CHAPTER 8

OBSTACLES, MINES, AND DEMOLITIONS

In urban combat, obstacles and mines are used extensively by the defender to canalize the enemy, impede his movement, and disrupt his attack. The national policy of the United States severely restricts the use of antipersonnel land mines, beginning with those that do not self-destruct but eventually including all types. This policy, currently in effect, applies to all units either engaged in, or training for, operations worldwide. US national policy forbids US forces from using standard or improvised explosive devices as booby traps. This policy does ***not*** *affect the standard use of antivehicular mines. It does* ***not*** *affect use of the M18 Claymore mine in the command-detonated mode. For the immediate future, units may still use self-destructing antipersonnel mines, such as the ADAM, when authorized by the appropriate commander. Under proper command authority, units may still emplace mixed minefields containing self-destructing antipersonnel land mines used to protect antivehicular land mines; for example, MOPMS or Volcano. Consider all references to antipersonnel mines and the employment of minefields in the light of the national policy limiting the use of nonself-destructing antipersonnel land mines. Readers should not construe any uses of the term mines, antipersonnel obstacle, protective minefield, or minefield contained in this manual to mean a US-emplaced obstacle that contains nonself-destructing antipersonnel land mines or booby traps.*

Section I. OBSTACLES

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

8-1. TYPES OF OBSTACLES

Command-detonated mines, barbed wire, and exploding flame devices are used to construct antipersonnel obstacles (Figures 8-1 through 8-5, pages 8-2 through 8-4). (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 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 friendly weapons fire. Tactical wire is usually positioned on the friendly side of the machine gun's final protective line (FPL).

(3) Supplementary obstacles are used to break up the pattern of tactical obstacles to prevent the enemy from locating friendly weapons.

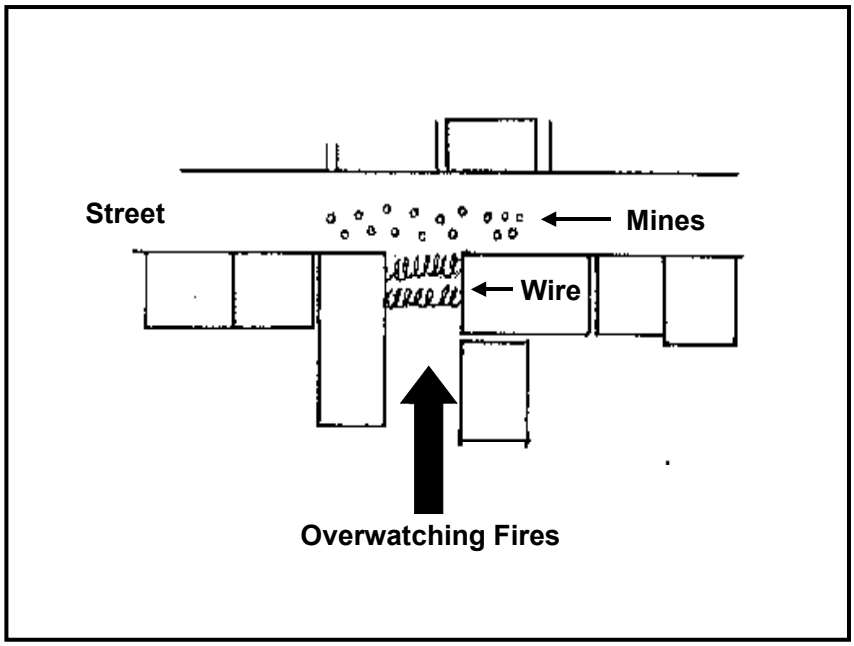


Figure 8-1. Mines and wire.

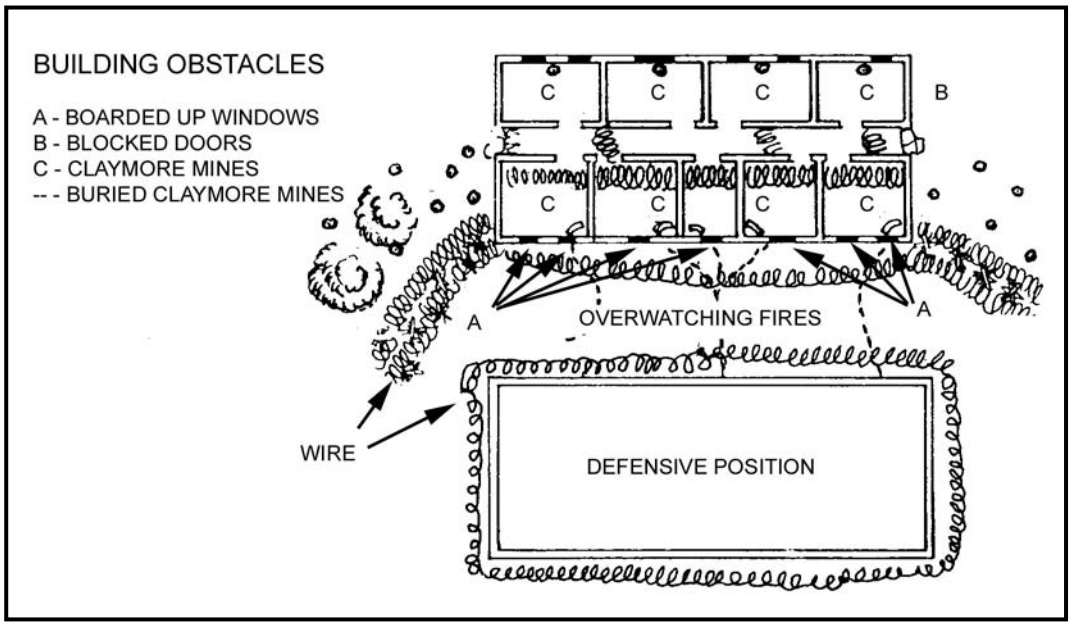


Figure 8-2. Building obstacles.

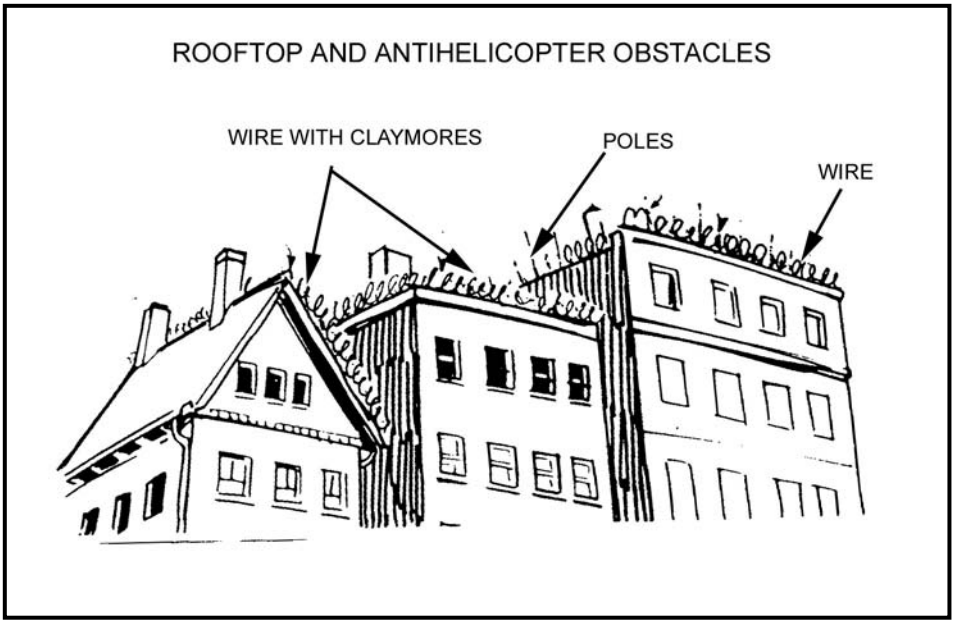


Figure 8-3. Rooftop and helicopter obstacles.

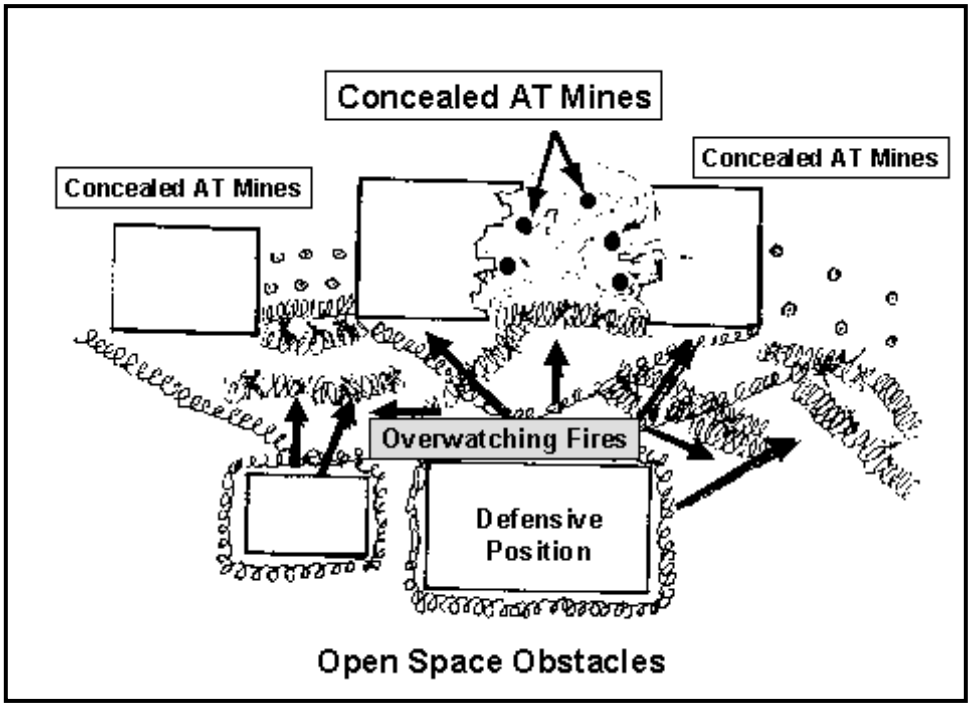


Figure 8-4. Open space obstacles.

