

APPENDIX G

Weapons And Fire Control

GENERAL

You must know how to fire your weapon and how to control your fire. This appendix covers the characteristics of the weapons you will be using and discusses characteristics of fire and methods of fire control.

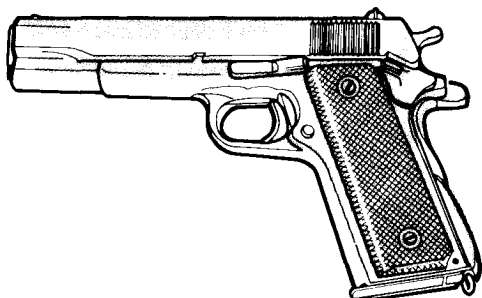
CONTENTS	
GENERAL	G-1
WEAPONS	G-2
CHARACTERISTICS OF FIRE	G-11
FIRE DISTRIBUTION	G-17
COVERING THE TARGET AREA	G-18
FIRE CONTROL	G-19

WEAPONS

M1911A1 PISTOL

This pistol fires caliber .45 rounds. It is a semiautomatic, recoil-operated magazine-fed handgun. It fires one round each time the trigger is pulled. Its magazine holds seven rounds. The top round is stripped from the magazine and chambered by the forward movement of the slide. When the last round in the magazine has been fired, the slide stays to the rear.

M1911A1 PISTOL



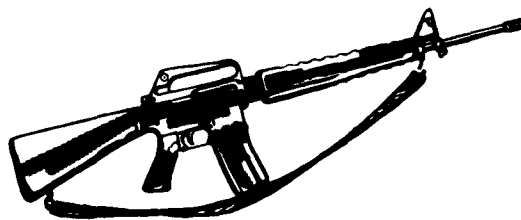
CHARACTERISTICS OF CALIBER .45 PISTOL

LENGTH 22 CM (8.6 IN)
 WEIGHT
 (W/LOADED MAGAZINE) 1.4 KG (3 LB)
 MAXIMUM RANGE 1,500 METERS
 MAXIMUM EFFECTIVE RANGE 50 METERS

M16A1 RIFLE

This rifle fires 5.56-mm rounds. It is magazine-fed and gas-operated. It can shoot either semiautomatic or automatic fire through the use of a selector lever. The most stable firing positions (those which allow the most accurate fire) are the prone supported or standing supported for semiautomatic fire and the prone bipod supported for automatic fire.

M16A1 RIFLE



CHARACTERISTICS OF M16A1 RIFLE

WEIGHT, LOADED
 (20-RD MAGAZINE) 3.5 KG (7.6 LB)
 (30-RD MAGAZINE) 3.6 KG (7.9 LB)
 LENGTH (WO BAYONET) 99 CM (39 IN)
 MAXIMUM RANGE 2,653 METERS
 MAXIMUM EFFECTIVE RANGE 460 METERS

RATES OF FIRE

CYCLIC 700 TO 800 RD/MIN
 SEMIAUTOMATIC 45 TO 65 RD/MIN
 AUTOMATIC 150 TO 300 RD/MIN
 SUSTAINED 12 TO 15 RD/MIN

Rate of fire is limited by a soldier's ability to aim, fire, and change magazines.

MOVING TARGET LESS THAN 200 METERS
 STATIONARY TARGET 250 METERS

M60 MACHINE GUN

This gun fires 7.62-mm rounds. It is belt-fed, gas-operated, and automatic. It has an attached bipod and a separate tripod mount. The prone position, using the M122 tripod and the traversing and elevating mechanism, allows the most accurate fire. Some vehicular mounts, such as the pedestal mount on the M151 ¼-ton vehicle, are available for this gun. When the gunner is standing, the gun may be fired from the hip, underarm, or shoulder firing position.

M60 MACHINE GUN ON MOUNT

CHARACTERISTICS OF M60 MACHINE GUN

WEIGHT,

MACHINE GUN ONLY 10.4 KG (23 LB)

TRIPOD, W/TRAVERSING AND ELEVATING MECHANISM 8.8 KG (19.5 LB)

300 ROUNDS OF AMMUNITION 9.5 KG (21 LB)

LENGTH 110.5 CM (43.5)

MAXIMUM RANGE 3,725 METERS

TRACER BURNOUT 900 METERS

MAXIMUM RANGE OF GRAZING FIRE 600 METERS

MAXIMUM EFFECTIVE RANGE 1,100 METERS

RATES OF FIRE

CYCLIC 550 RD/MIN

SUSTAINED 100 RD/MIN

RAPID 200 RD/MIN

TYPES OF AMMUNITION

- BALL
- TRACER
- ARMOR-PIERCING

Ranges at which a 50-50 chance of a target hit can be expected (shooting bursts of six to nine rounds):

