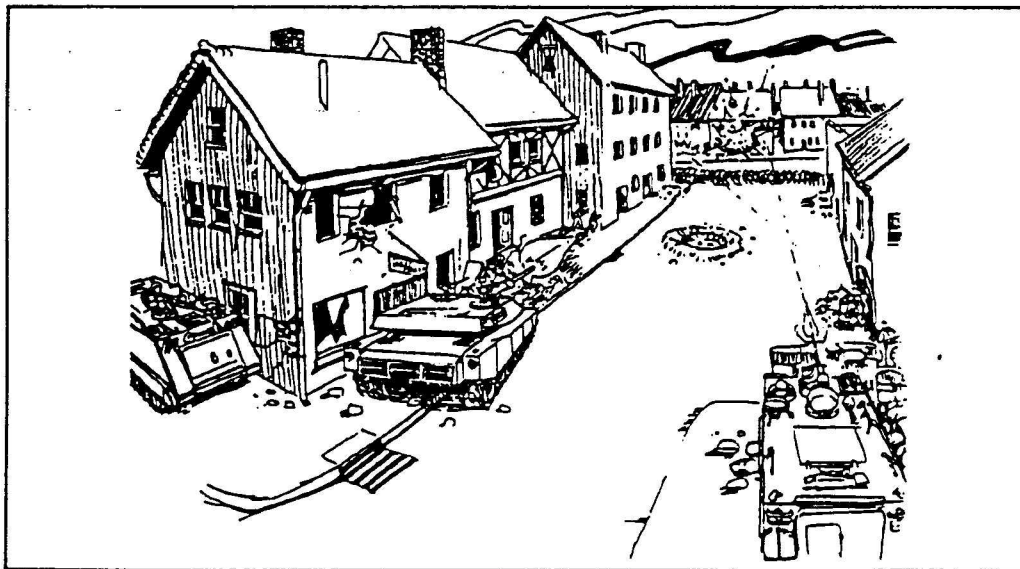


Figure F-3. Main gun used to breach exterior.

c. Just before the rush of the assault force, suppressive fires on the objective should be increased by the support force and continued until masked by the advancing assault force. Once masked, fires are shifted to upper windows and continued until the assault force has entered the building. At that time, fires are shifted to adjacent buildings to prevent enemy withdrawal or reinforcement.

d. Assault parties quickly close on the building. Before entry through the breached wall, a hand grenade is cooked off (pin pulled, safety lever released, and held for two seconds before being thrown) and vigorously thrown inside. Immediately after the explosion, assault parties enter and spray the interior, using three-round bursts and concentrating on areas of the room that are possible enemy positions.

e. Once inside the building, the priority tasks are to cover the staircase leading to upper floors and the basement, and to seize rooms that overlook approaches to the building. These actions are required to isolate enemy forces within the building and to prevent reinforcement from the outside. The assault parties clear each ground floor room and then the basement.

(1) The assault team leader determines which room(s) to clear first.

(2) The support team provides suppressive fire while the assault team is systematically clearing the building. It also provides suppressive fire on adjacent buildings to prevent enemy reinforcements or withdrawal. The support team destroys any enemy trying to exit the building.

(3) After assault team 1 establishes a foothold in the building, a soldier from assault team 2 positions himself to provide security for the foothold. Assault team 1 proceeds to clear the first room.

(a) Soldier 1 throws a grenade into the room and yells, "Frag out," to alert friendly personnel that a grenade has been thrown toward the enemy.

WARNING

If walls and floors are thin, fragments from hand grenades can injure soldiers outside the room.

*(b) After the grenade explodes, soldier 2 enters the room and positions himself to the left of the door up against the wall, scanning the room from left to right. (Soldiers 1 and 3 provide outside room security.) Soldier 2 will give a voice command of "All clear" before soldier 3 enters the room.

(c) Soldier 3 shouts, "Coming in," and enters the room. He positions himself to the right of the door up against the wall and scans the room from right to left. (Soldier 2 provides inside room security and soldier 1 provides outside room security.)

(d) Soldier 1 positions himself up against the hall wall so that he can provide security outside the room and can also observe into the room.

(e) Soldier 3 proceeds to clear the room while soldier 2 provides inside room security. Soldier 1 remains at his outside security position.