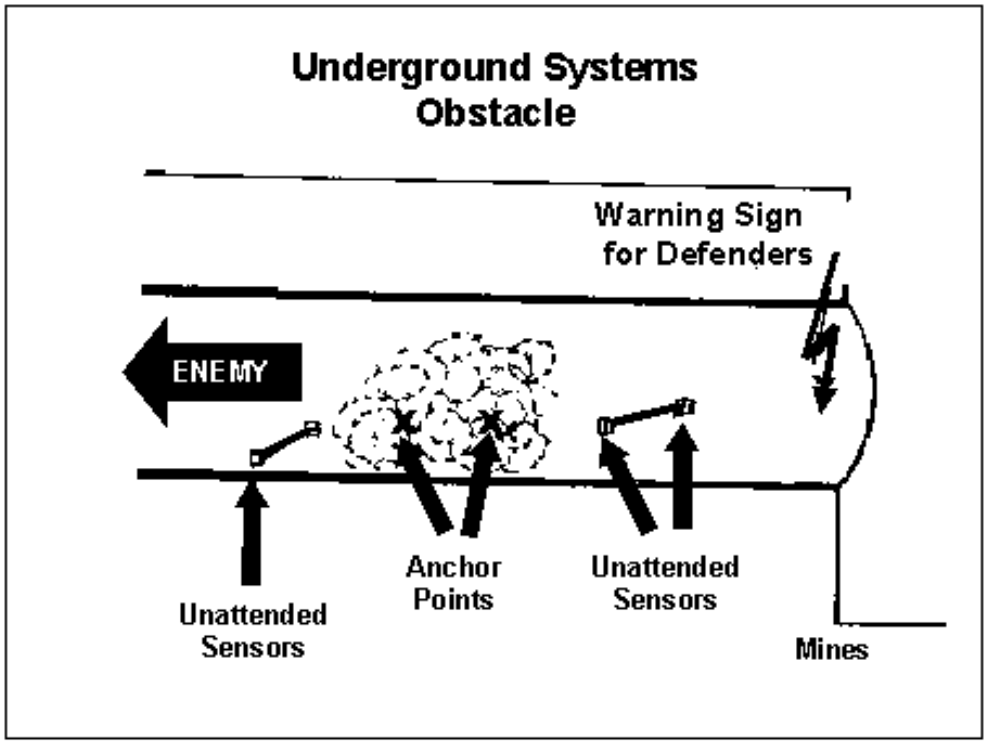


Figure 8-5. Underground systems obstacle.

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

c. Antiarmor obstacles are restricted to streets and open areas (Figures 8-6 through 8-11, pages 8-5 through 8-7).

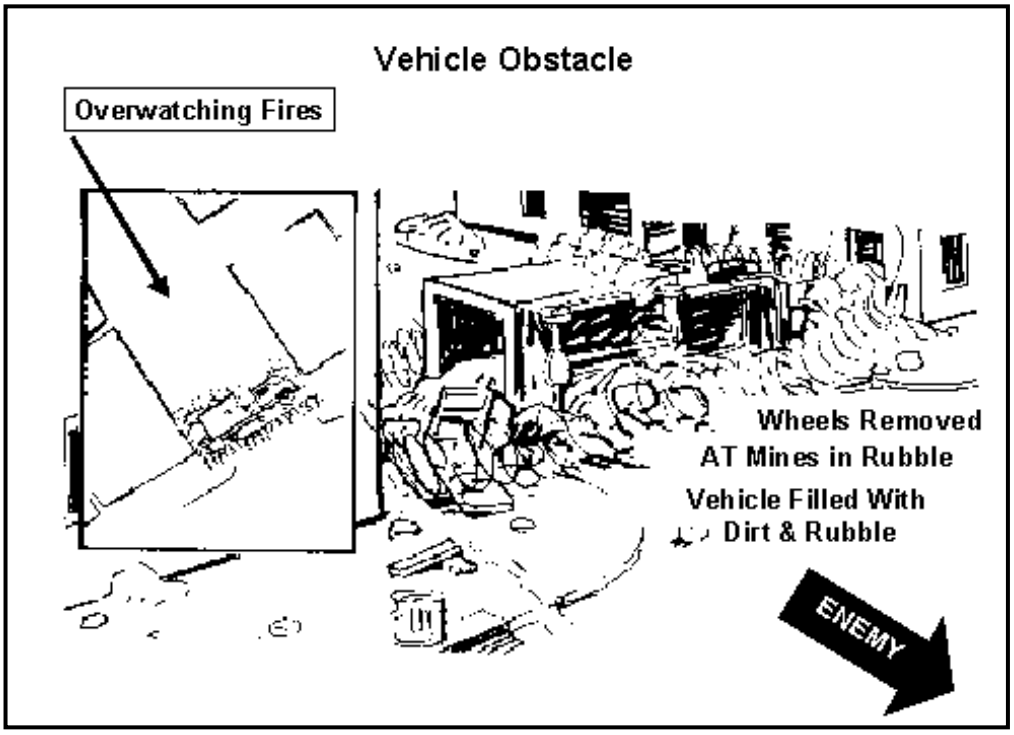


Figure 8-6. Vehicle obstacle.

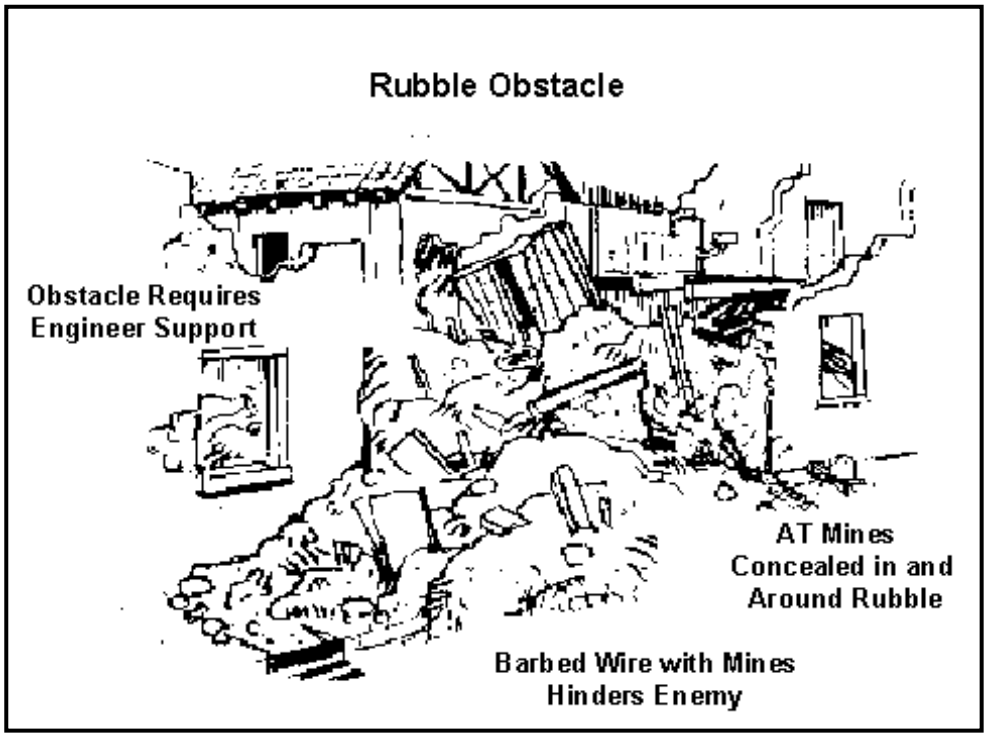


Figure 8-7. Rubble obstacle.

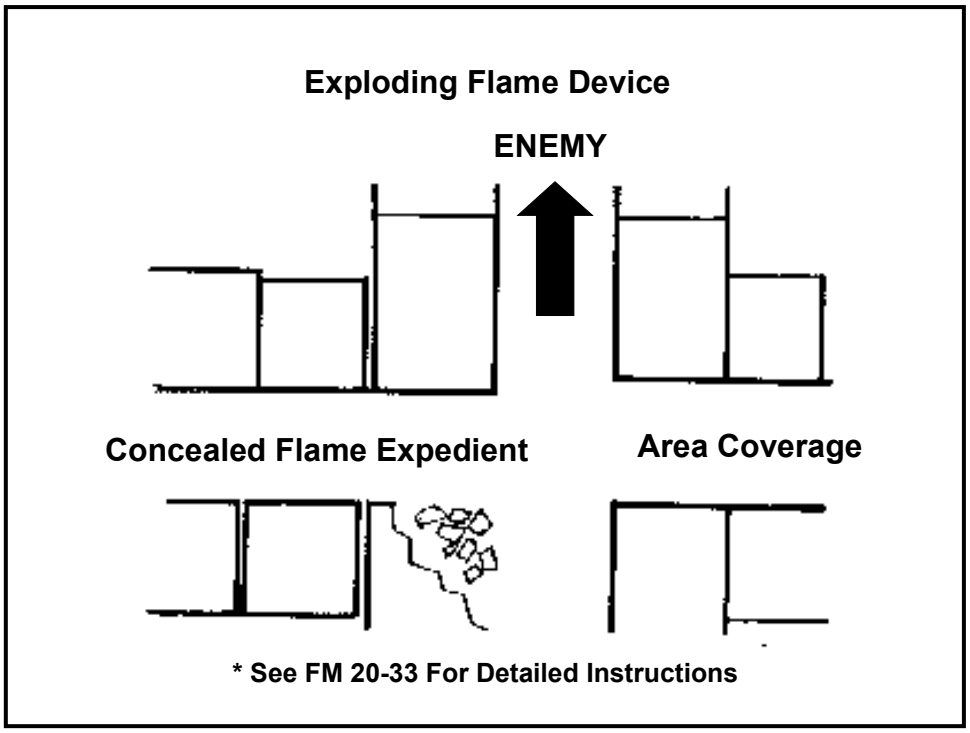


Figure 8-8. Exploding flame device.

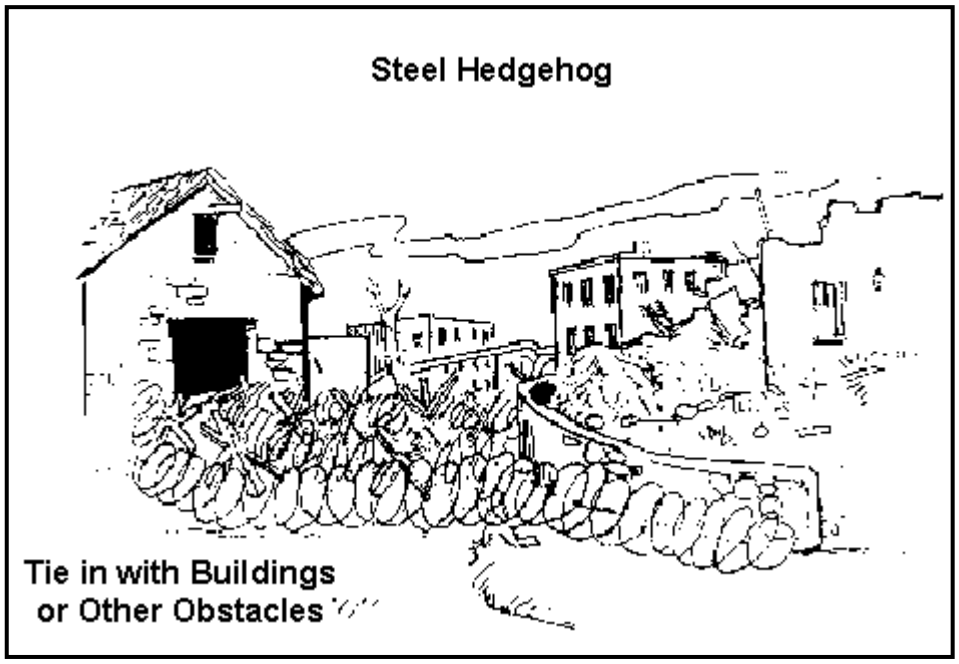


Figure 8-9. Steel hedgehog.