MOVING TARGET* (BIPOD) 200 METERS

POINT TARGET* (BIPOD OR TRIPOD) 600 METERS

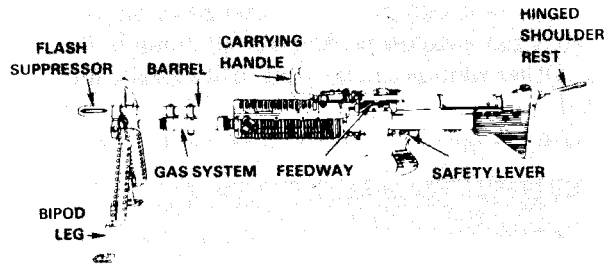
AREA TARGET* (BIPOD) 800 METERS

AREA TARGET** (TRIPOD) 1,100 METERS

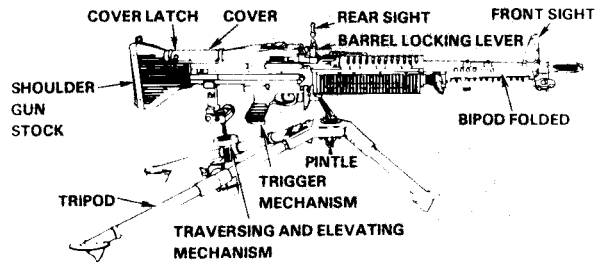
* A point target is an area the size of a standing man.

** An area target is an area of the size that a fire team would occupy.

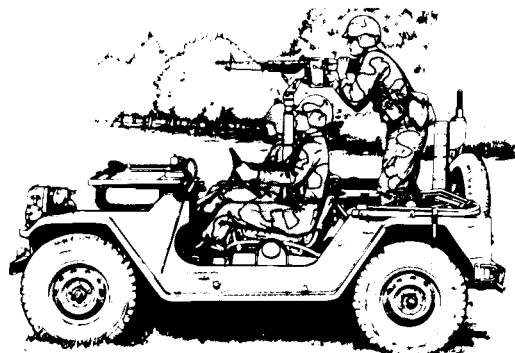
BIPOD MOUNTED



TRIPOD MOUNTED



PEDESTAL MOUNTED

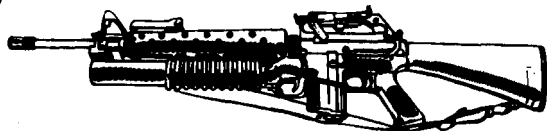


40-MM GRENADE LAUNCHER, M203

This grenade launcher (GL) is attached to an M16A1 rifle. The rifle has already been discussed. The GL is a single-shot, breech-loaded, pump-action weapon. It fires a variety of rounds. It can be used to suppress targets in defilade. The GL can be used to suppress or disable armored vehicles, except tanks. Its HEDP round can penetrate concrete, timber, sandbagged weapon positions, and some buildings. Other rounds can be used to illuminate and signal. The most stable firing positions are the standing supported and the prone supported.

M433 High-Explosive Dual Purpose (HEDP) Round. This round can penetrate 5 cm (2 in) of armorplate, 30 cm (12 in) of pine logs, 40 cm (16 in) of concrete blocks, or 50 cm (20 in) of sandbags at ranges up to 400 meters. It has a 5-meter casualty radius against exposed troops.

M203 GRENADE LAUNCHER



CHARACTERISTICS OF M203 GRENADE LAUNCHER

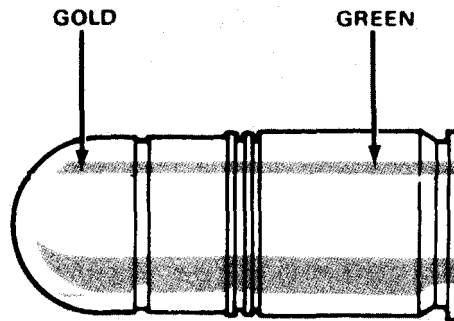
WEIGHT, LOADED (RIFLE AND GL)	4.98 KG (11 LB)
LENGTH	99 CM (39 IN)
MAXIMUM RANGE	400 METERS
MINIMUM SAFE FIRING RANGES (HE AND TP)	
TRAINING	80 METERS
COMBAT	31 METERS
MINIMUM ARMING RANGE	14 TO 38 METERS*

Ranges at which a 50-50 chance of a target hit can be expected:

AREA TARGET (FIRE-TEAM SIZE)	350 METERS
POINT TARGET: VEHICLE OR WEAPON POSITION	200 METERS
WEAPON OPENING	125 METERS
BUNKER APERTURE	50 METERS

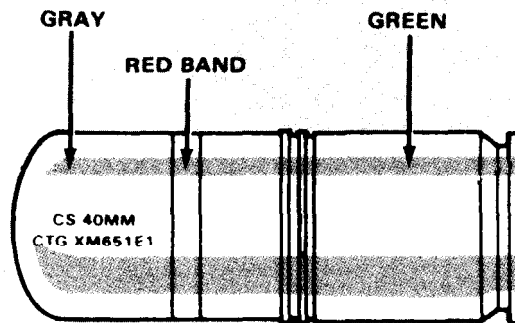
*This must be considered in close-in firing, as in towns and other restrictive terrain, to insure that the round will explode.