(f) After the room is cleared, the clearing team shouts, "Coming out," and proceeds to clear the next room(s). A soldier from the second assault

team positions himself to cover the cleared room. The cleared rooms are marked IAW unit SOP.

(g) This procedure is continued until the entire floor is cleared.

f. If the assault force is preparing to clear a building from the top floor down, they should gain entrance through a common wall or the roof of an adjoining building. Accompanied by the company's attached engineer squad, the force uses a demolition charge to breach the wall and to gain entrance to the top floor. Access to lower floors and rooms may be gained by breaching holes in the floor and having the soldiers jump or slide down ropes to the lower floors. Stairs can be used if they are first cleared.

g. When using the top-to-bottom method of clearing, security requirements remain the same as for other methods (Figure F-4). After the floor is breached to gain access to a lower floor, a grenade is allowed to cook off and is dropped to the lower room. A soldier then sprays the lower room with gunfire using three-round bursts and drops through-the mousehole.

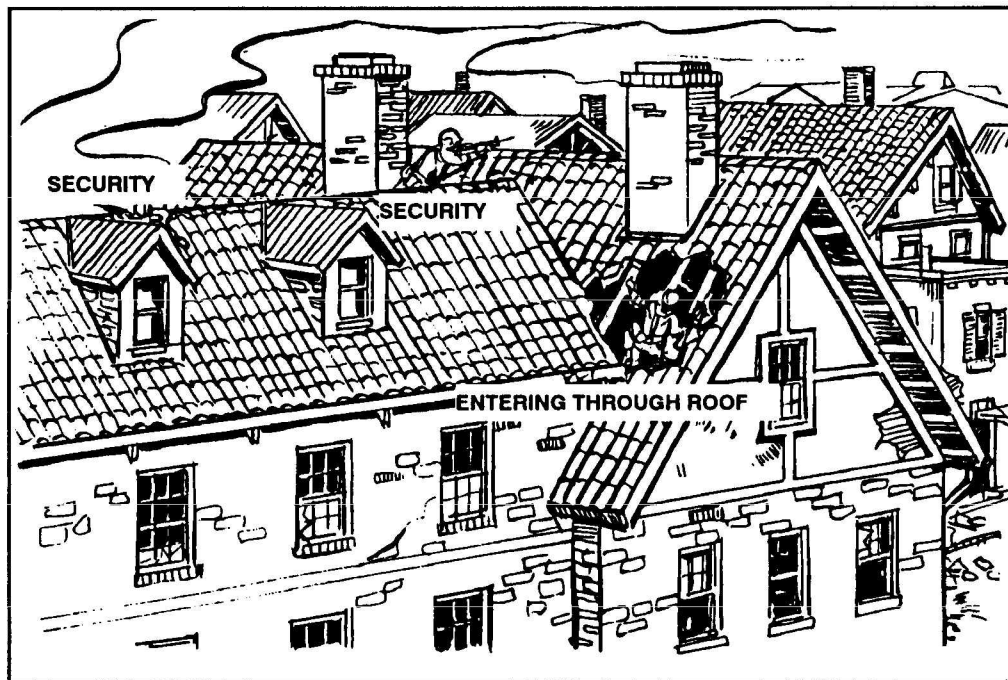


Figure F-4. Upper floors secured.

h. Soldiers must avoid clearing rooms the same way each time by varying techniques so that the enemy cannot prepare for the assault (Figure F-5, page F-8). As rooms are cleared, doors should be left open and a predetermined mark (cloth, tape, spray paint) placed on the doorjamb or over the door.

i. If there is a basement, it should be cleared as soon as possible, preferably at the same time as the ground floor. The procedures for clearing a basement are the same as for any room or floor, but important differences do exist. Basements often contain entrances to tunnels such as sewers and communications cable tunnels. These should be cleared and secured to prevent the enemy from infiltrating back into cleared areas.