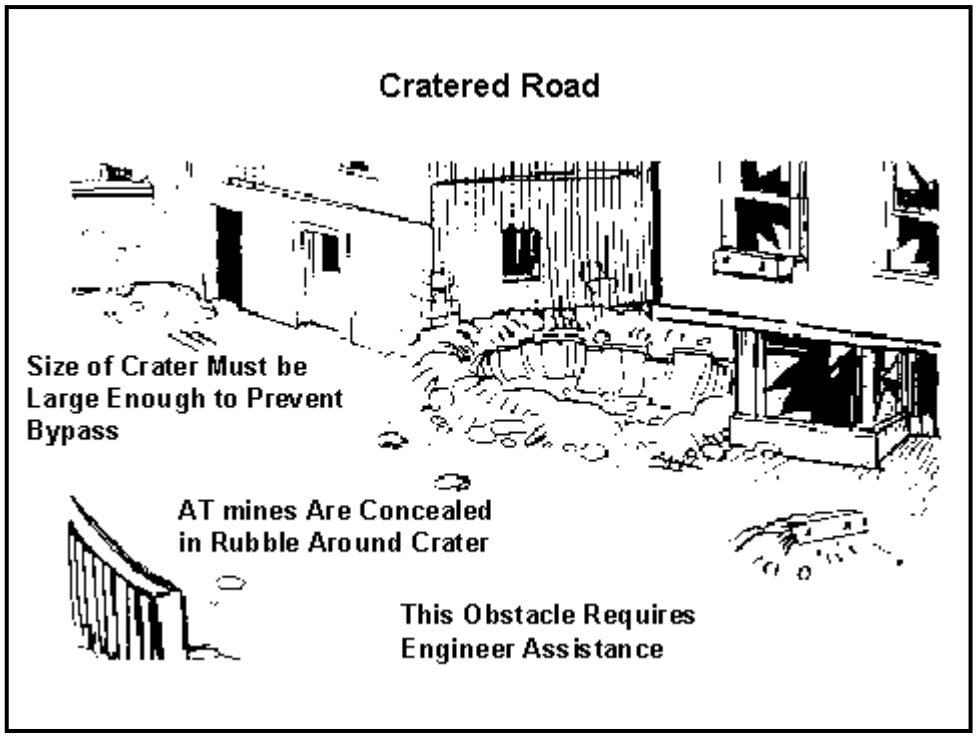


Figure 8-10. Road craters.

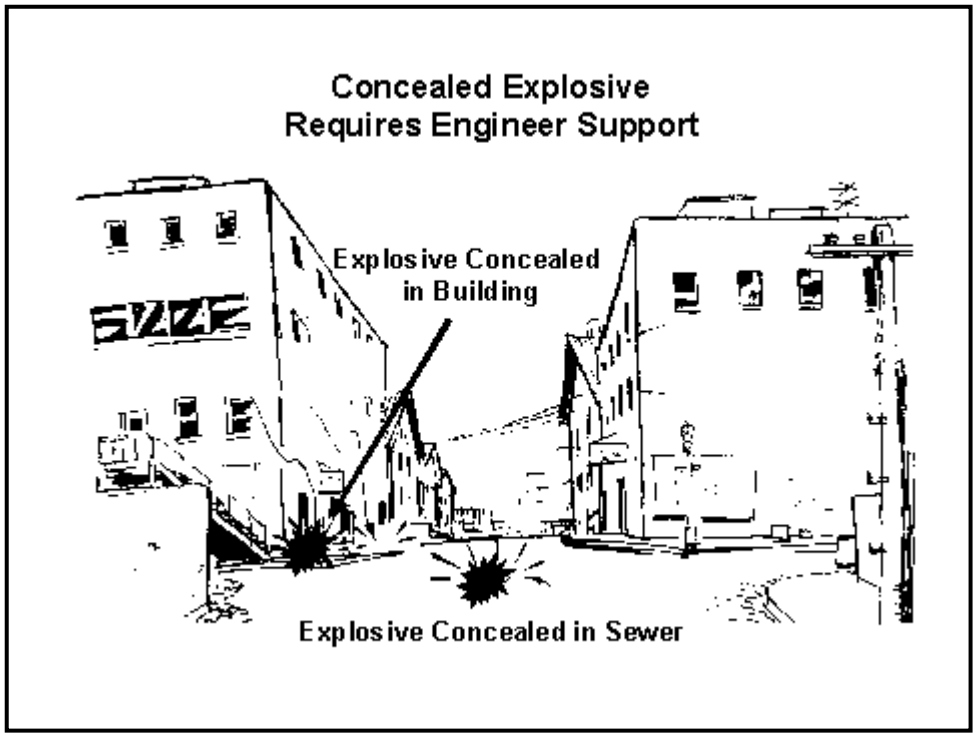


Figure 8-11. Concealed explosive.

8-2. 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 rubbling with explosives or flame, or by using wire. The building can be prepared as an explosive or flame trap for execution after enemy occupation.

Section II. MINES

On 16 May 1996, Public Law 104-295 (Leahy Amendment) took effect. US policy forbids the use of booby traps and nonself-destructing antipersonnel land mines. Mines found in built-up areas should be recorded on a building sketch. The sketch should include the number of the building (taken from a city map) and floor plans. It should also include the type of mine and firing device, if known. When identified, mined buildings should be marked on the friendly side. 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 8-1 for the approving authority for minefields.)

TYPE MINEFIELD	APPROVING AUTHORITY
Protective hasty	Brigade commander (may be delegated down to battalion level 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 level).
Short duration (less than 24 hours)	Corps commander (may be delegated to division, brigade, or battalion level).

Table 8-1. Minefield employment authority.

8-3. TYPES OF MINES AND EMPLOYMENT TECHNIQUES

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

a. 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 C4 can be removed from the mine and used as an explosive, if authorized.

(2) Claymore mines can be mixed with antitank mines in nuisance minefields. They can fill the dead space in the final protective fires of automatic weapons (Figure 8-12).

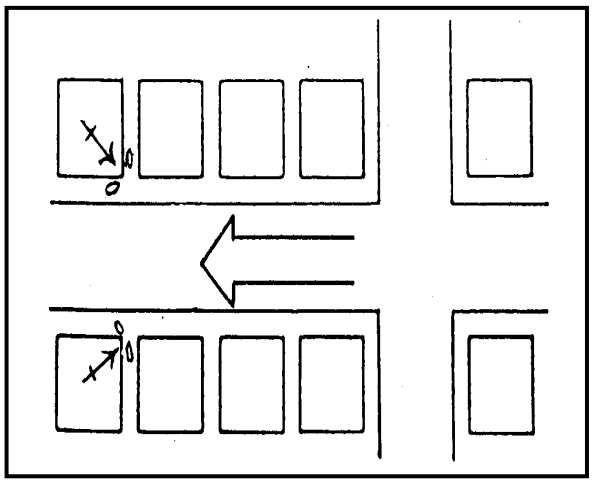


Figure 8-12. Claymore mines used to cover dead space of automatic weapons.

(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 escape routes (Figure 8-13).

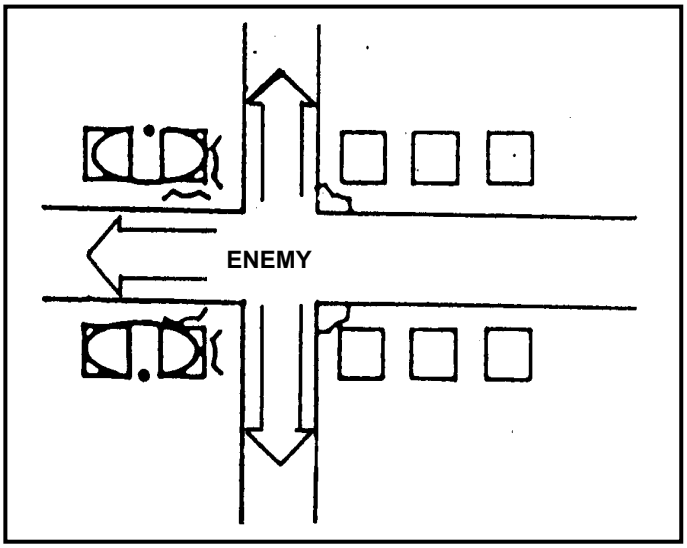


Figure 8-13. Claymore mines used to block enemy escape routes.

b. The M15, M19, and M21 antitank mines are employed (Figure 8-14, page 8-10)—

- In conjunction with other man-made obstacles and covered with fire.
- As standard minefields 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.

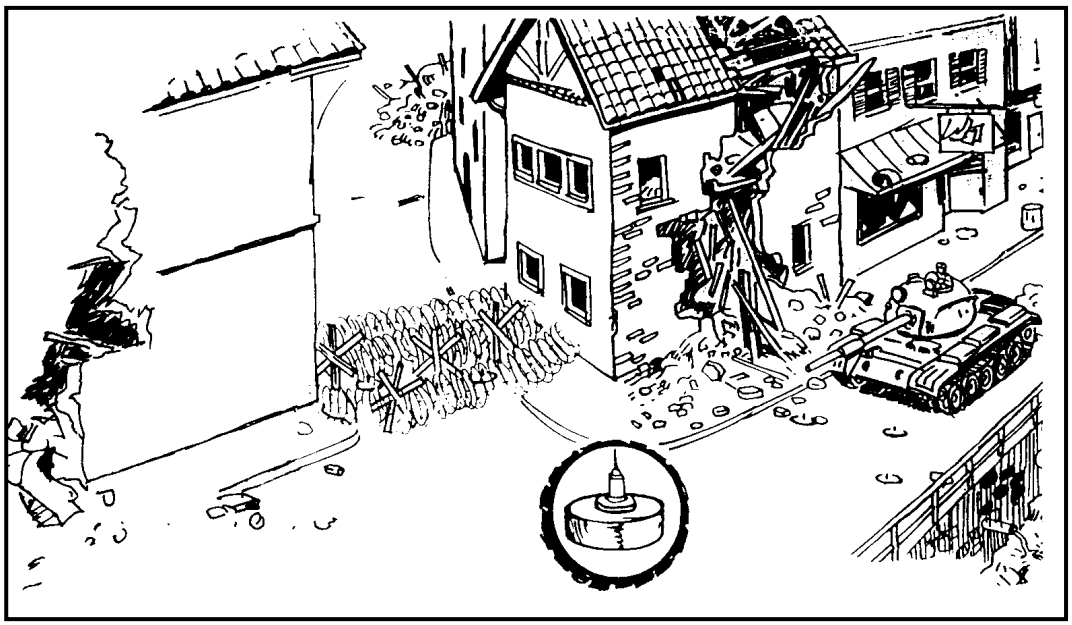


Figure 8-14. Emplacement of antitank mines.