M433 HIGH-EXPLOSIVE DUAL PURPOSE (HEDP)

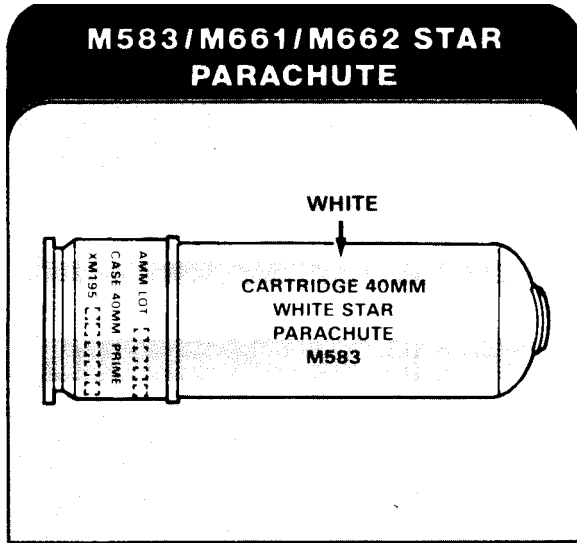


M651 CS Round. This chemical round is used to drive the enemy from bunkers or enclosed positions in built-up areas.

CTG XM651E1

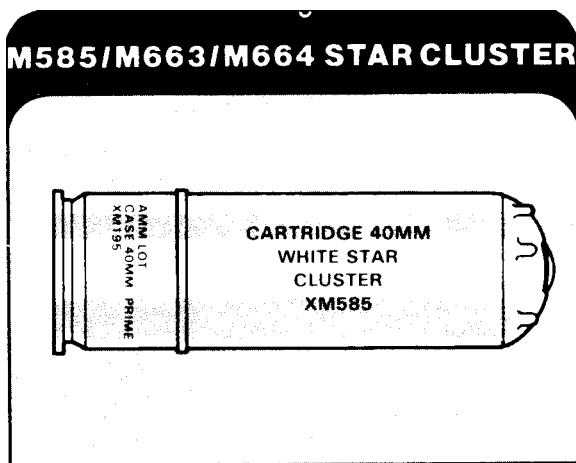


M583 White Star Parachute/M661 Green Star Parachute/M662 Red Star Parachute Rounds. These are used to signal and illuminate. One can be placed 300 meters forward of a squad to illuminate an area 200 meters in diameter for 40 seconds.



M585 White Star Cluster/M663 Green Star Cluster/M664 Red Star Cluster Rounds. They are used to signal.

**NOTE:
THE GREEN STAR CLUSTER MAY
APPEAR WHITE IN BRIGHT SUNLIGHT.**



for firing LAWs are the standing supported, prone, and prone supported.

The M72A2 LAW consists of a 66-mm HEAT (high explosive antitank) rocket in a disposable fiberglass and aluminum launcher tube. Its light weight and its ability to penetrate more than 30 cm (12 in) of armor make it useful against enemy armor, bunkers, and other hard targets out to a range of 200 meters.

The four methods of engagement with a LAW are single, sequence, pair, and volley firing. The two best methods of engagement are volley firing and pair firing.

Single firing. In single firing, you fire at a target with only one LAW. This method is used only at ranges of 50 meters or less. Beyond that range, single firing is ineffective, as the chance of a first-round hit is low.

Sequence firing. In sequence firing, you prepare several launchers for firing. After firing the first LAW, note its impact. If you get a hit, continue to fire, using the same sight picture, until the target is destroyed. If the first round is a miss, adjust the range and lead of succeeding rounds until you get a hit. Then continue to fire until the target is destroyed.

Pair firing. In pair firing, you and another gunner prepare two or more LAWs each, and fire at a target one at a time. You swap information when firing at the target. The gunner seeing a target identifies it and gives the estimated range and lead he will use (for example, TANK, 150 METERS, FAST TARGET), then fires. If the first gunner misses, the second gunner quickly announces a revised estimate of range and lead (as appropriate) and fires. Both gunners continue exchanging range and lead information until one gets a hit. Once the range and lead are determined, gunners fire at the target until it is destroyed. Pair firing is preferred

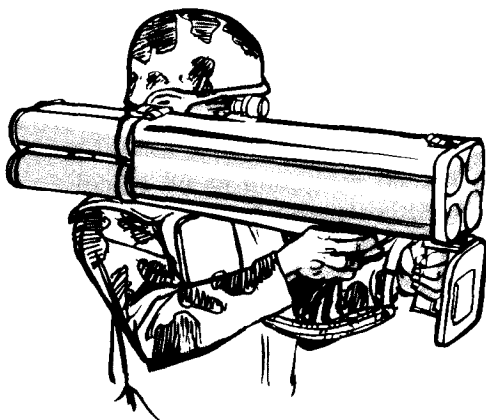
over sequence firing, as it lets the gunners get hits faster. The gunner firing the second round can be ready to fire as soon as the first round impacts. In sequence firing, you must get another LAW, establish a sight picture, and fire. Pair firing also has the advantage of having two gunners track the target at one time.