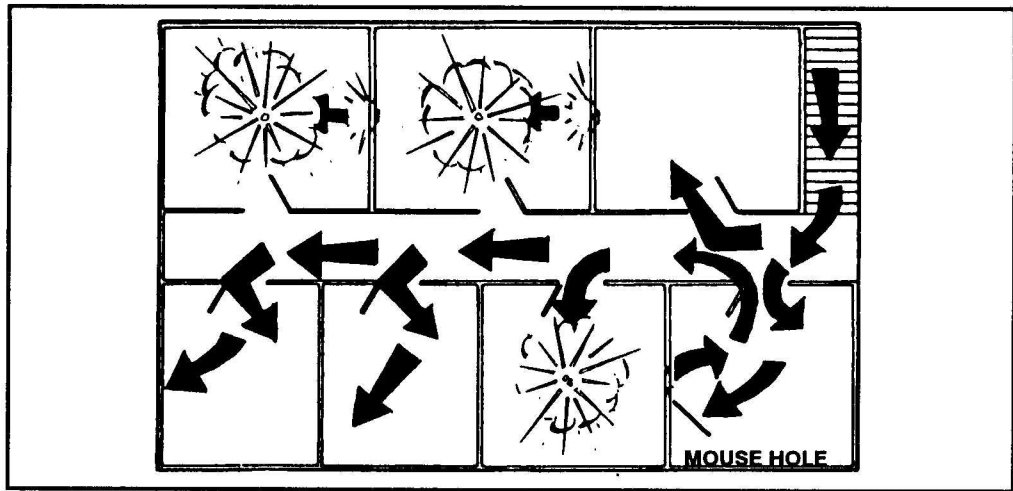


Figure F-5. Varying techniques for clearing rooms.

j. The most common types of buildings that must be cleared are brick buildings, brick houses, box-wall buildings, heavy-clad framed buildings, and light-clad framed buildings (Figure F-6). The best way to enter a brick building is to blow a breaching hole in the side with a tank firing HEAT ammunition. If tanks are not available, a door or window in the rear of the building usually provides better cover and concealment for entry than one in the front. If there is enough cover and concealment, the assault force should enter the rear of the building at an upper level, using a fire escape or grapplinghook.