8-4. ENEMY MINES AND BOOBY TRAPS

Buildings contain many areas and items that are potential hiding places for booby traps such as 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 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 urban combat (Figure 8-15).

a. Equipment used in clearing operations:
   - Mine detectors.
   - Probes.
   - Grappling hooks.
   - Ropes.
   - Bulk explosives and firing devices.
   - Protective vests (at least PASGT). (EOD vests are best, but heavy).
   - Eye protection.
   - Engineer tape or other marking devices such as florescent spray paint.

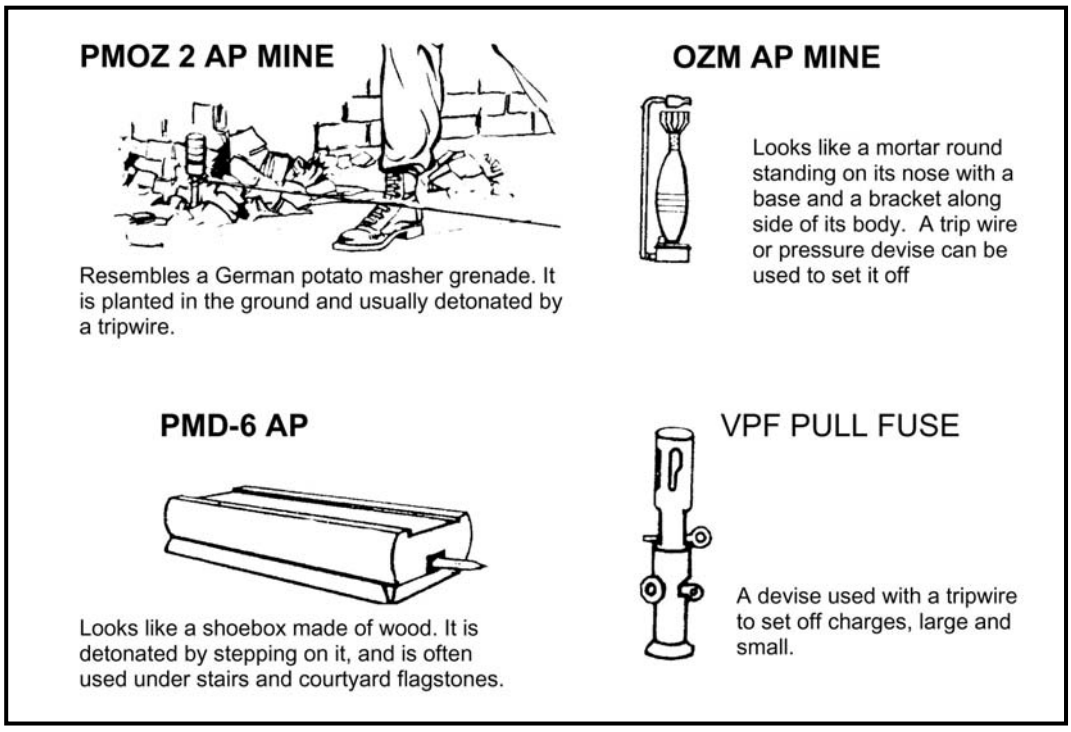


Figure 8-15. Threat mines and booby traps.

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

c. To detect tripwires, 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 8-16, page 8-12).

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 sketch over to the platoon leader or S2.

e. Explosive ordnance disposal (EOD) personnel should neutralize most booby traps. If EOD teams are not available, booby traps can be blown in place. Personnel should move to 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 can be used to mark booby traps. If tape is not available, strips ripped from bedsheets can be used.

f. If possible, a guide should lead personnel through known booby-trapped areas. Prisoners and civilians can be a good source of information on where and how booby traps are employed.

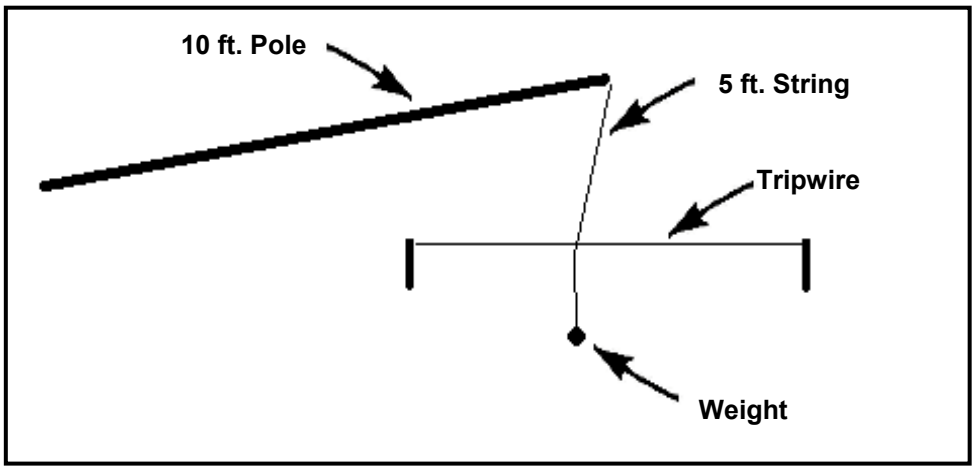


Figure 8-16. Trip wire detection.

Section III. DEMOLITIONS

Demolitions are used more often during urban combat than during operations in open terrain. The engineers that support the brigade, battalion task force, and company team should enforce demolition operations. However, if engineers are involved in preparing and executing the barrier plan, infantrymen can prepare mouseholes, breach walls, and rubble buildings themselves, assisted and advised by the brigade, task force, or team engineer.

8-5. OFFENSIVE USE

When assaulting or clearing an urban area, demolitions enable the maneuver commander to create an avenue of approach through buildings. As discussed earlier, the infantry commander forms his personnel into assault and support elements to seize and clear buildings.

a. Prefabricate expedient charges and initiation systems. Cross load charges and explosives so as not to overburden any one individual with unnecessary explosives, and to keep the charges dispersed if compromised. Ensure that the caps and charges are separate, but within the breach element. As METT-TC dictates, cross loading explosives within elements of the assault may be necessary. Once a foothold is established, redistribute the explosives for the next COA during consolidation and reorganization.

b. One of the most difficult breaching operations faced by the assault element is the breaching of masonry and reinforced concrete walls. Always look for an alternate entry point, including safe firing positions and movement routes, before committing the element. Also consider the effects of blast waves, overpressure, and secondary missile projectiles in direct relationship to the charge and charge placement.

(1) Normally, building walls are 15 inches thick or less and will vary depending on the theatre of operations. C4 is an ideal charge to use when assuming all outer walls are constructed of reinforced concrete. When breaching external walls, place six to eight horizontal blocks of C4 10 to 12 inches apart in two columns (three or four blocks in each column). Prime at the outer edge of each block using a ring main and sliding uli knots.

The supplied adhesive may not be strong enough to hold the blocks in place. A frame can be constructed out of cardboard or other available sheeting to mount the charge on, then prop sticks are used to secure the charge in place. *(Always use two methods of attachment precluding a failed breach.)* When detonated, this will clear concrete from the wall large enough for a man to pass through and expose the rebar reinforcement. (Refer to FM 5-34 for steel-cutting rules of thumb for chains, cables, rods, and bars.)

(2) All reinforced concrete breaches should have two shots planned—one for concrete and one for rebar. Rebar may also be defeated by thermal, mechanical or ballistics means. METT-TC and experience will determine what technique would best fit the situation. In all cases, rebar can be a time-consuming and dangerous objective. Breaching personnel must have extended suppression of enemy fires while this task is being performed due to their level of exposure. Fragmentation or concussion grenades should be thrown into the opening to clear the area of enemy. The amounts of TNT required to breach concrete are shown in Table 8-2.

NOTE: Prop sticks become secondary projectiles when used.

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 8 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 CONCERT MASONARY		
THICKNESS OF MATERIAL	TNT	SIZE OF OPENING
Up to 35 CM (14 inches)	1 KG (2.2LBS)	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)

Table 8-2. TNT required to breach concrete.

c. Mouseholes provide the safest method of moving between rooms and floors. Although they can be created with explosives, all mechanical means should be used first. When assaulting a unit in the defense, mouseholes may be provided.

d. When enemy fire prevents an approach to the wall, the breaching charge may be attached to a pole and slid into position for detonation at the base of the wall (Figure 8-17, page 8-14). 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.

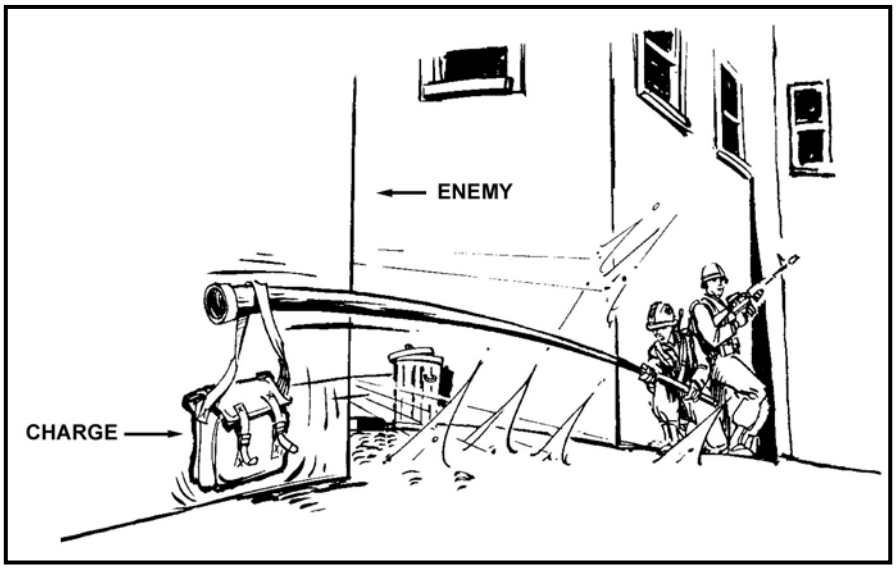


Figure 8-17. Charge placement when small-arms fire cannot be suppressed.