Volley firing. In volley firing, you and one or more other gunners fire at once. Before firing, each gunner prepares one or more LAWs. Gunners fire on command or on signal until the target is destroyed for example, TANK, 100 METERS, SLOW TARGET, VOLLEY FIRE, READY, AIM, FIRE. Volley fire is used only when the range to the target and the lead have been determined. Range can be determined by map, by pacing, or by the results of pair firing after a target has been hit. The volley method is best because more rounds are fired at a target at one time. That increases the chance of a hit.

M202A1, MULTISHOT ROCKET LAUNCHER 66-MM (FLASH)

This is a lightweight, four-tube, 66-mm rocket launcher (RL). Aim and fire it from the right shoulder in the standing, kneeling, or prone position. It can fire a single rocket or up to four rockets semiautomatically at a rate of one rocket per second. It is reloaded with a new clip of four rockets. The brilliant splash of the bursting incendiary warhead makes it a good weapon to suppress enemy rocket gunners. When it impacts near enemy vehicles, it will make them button up. The most stable position for firing the FLASH is the standing supported position. When you fire it from a fighting position, there are two limitations. First, overhead cover can limit the elevation of the RL and therefore the range. Second, when elevating the RL, you must make sure that the rear of the launcher is outside the hole so that its backblast is not deflected on you.

M202A1 MULTISHOT ROCKET LAUNCHER (FLASH)



**CHARACTERISTICS OF
M202A1**

WEIGHT, LOADED 12.1 KG (26.6 LB)
 LENGTH, CLOSED 68.5 CM (27 IN)
 LENGTH, EXTENDED 88.9 CM (35 IN)
 MINIMUM ARMING RANGE 6 TO 13
 METERS

BURSTING RADIUS OF
 ROCKET WARHEAD 20 METERS

Ranges at which a 50-50 chance of a target hit can
 be expected.

AREA TARGET (FIRE
 TEAM SIZE) 750 METERS
 POINT TARGET 200 METERS

**M47 DRAGON MEDIUM ANTITANK
WEAPON**

This is a wire-guided missile system. It is man-portable and shoulder-fired. The Dragon actually rests on your shoulder and the front bipod legs. It has two major components, the tracker and the round. The round (the expendable part of the system) has two major parts, the launcher and the missile. These are packaged together for handling and shipping. The launcher is both the handling and carrying container and the tube from which the missile is fired. The tracker is the reusable part of the system. It is designed for fast, easy detachment from the round.

To fire the Dragon, look through the sight in the tracker, put the crosshairs on the target, and fire. Keep the crosshairs on the target throughout the missile's flight. The missile is continuously guided along your line-of-sight. The tracker detects deviations from the line-of-sight and sends corrections to the missile by a wire link.

M47 DRAGON

CHARACTERISTICS OF DRAGON

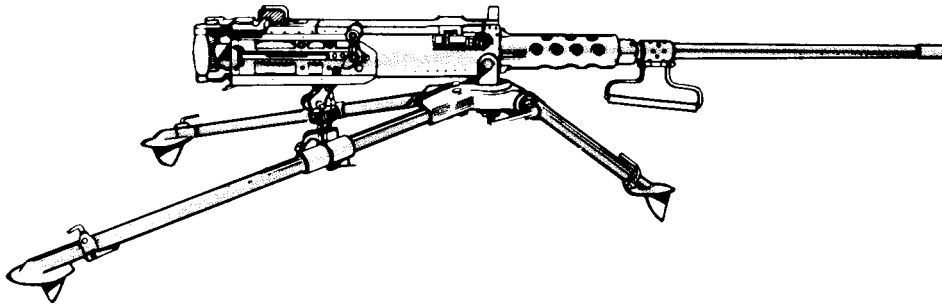
WEIGHT (TOTAL)	
W/DAY TRACKER	15.30 KG (31.87 LB)
WEIGHT (TOTAL)	
W/NIGHT TRACKER ...	20.76 KG (45.89 LB)
WEIGHT OF	
DAY TRACKER	3.9 KG (6.58 LB)
WEIGHT OF	
NIGHT TRACKER	9.36 KG (20.6 LB)
WEIGHT OF ROUND	11.4 KG (25.29 LB)
LENGTH	115.4 CM (45.5 IN)
DIAMETER	29.2 CM (11.5 IN)
MINIMUM RANGE	65 METERS
MAXIMUM RANGE	1,000 METERS



CALIBER .50 MACHINE GUN

This gun is belt-fed and recoil-operated. You can fire a single shot and automatic from the M3 tripod mount or the M63 anti-aircraft mount. Fire bursts of 9 to 15 rounds to hit ground targets from a stationary position. To fire at aircraft, use a continuous burst, rather than several short bursts. While firing on the move, "walk" long bursts into the target. You can suppress enemy antitank guided missile (ATGM) gunners, vehicles, and troops with a heavy volume of fire from the caliber .50 machine gun until a friendly maneuver element can destroy or bypass the enemy.