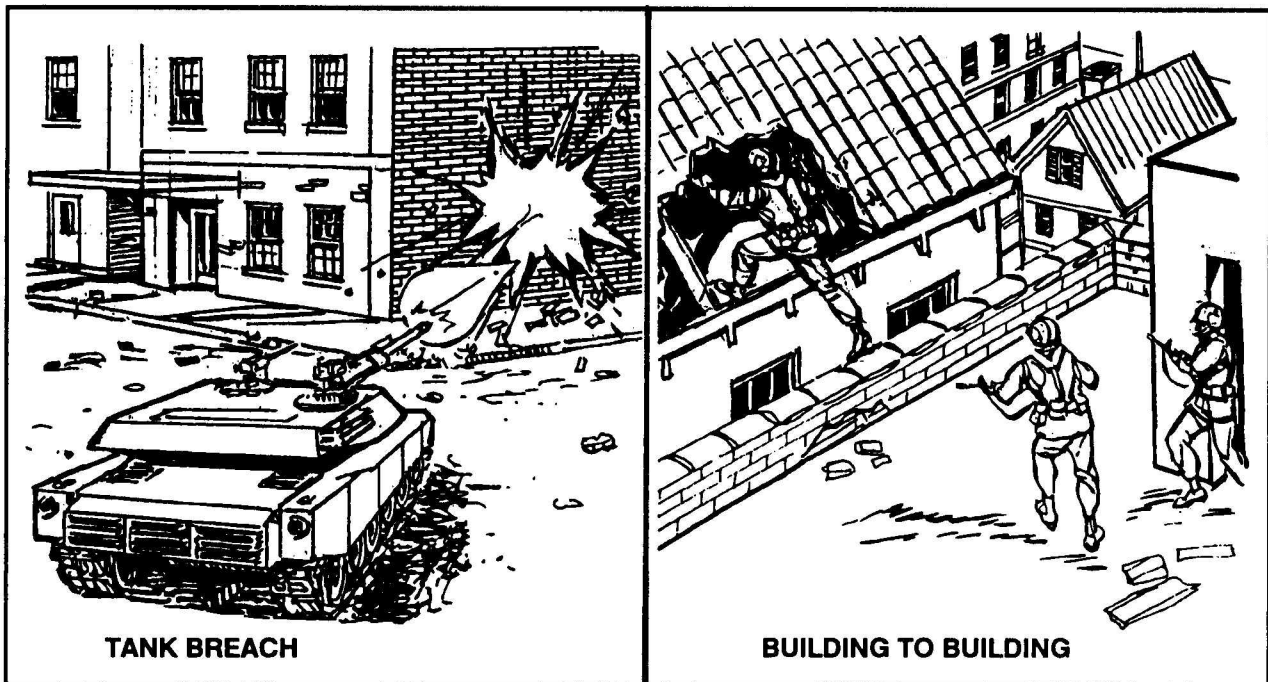


Figure F-6. Building being cleared.

(1) *Brick buildings.* To clear from building to building, the best method is to move from roof top to rooftop since the roofs of brick buildings are usually easy to breach. The walls between buildings are at least three bricks thick (total of six bricks between buildings) and require large quantities of demolitions to breach. Walls are normally easier to breach on an upper floor than a lower floor, since the walls are thinner on upper floors. If rooftops are covered by fire and if there are not enough demolitions to breach walls between buildings, clearing from rear to rear of buildings is safer than clearing from front to front. The floor plans in brick buildings are different on ground floor levels than on upper levels (Figure F-7).

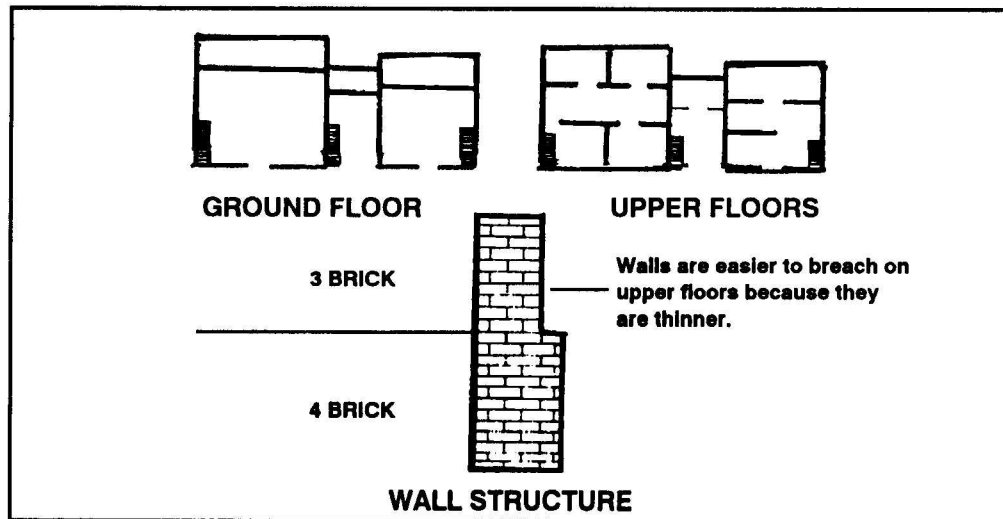


Figure F-7. Floor plans of brick buildings.

(2) *Brick houses.* Brick houses have similar floor plans on each floor (Figure F-8), therefore, ground floors are cleared the same way as upper floors.