8-6. DEFENSIVE USE

The use of demolitions in defensive operations is the same as in offensive operations. When defending an urban 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 areas that are likely enemy weapons positions, in individual firing positions, or on movement routes. Expedient-shaped charges (effective in equipment destruction and against lightly armored vehicles) can also be placed on routes of mounted movement and integrated into antiarmor ambushes.

b. Engineers must furnish technical assistance for selective rubbling. Normally, buildings can be rubbled using shaped charges or C4 on the supports and major beams.

c. Charges should be placed directly against the surface to be breached unless a shaped charge is used. Depending on the desired effect and target material, charges may be tamped, untamped, or buffed depending on the situation. Tamping materials can be sandbags, rubble, or even water blivits when filled (Figure 8-18).

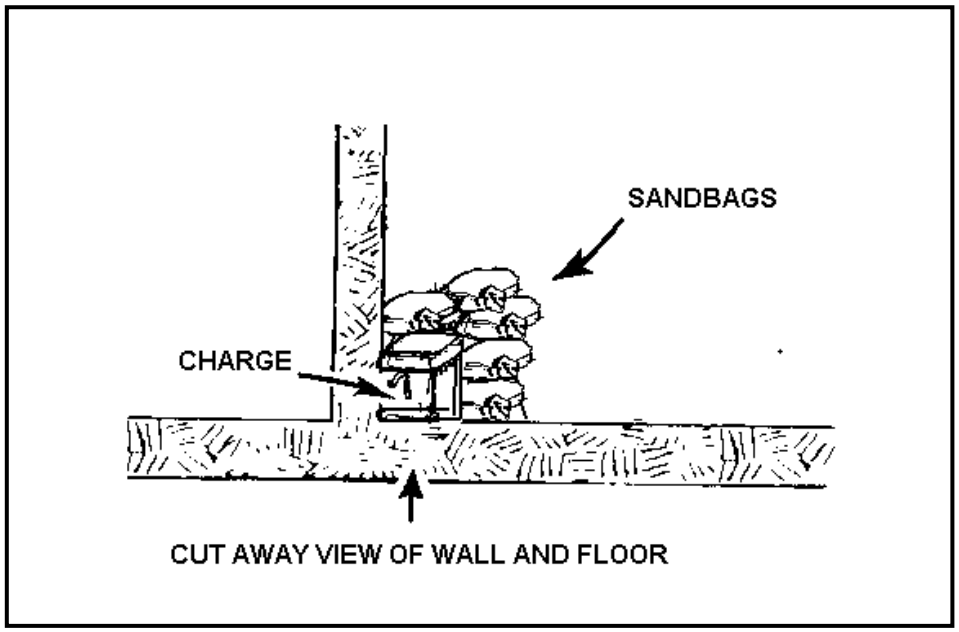


Figure 8-18. Sandbags used to tamp breaching charge.

d. For most exterior walls, tamping of breaching charges could be impossible due to enemy fire. Thus, the untamped ground level charge requires twice the explosive charge to produce the same effect as an elevated charge (Table 8-3).

METHODS OF PLACEMENT				
THICKNESS OF CONCRETE (FEET)	ELEVATED CHARGE		GROUND-LEVEL CHARGE	
	POUNDS OF TNT	POUNDS OF C4	POUNDS OF TNT	POUNDS OF C4
2	14	11	28	21
2 ½	27	21	54	41
3	39	30	78	59
3 ½	62	47	124	93
4	93	70	185	138
4 ½	132	99	263	196
5	147	106	284	211
5 ½	189	141	376	282
6	245	186	490	366

Table 8-3. Breaching reinforced concrete.

e. 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 using one or more fragmentation grenades primed with modernized demolition initiator (MDI), or a

Claymore mine (Figure 8-19). These devices should be tamped to increase their effectiveness and to reduce the amount of explosive force directed to the rear.

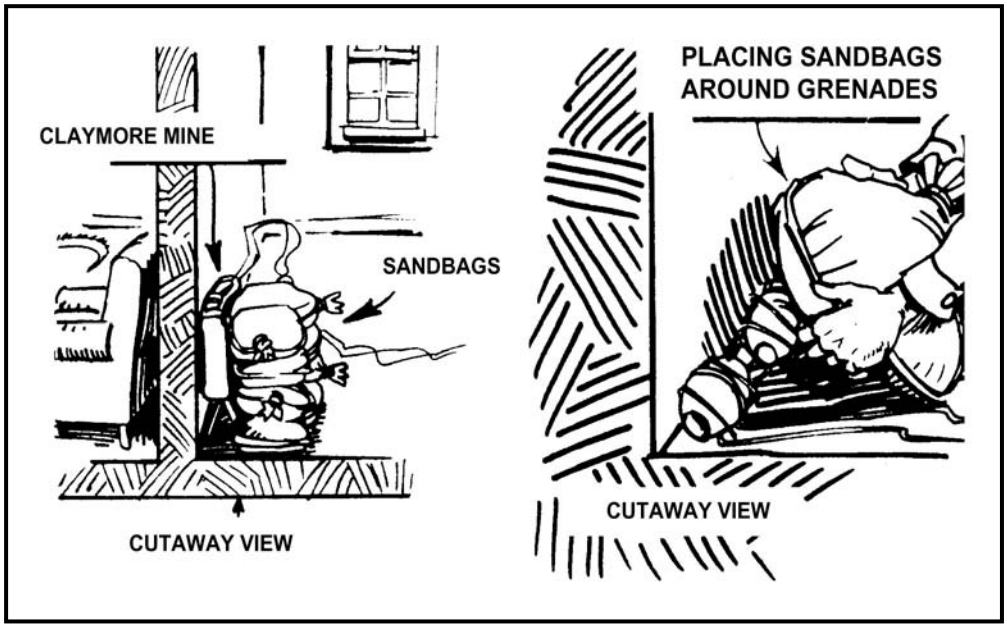


Figure 8-19. Tamping of a Claymore mine and fragmentation grenades to breach internal walls.

f. The Molotov cocktail (Figure 8-20) is an expedient device for disabling both wheeled and tracked vehicles. It is easy to make since most materials are readily available. Results can be very effective because of the close nature of engagements in urban areas. The objective is to ignite a flammable portion of the vehicle or its contents, such as the fuel or ammunition it is transporting.

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.

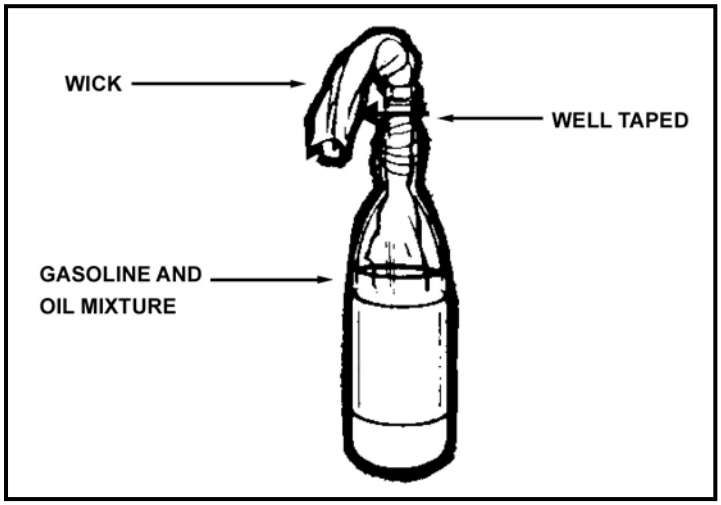
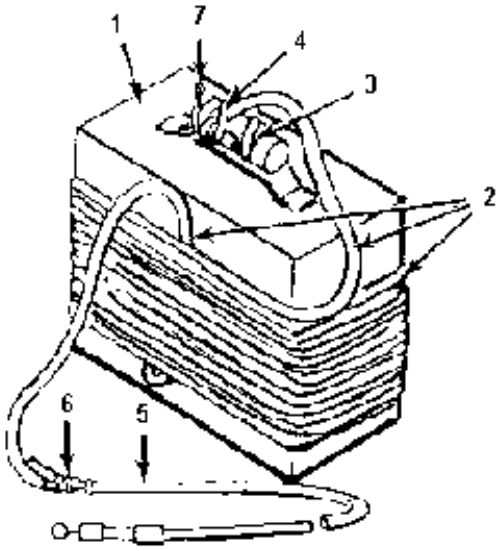


Figure 8-20. Molotov cocktail.

g. The bunker bomb is an expedient explosive flame weapon best used against fortified positions or rooms (Figure 8-21, page 8-18).

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 MDI 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 MDI igniter safety pin only when it is time to use the device.



1. Ammunition can
2. 50 ft. of detonating cord
3. Igniter
4. Detonating cord pigtail
5. MDI
6. Detonating cord pigtail
7. Igniter safety pin

Figure 8-21. Bunker bomb made from ammunition can.

8-7. SAFETY

The greatest dangers to friendly personnel from demolitions are the debris thrown by the explosion and blast overpressure. Leaders must ensure protective measures are enforced, and have personnel trained in procedures for determining overpressure, be it indoors or outdoors, in respect to net explosive weights and room size. The minimum safe distances listed in Table 8-4 indicate the danger of demolition effects.

a. Rules for using demolitions:

- Team/squad leaders and the platoon engineer(s) supervise the employment of demolitions.
- Wear helmets, body armor, ear and eye protection when firing explosives.
- Handle misfires with extreme care.
- Clear the room and protect personnel when blowing interior walls.

b. Some charges should be prepared, minus initiators, beforehand to save time; for example, 10- or 20-pound breaching charges of C4 and 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 carry explosives and blasting caps together.

POUNDS OF EXPLOSIVES	SAFE DISTANCE IN METERS	POUNDS OF EXPLOSIVES	SAFE DISTANCE IN METERS
1 to 27	300	150	514
30	311	175	560
35	327	200	585
40	342	225	605
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. For example, a platoon leader using demolitions in an urban area with heavy-clad, mass construction buildings available to protect his soldiers, may use this information in conjunction with making a risk assessment and reduce the MSD to 50 meters if he is using a 20- to 25-pound charge.			

Table 8-4. Minimum safe distances (MSD) for personnel in the open.

Section IV. FIELD-EXPEDIENT BREACHING OF COMMON URBAN BARRIERS

Urban combat requires access to compounds, buildings, and rooms. Mechanical breaching of doors or windows using sledgehammers, bolt cutters, saws, or crowbars; or ballistic breaching using weapons fire are options. However, mechanical or ballistic breaching are sometimes too slow or exposes soldiers to enemy fire. Explosive breaching is often the fastest and most combat-effective method. With a little time to prepare, units can use slightly modified standard Army demolitions to breach all common urban barriers.