CALIBER .50 MACHINE GUN



CHARACTERISTICS OF CALIBER .50

WEIGHT OF MACHIN GUN 38 KG (84 LB)
 WEIGHT OF TRIPOD 20 KG (44 LB)
 LENGTH OF MACHIN GUN 165 CM (65 IN)
 MAXIMUM RANGE OF GRAZING FIRE 800 METERS
 TRACER BURNOUT 2,200 METERS
 MAXIMUM RANGE 6,800 METERS

RATES OF FIRE

SUSTAINED 40 OR LESS RD/MIN
 RAPID MORE THAN 40 RD/MIN
 CYCLIC 450 TO 550 RD/MIN

TYPES OF AMMUNITION

BALL
 TRACER
 ARMOR-PIERCING
 ARMOR-PIERCING INCENDIARY

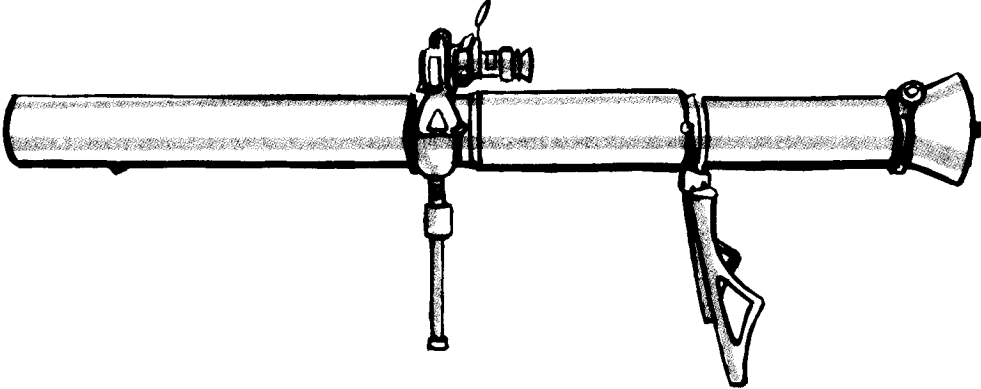
Ranges at which a 50-50 chance of a target hit can be expected:

(Tripod mounted, firing bursts of 9 to 15 rd)
 POINT TARGET (MAN) 700 METERS
 POINT TARGET (VEHICLE) 1,100 METERS
 AREA TARGET 1,600 METERS
 (Cupola mounted, stationary vehicle, firing bursts of 9 to 15 rd)
 POINT TARGET (MAN) 500 METERS
 POINT TARGET (VEHICLE) 600 METERS
 AREA TARGET 1,000 METERS
 (Cupola mounted, moving vehicle, firing bursts of 15 to 30 rd)
 AREA TARGET 300 METERS
 Range at which a 30% probability of hit can be expected:
 SQUAD-SIZE PLATOON 500 METERS

M67 90-MM RECOILLESS RIFLE (RCLR)

This RCLR is a breech-loaded, single-shot, man-portable, crew-served weapon. You can use it in both antitank and antipersonnel roles. You can fire it from the ground, using the bipod or the monopod, or from the shoulder. The most stable firing position is the prone position.

M67 90-MM RECOILLESS RIFLE



CHARACTERISTICS OF 90-MM RCLR	TYPES OF AMMUNITION
<p>WEIGHT (COMPLETE, WITH SIGHT) 17.5 KG (37.5 LB)</p> <p>LENGTH 135 CM (53 IN)</p> <p>MAXIMUM RANGE (APPROX) 2,100 METERS</p> <p>ARMING RANGE 30 TO 35 METERS</p>	<p>HEAT</p> <p>TARGET PRACTICE</p> <p>CANISTER (ANTIPERSONNEL)</p> <p>Ranges at which a 50-50 chance of a target hit can be expected:</p> <p>STATIONARY TARGET 300 METERS</p> <p>MOVING TARGET 200 METERS</p>

CHARACTERISTICS OF FIRE TRAJECTORY

This is the path of a projectile from a weapon to the point of impact.

At ranges out to 300 meters, the trajectory of rifle fire is almost flat. For greater ranges,

you must raise the rifle muzzle, thus raising the height of the trajectory.