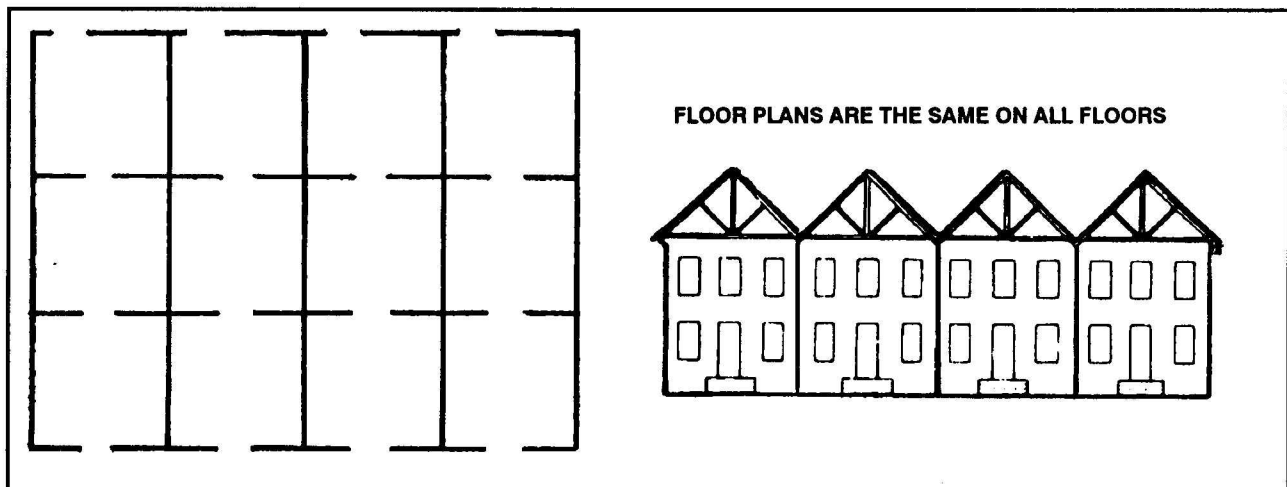


Figure F-8. Similar floor plans.

(3) *Box-wall buildings.* Box-wall buildings often have reinforced concrete walls (Figure F-9), which are difficult to breach due to the reinforcing bars. Therefore, the best way to enter is to blow down the door or to blow in one of the side windows. The floor plans of these buildings are predictable; clearing rooms is usually done from one main hallway. Interior walls are also constructed of reinforced concrete and are difficult to breach. The stairways at the ends of the building must be secured during clearing.

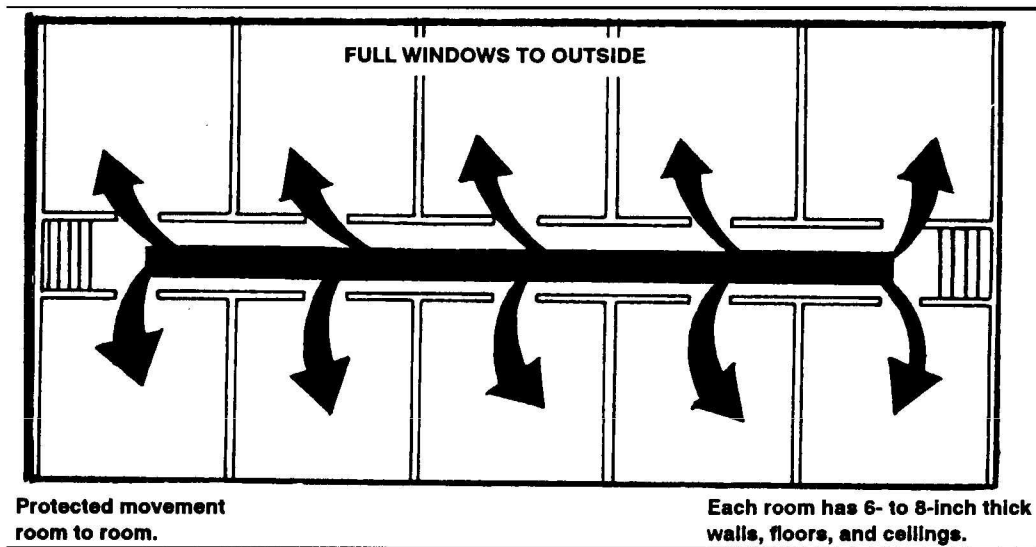


Figure F-9. Box-wall principle buildings.

(4) *Heavy-clad framed buildings.* Heavy-clad framed buildings are relatively easy to breach, because a tank can breach a hole in the cladding (Figure F-10). Their floor plans are oriented around a stairway or elevator, which must be secured during clearing. The interior walls of these buildings can be breached, although they may require use of demolitions.