NOTE: The techniques described in this section should be employed by soldiers who have been trained in their use.

8-8. FORCE PROTECTION

Soldiers must take care when fabricating, carrying, and using field-expedient explosive devices. Leaders must ensure all standard procedures and precautions outlined in doctrinal and training material for Army demolitions activities are followed. This is dictated by more than just the commander's concern for the safety and welfare of his individual soldiers. Accidental or premature detonation of demolitions during combat not only can injure or kill friendly soldiers but can jeopardize the unit's mission. During combat, soldiers often need to position themselves close to breach points to enter quickly and overcome enemy resistance before the effects of the explosion subside. However, a soldier who is too close to an explosion and injured by flying debris becomes a casualty. Fire and extreme dust volumes may be encountered, preventing fluid movements, and

must be prepared for. The unit must accomplish its mission without sustaining friendly casualties from its own demolitions.

8-9. BREACHING REINFORCED AND NONREINFORCED EXTERIOR WALLS

The Army issues both bulk explosives (TNT or C4) and prepackaged satchel charges that are powerful enough to breach all but the most heavily reinforced exterior walls. In some situations, satchel charges may be unavailable or may prove too powerful for the breach required. In high-intensity urban combat, the situation may call for large amounts of bulk explosive, but in many precision conditions the commander may want to create a smaller-size hole than the M37 or M183 satchel charges normally produce. Smaller satchel charges can be improvised. Research and development can determine the correct size of these improvised satchels, depending on the types of walls found in the battle area.

a. General-purpose satchel charges can be assembled using empty machine gun ammunition bandoleers filled with various amounts of C4 explosive.

(1) Connect a short length of detonation cord firmly to the explosive and leave it dangling. Tape the explosive securely into the bandoleer.

(2) Hang the charge on a wall by the bandoleer strap or prop it against the wall using a stick or other object. Satchel charges detonated while firmly secured against the target wall at about shoulder height produce the best effects.

(3) Prime the charge with an MDI firing system to the short length of detonation cord left dangling. When used against a nonreinforced concrete wall, a satchel charge containing 2 pounds of C4 usually produces a mousehole; 5 pounds creates a hole large enough for a man to move through; 7 pounds creates a hole large enough for two men to move through simultaneously; and 10 pounds of C4 can blow a hole large enough to drive a vehicle through. The 10-pound charge may also destroy the entire building if it is not of sturdy construction.

b. A useful breaching charge improvised by light engineer sappers during combat operations in Somalia consisted of a 3-foot length of engineer picket (U-shaped engineer stake) packed with 4 to 8 pounds of C4. The explosive was primed with detonation cord and taped securely to the picket. When needed, the picket was placed upright with its flat side against the wall, held to the wall by another stake, and then detonated. This charge could be rapidly fabricated, was sturdy, and could be easily and quickly emplaced. According to reports from the field, this device would blow a hole about 4 feet wide and 8 feet high in a nonreinforced concrete wall (common in the third world). The charge would throw fragments from the picket straight back for long distances (from 50 to 100 meters) but was fairly safe to either side. In combat, infantrymen could stand about 20 meters from the picket, crouched tightly against the wall with their backs turned to the explosive, without undue risk. This allowed them to follow up on the explosion with a rapid assault into the compound or building before the occupants could recover.

8-10. BREACHING INTERIOR WALLS AND PARTITIONS

Interior walls generally require much less explosive to create a satisfactory breach than do exterior, load-bearing walls. An easily fabricated silhouette charge can further reduce the amount of explosive needed to breach plywood, Sheetrock, or light plaster walls.

It can also be used to breach wooden or metal doors. This charge can be emplaced quickly and creates a hole large enough for a man to move through.

a. Tape two E-type silhouette targets, or similar stiff cardboard, together. To make the charge easier to carry, it can be built to fold in the middle (Figure 8-22). Rounding the corners makes the charge easier to handle.

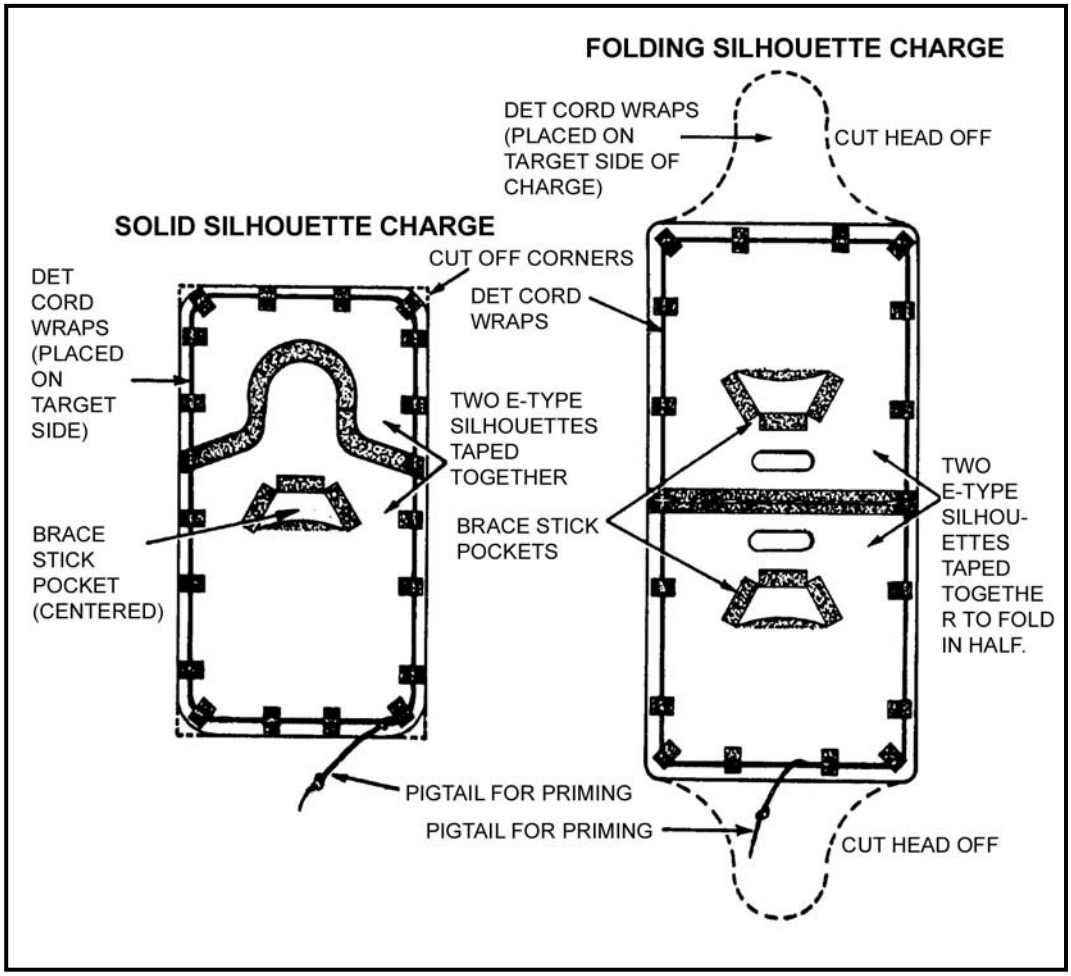


Figure 8-22. Construction of solid and folding silhouette charges.

b. Place detonation cord or flexible linear-shaped charge (FLSC) around the edges of the silhouettes, leaving a 6-inch tail for priming. Secure the cord to the silhouette using sturdy tape (for example, "100-mph tape"). (See Table 8-5 on page 8-22 for the appropriate number of wraps of detonation cord or FLSC to breach various barriers.) Tape several small dowels or other materials at various places around the silhouette if using FLSC. This provides the necessary standoff distance to ensure the maximum shaped charge effect. (See Table 8-6 on page 8-22 for the required standoff distance for various sizes of FLSC.)

NOTE: Always consider the silhouette material (about 1/8 inch) when determining standoff distance.

Type of Obstacle	Detonation Cord Needed	FLSC Needed
Hollow-core door	1 wrap	75 grain/foot
Particle-filled door (1 inch)	2 wraps	75 grain/foot
Solid wood door (2 inches)	3 wraps	75 grain/foot
High-quality solid door	4 wraps	225 grain/foot
1/4-inch plywood	1 wrap	75 grain foot
1/2-inch plywood	2 wraps	75 grain/foot
3/4-inch plywood	3 wraps	75 grain/foot
Light metal door	NA	225 grain/foot
Medium steel door	NA	300 grain/foot
Heavy steel door	NA	300 grain/foot

Table 8-5. Silhouette charge explosive loads.

NOTE: The information, in Table 8-5, is based on US manufactured materials. Building materials of other countries may be of inferior quality; however, some European companies have standards that surpass that of the US.

Standoff Required for FLSC	Standoff
75 grain	0 - 1/16 inch
225 grain	1/8 inch
300 grain	1/8 inch - 3/16 inch
NOTE: FLSC that is 300 grains or higher cannot be molded.	

Table 8-6. Standoff required for flexible linear-shaped charges.

c. Place three or four strips of heavy-duty, double-sided contact tape on the front of the silhouette from top to bottom. Construct a sturdy pocket for a brace stick in the appropriate position on the back of the silhouette.

d. Pull the covering off the double-sided tape and place the charge against the wall at knee height, bracing it if necessary. Prime the charge, take cover, and detonate.

8-11. DOOR-BREACHING CHARGES

Several different field-expedient charges can be used to breach interior or exterior doors and chain link fence. Among these are the general-purpose charge, the rubber band charge, flexible linear charge, doorknob charge, rubber strip charge, and the chain link charge. All can be made ahead of time and are simple, compact, lightweight, and easy to emplace.

CAUTION
Any time explosive charges are used to breach doors, the knobs, locks and hinges made of steel and metal can become lethal projectiles.

a. **General-Purpose Charge.** The general-purpose charge is the most useful preassembled charge for breaching a door or other barrier. As its name implies, it is useful not only for door breaching, but it can also cut mild steel chain and destroy captured enemy equipment.

(1) Start building the general-purpose charge with a length of detonation cord about 2 feet long. Using another length of detonation cord, tie two uli knots (Figure 8-23) around the 2-foot long cord. The uli knots must have a minimum of six wraps and be loose enough for them to slide along the main line, referred to as a uli slider. Trim excess cord from the uli knots and secure them with tape, if necessary.

(2) Cut a block of C4 explosive to a 2-inch square. Tape one slider knot to each side of the C4 block, leaving the length of detonation cord free to slide through the knots (Figure 8-24).