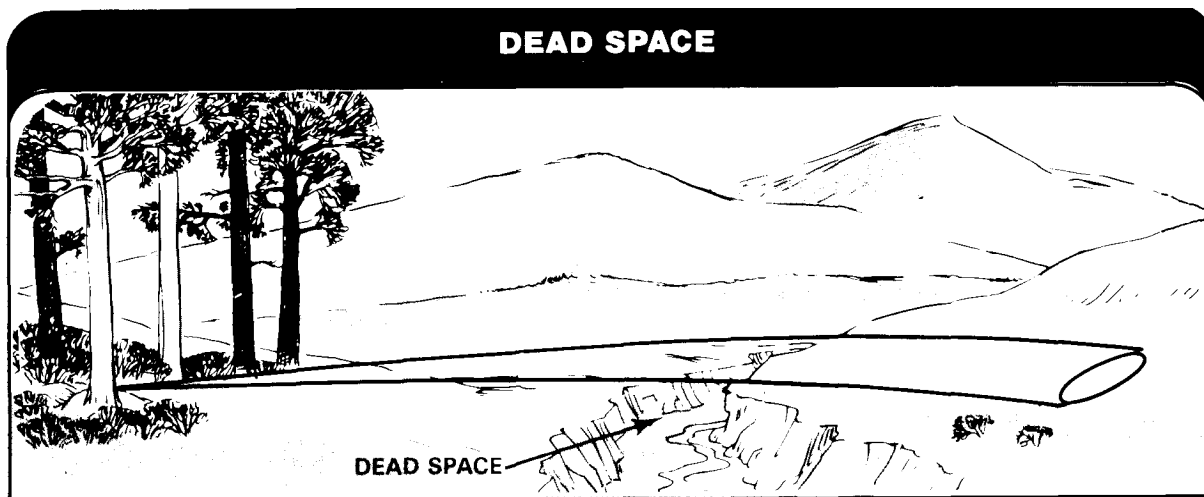
The GL has a high trajectory that is different from that of a rifle. The GL muzzle velocity is slow when compared to that of a rifle, but it is fast enough to have a flat trajectory out to 150 meters. For targets at greater ranges (150 to 350 meters), you must hold the GL about 20 degrees above the horizontal. This results in a higher trajectory and increases the time of flight of the grenade to its target. Because the trajectory is high and the time of flight long at ranges beyond 150 meters, winds may blow the grenade off course. As a grenadier, you must compensate for this.

DANGER SPACE

This is the space between a weapon and its target where the trajectory does not rise above the average height of a standing man (1.8 meters). It includes the beaten zone.

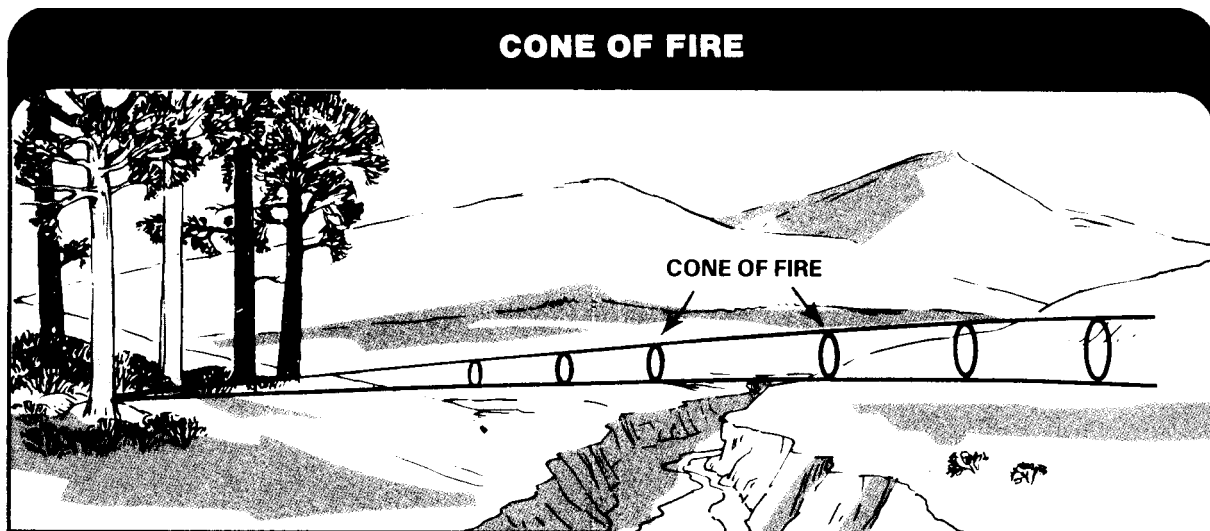
DEAD SPACE

Any area within a weapon's sector that cannot be hit by fire from that weapon is dead space.



CONE OF FIRE

This is the cone-shaped pattern formed by the paths of rounds in a group or burst. The paths of the rounds differ and form a cone because of gun vibration, wind changes, and variations in ammunition.



BEATEN ZONE

The area on the ground where the rounds in a cone of fire fall is the beaten zone.