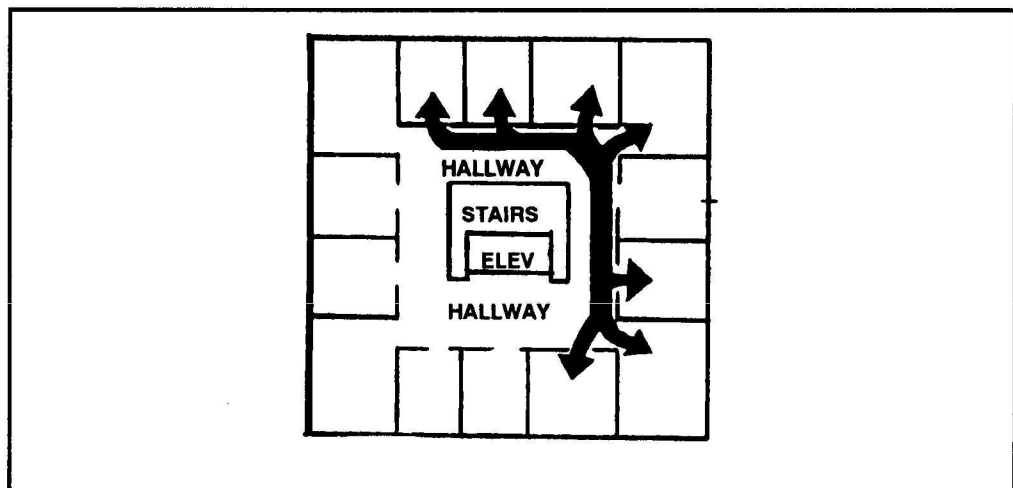


Figure F-10. Heavy-clad framed buildings.

(5) *Light-clad framed buildings.* On light-clad framed buildings (Figure F-11), the clearing tasks are usually the same: secure the central stairway and clear in a circular pattern. Walls are easier to breach since they are usually thin enough to be breached with an axe.

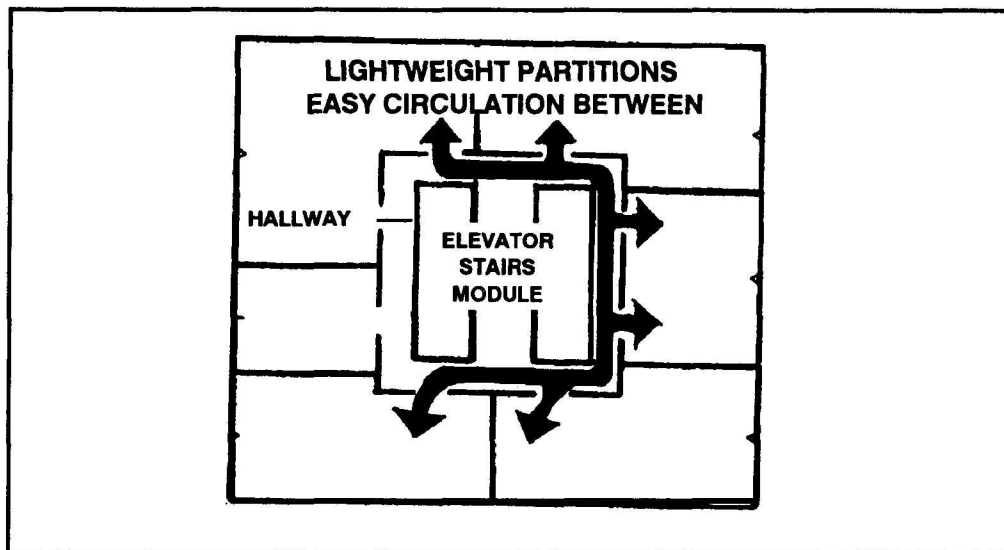


Figure F-11. Light-clad framed buildings.

Reorganization of the assault force in a cleared building must be quick to repel enemy counterattacks and to prevent the enemy from infiltrating back into the cleared building. After securing a floor (bottom, middle, or top), selected members of the assault force are assigned to cover potential enemy counterattack routes to the building. Those sentinels alert the assault force and place a heavy volume of fire on enemy forces approaching the building. They guard—

- Enemy mouseholes between adjacent buildings.
- Covered routes to the building.
- Underground routes into the basement.
- Approaches over adjoining roofs.

As the remainder of the assault force completes search requirements, they are assigned defensive positions. After the building has been cleared, the following actions are taken:

- Resupplying and redistributing ammunition.
- Marking the building to indicate to friendly forces that the building has been cleared.
- Assuming an overwatch mission and supporting an assault on another building.
- Treating and evacuating wounded personnel.
- Developing a defensive position if the building is to be occupied for any period.