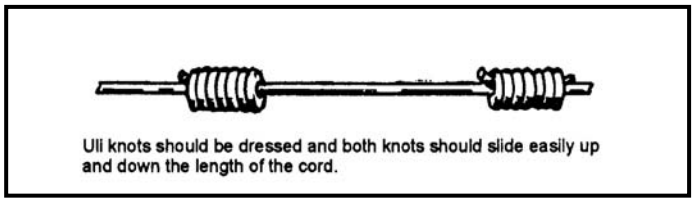


Figure 8-23. Sliding uli knots.

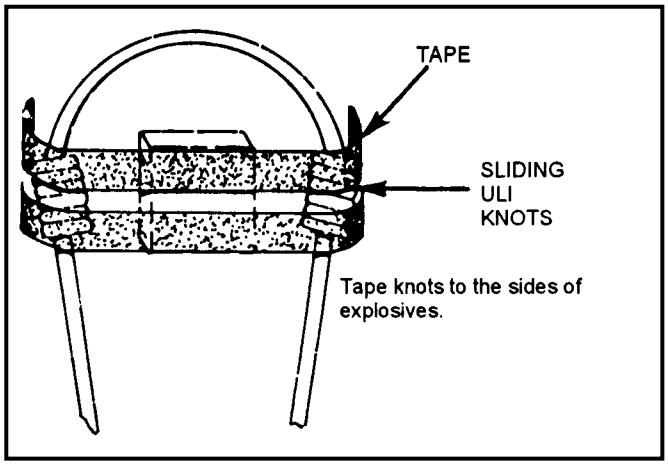


Figure 8-24. Completed general-purpose charge.

(3) To breach a standard door, place the top loop of the charge over the doorknob. Slide the uli knots taped to the C4 so that the charge is tight against the knob. Prime the loose ends of the detonation cord with a MDI firing system and detonate (Figure 8-25).

To cut mild steel chain, place the loop completely around the chain link to form a girth hitch. Tighten the loop against the link by sliding the uli knots.

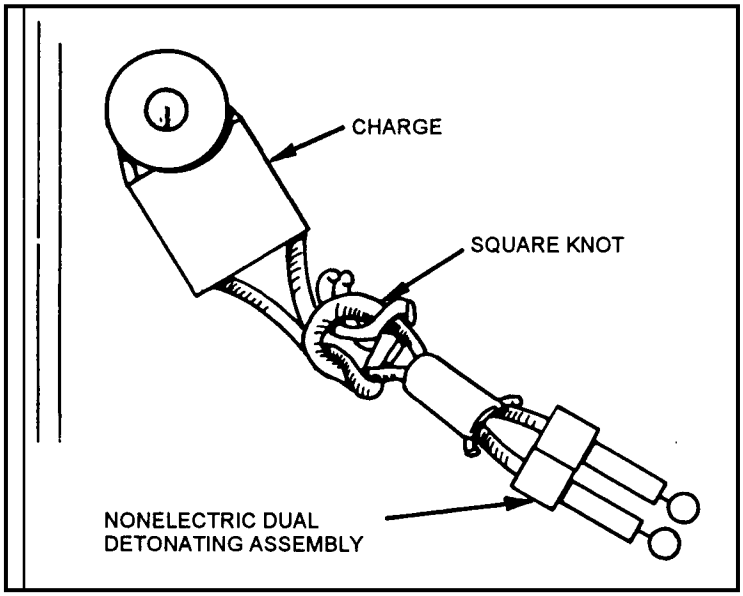


Figure 8-25. Charge placement against doorknob.

b. **Rubber Band Charge.** The rubber band charge is another easily fabricated lightweight device that can be used to remove the locking mechanism or doorknob from wooden or light metal doors, or to break a standard-size padlock at the shackle.

(1) Cut a 10-inch piece of detonation cord and tie an overhand knot in one end. Using another piece of detonation cord, tie a uli knot with at least eight wraps around the first length of cord. Slide the uli knot tightly up against the overhand knot. Secure it in place with either tape or string. Loop a strong rubber band around the base of the uli knot tied around the detonation cord. Tie an overhand knot in the other end of the cord to form a pigtail for priming the charge.

(2) Attach the charge to the doorknob (or locking mechanism) by putting the loose end of the rubber band around the knob. The charge should be placed between the knob and the doorframe. This places the explosive over the bolt that secures the door to the frame.

c. **Flexible Linear Charge.** One of the simplest field-expedient charges for breaching wooden doors is the flexible linear charge. It can be made in almost any length, and it can be rolled up and carried until needed. It is effective against hollow-core, particle-filled, and solid wood doors. When detonated, the flexible linear charge cuts through the door near the hinges (Figure 8-26).

(1) Lay out a length of double-sided contact tape with the topside adhesive exposed. Place the necessary number of strands of detonation cord down the center of the double-sided tape, pressing them firmly in place. Military detonation cord has 50 grains of explosives per foot and there are 7,000 grains in a pound. Most residential doors are 80 inches tall and commercial doors are 84 inches tall. This must be considered when calculating the quantities of explosives, overpressure and MSDs. For hollow-core doors,

use a single strand. For particle-filled doors, use two strands, and for solid wood doors use three. If the type doors encountered are unknown, use three strands. One of the strands must be cut about a foot longer than the others and should extend past the end of the double-sided tape. This forms a pigtail where the initiating system is attached once the charge is in place.

(2) Cover the strands of detonation cord and all the exposed portions of the double-sided tape with either sturdy single-sided tape or another length of double-sided tape. Roll the charge, starting at the pigtail, with the double-sided tape surface that is to be placed against the door on the inside.

(3) At the breach site, place the charge straight up and down against the door tightly. If the charge is too long, angle it to best fit the door or use the excess to defeat the possibility of a door return at the top of the door. Sometimes but not always visible from the outside by exposed bolts. If it is too short, place it so it covers at least half of the door's height. Prime and fire the charge from the bottom.

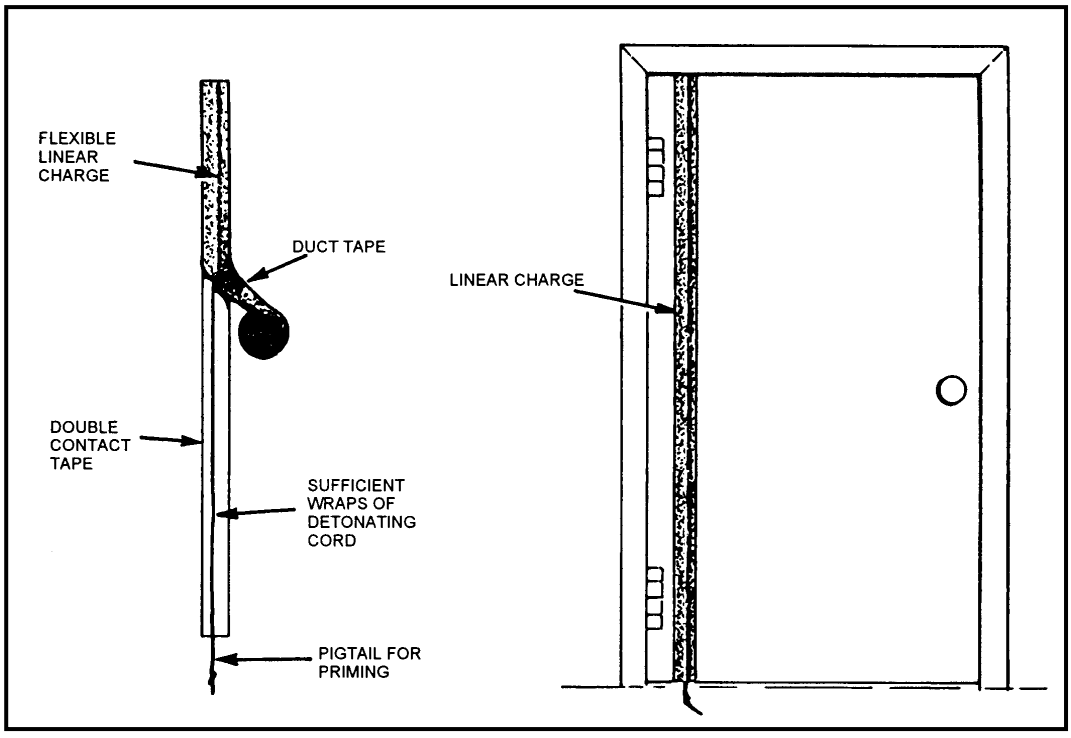


Figure 8-26. Placement of the flexible linear charge.

d. **Doorknob Charge.** A doorknob charge is easy to make and highly effective against wooden or light metal doors. Charges for use against wooden doors can be made with detonation cord. If the charge is to breach a light metal door, either detonation cord (three lengths) or 225 grain/foot flexible linear shaped charge (FLSC) should be used.

(1) Cut the appropriate amount of detonation cord for the charge. Use a 30-inch length for a hollow-core door. For a particle-filled door, use one 30-inch length and one 18-inch length. For a solid-core wooden door or a light metal door, use one 30-inch length and two 18-inch lengths.

(2) Cut the charge holder from a piece of stiff cardboard.

(3) Place double-sided tape on the face of the charge holder in the shape of a large "C". Place the detonation cord on top of the double-sided tape, also in the shape of a large "C" along the edge of the charge holder. Leave a 12-inch pigtail for priming (Figure 8-27).

(4) If using FLSC, cut a length 21 inches long. Tape the FLSC to the outside of the charge holder, leaving a 3-inch tail for priming. Bend the tail upward. Tie a Sliding Uli knot to a 12-inch length of detonation cord and tie an overhand knot on each end of the knot. Tape the slider and detonation cord combination to the tail end of the FLSC and on the inside of the "V" shape to insure detonation.

(5) Hang the charge on the doorknob or locking mechanism. Secure the FLSC charge in place with the double-sided tape, and the "Det cord" charge with "100 mph" tape. The detonation cord must be held firmly against the door's surface.