CASUALTY RADIUS

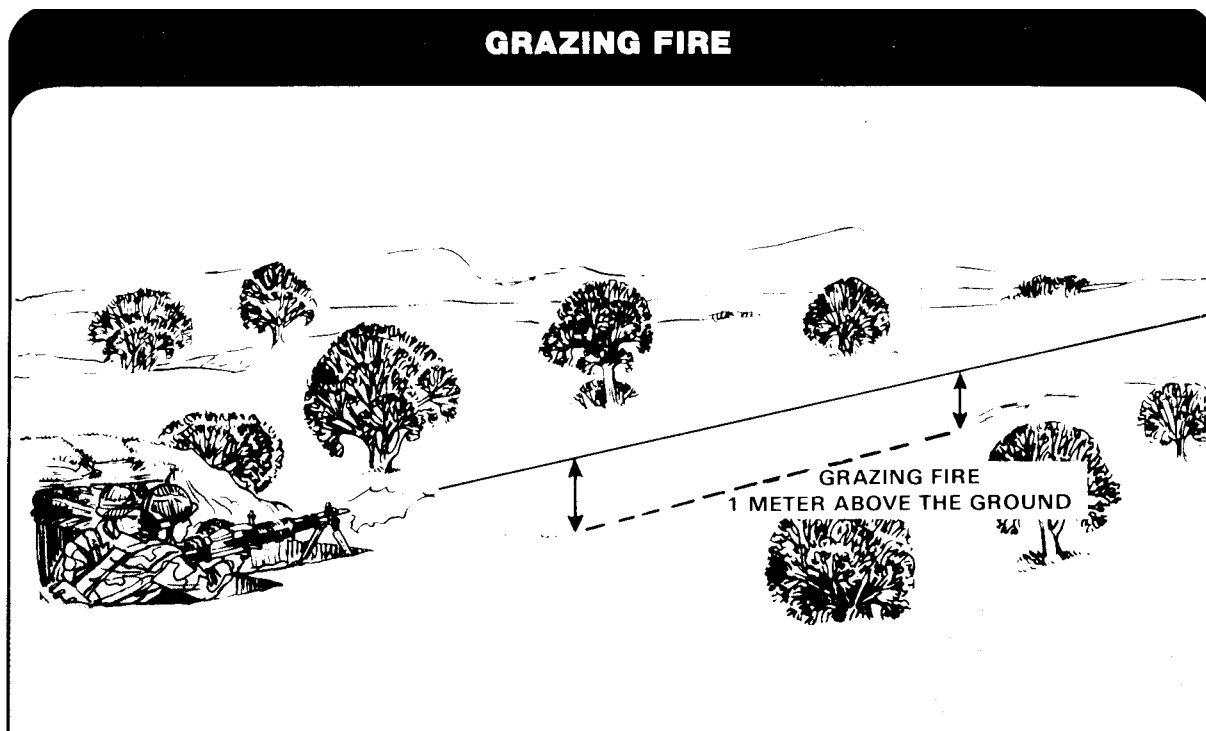
This is the area around a projectile's point of impact in which soldiers could be killed or injured by either the concussion or fragmentation of the projectile.

CLASSES OF FIRE

Fire is classified with respect to the ground and the target.

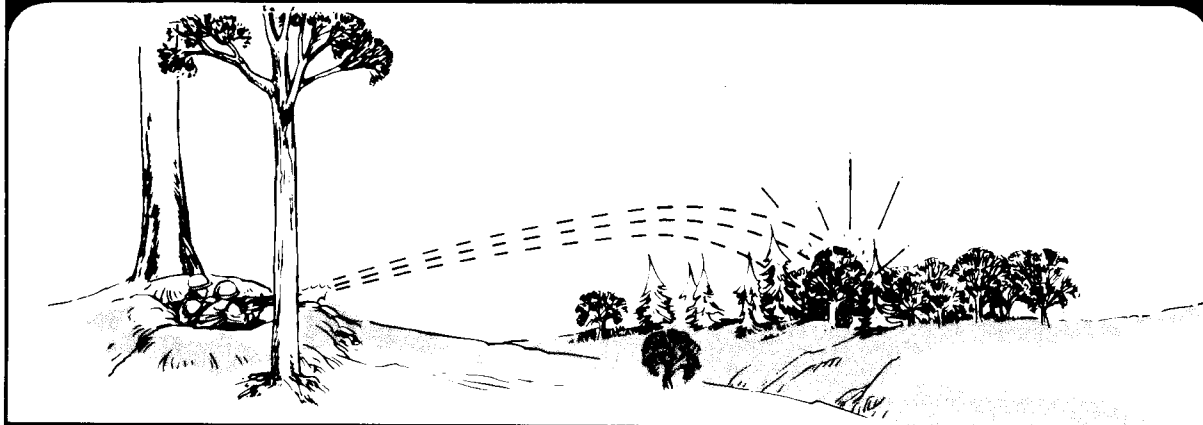
Fire with respect to the **ground** is:

- **Grazing fire** when most of the rounds do not rise above 1 meter from the ground.



- **Plunging fire** when the path of the rounds is higher than a standing man except in its beaten zone. Plunging fire is attained when firing at long ranges, when firing from high ground to low ground, and when firing into a hillside.