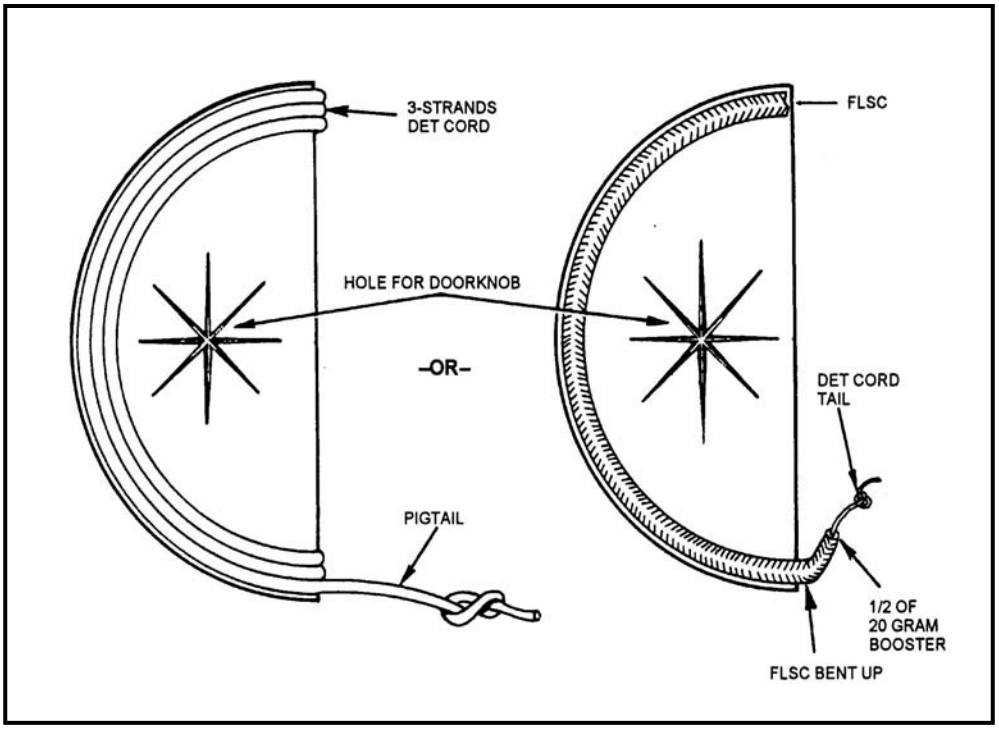


Figure 8-27. Doorknob charge.

e. **Rubber Strip Charge.** The rubber strip charge (Figures 8-28 and 8-29) can be used to open a solid wood door with multiple locking devices or a metal door. It defeats the locking mechanism and dislodges the door from the frame. It can also be used to defeat windows with a physical security system. Place the charge on the target between locking devices and doorjamb. Ensure that the rubber strip covers the area where the locking bolts are located. For a metal door with standard locking devices, place the charge in the center of the door, parallel with the locking mechanism. When detonated it will buckle and or bend the door, pulling the locking mechanisms from their catches.

WARNING
Net explosive weight should not exceed 8 ounces for a complete charge.

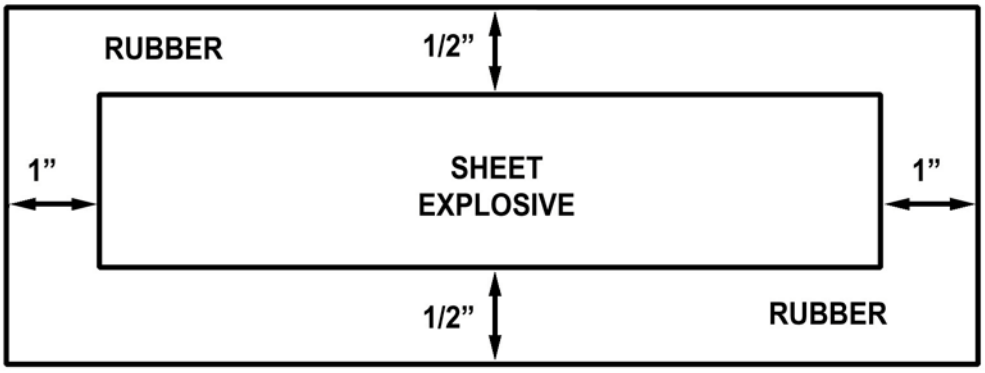


Figure 8-28. Rubber strip charge (top view).

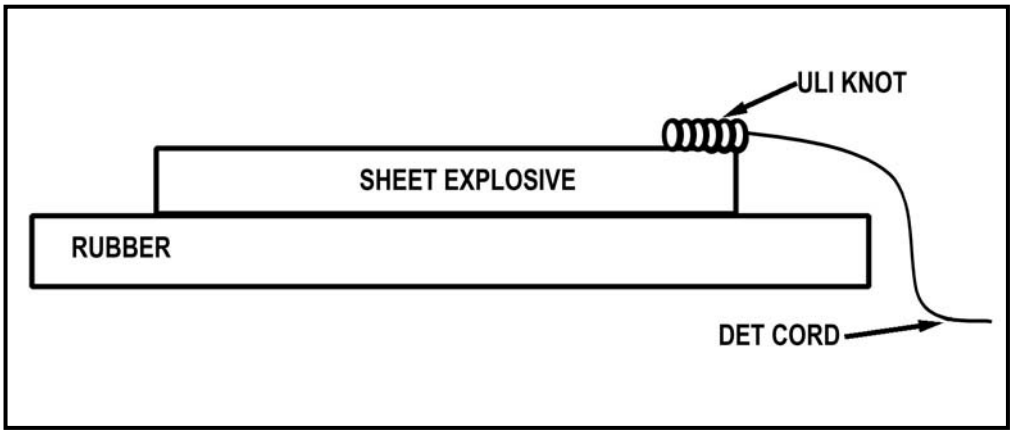


Figure 8-29. Rubber strip charge (side view).

WARNING
Friendly troops must be clear of the area 90 degrees from the target. The doorknob will be blown away from the door with considerable force.

f. **Chain-Link Ladder Charge.** The chain-link ladder charge (Figure 8-30, page 8-28) is designed to create a man-sized hole in a chain-link fence. The charges run lengthwise along the detonation cord on sliding uli knots. Once in the desired location,

secure in place with tape. Determine where charge is to be emplaced on the fence. To ensure that the full impact is received by the fence, place the charge next to a fence post so that the fence will not "give." Secure the top of the charge to the breach location on the fence. Simply hang the large hook into a link of the fence. Secure the charge at the bottom of the fence using surgical tubing and a small hook.

NOTES: 1. Use six-wrap uli knots constructed of detonation cord.

2. Only slight pressure is required to secure the charge; too much tension may cause the fence to buckle and result in poor cutting of the fence.

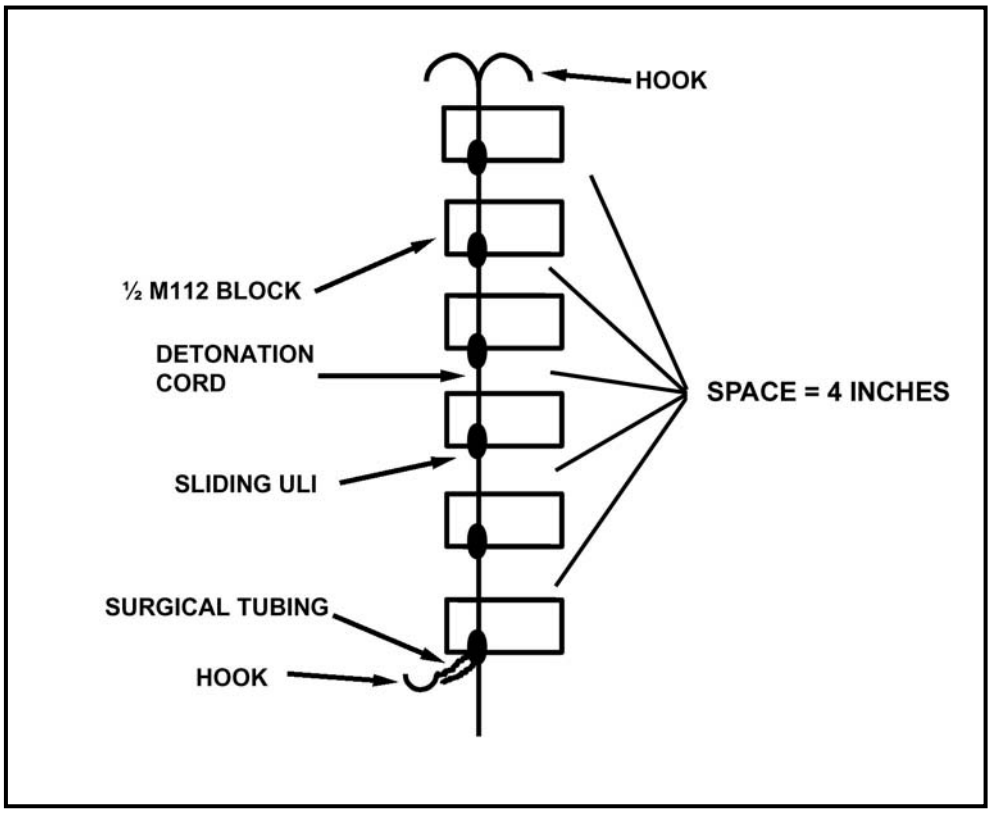


Figure 8-30. Chain-link ladder charge.

NOTE: Table 8-7 provides a summary of the different charges discussed in this chapter.

CHARGE	OBSTACLE	EXPLOSIVES NEEDED	ADVANTAGES	DISADVANTAGES
Wall Breach Charge (Satchel Charge or U-Shaped Charge)	Breaches through wood, masonry, or brick, and reinf concrete walls	- Detonation cord - C4 or TNT	- Easy and quick to make - Quick to place on target	- Does not destroy rebar - High overpressure - Appropriate attach-ment methods needed - Fragmentation
Silhouette Charge	Wooden doors; creates man-sized hole. Selected walls (plywood, Sheet-rock, CMU)	- Detonation cord	- Minimal shrapnel - Easy to make - Makes entry hole to exact specifications	- Bulky; not easily carried
General Purpose Charge	Door knobs, mild steel chain, locks, or equipment	- C4 - Detonation cord	- Small, lightweight - Easy to make - Very versatile	- Other locking mechanisms may make charge ineffective
Rubber Strip Charge	Wood or metal doors; dislodges doors from the frame, windows with a physical security system	- Sheet Explosive - Detonation cord	- Small, easy to carry - Uses small amount of explosives - Quick to place on target	
Flexible Linear Charge	Wooden doors; widows cuts door along the length off the charge.	Detonation cord	- Small, lightweight - Quick to place on target - Several can be carried by one man - Will defeat most doors regardless of locking systems	- Proper two-sided adhesive required
Doorknob Charge	Doorknobs on wood or light metal doors	Detonation cord or flexible linear shaped charge	- Small, lightweight - Easily transported - Quick to place on door	- Other locking mechanisms may make charge ineffective
Chain-link Ladder Charge	Rapidly creates a hole in chain-link fence large enough to run through	- C4 - Detonation Cord	- Cuts chain link quickly and efficiently	- Man must stand to emplace it
NOTE: All doorknobs and prop-sticks will become secondary missiles; any charge placed on metal may create shrapnel.				

Table 8-7. Summary of breaching charges.