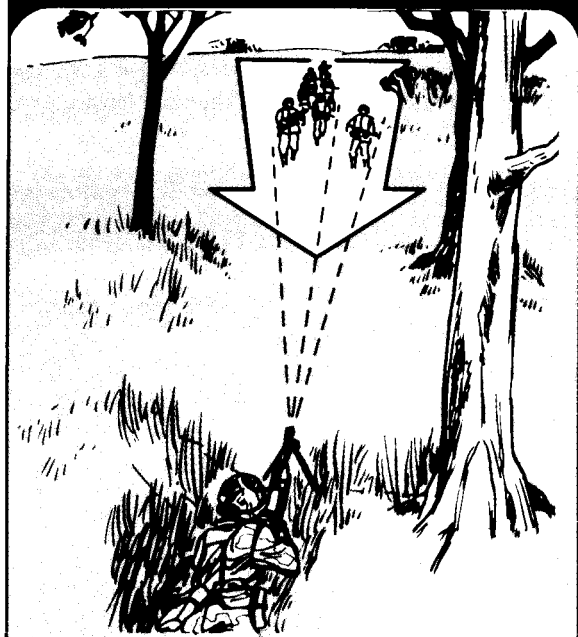
PLUNGING FIRE



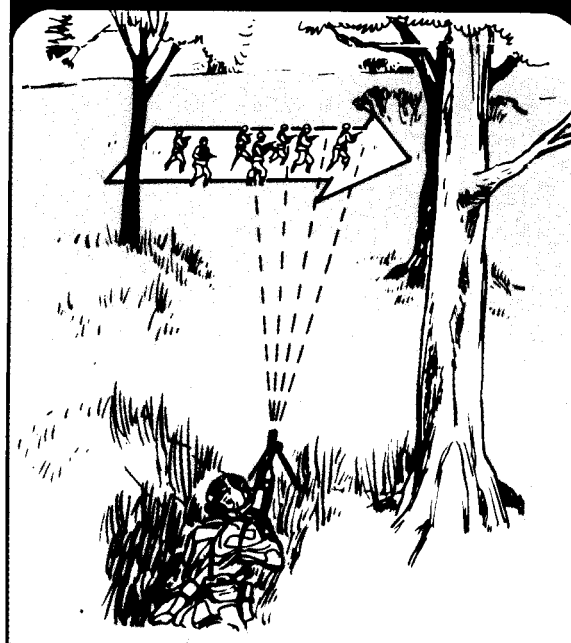
Fire with respect to the target is:

- Frontal fire when the rounds are fired directly at the front of the target.
- Flanking fire when the rounds are fired at the flank of the target.

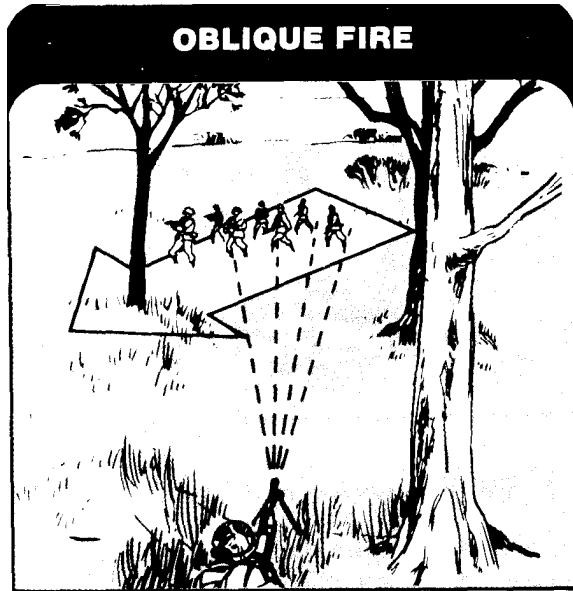
FRONTAL FIRE



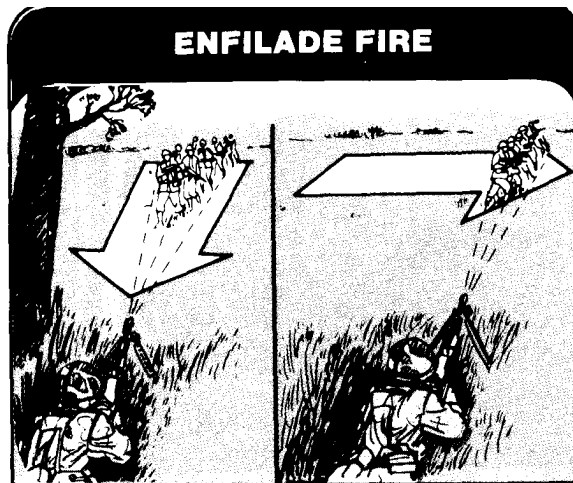
FLANKING FIRE



- Oblique fire when the long axis of the beaten zone is oblique to the long axis of the target.



- Enfilade fire when the long axis of the beaten zone is the same as the long axis of the target. It can be either frontal, flanking, or oblique. It is the best type of fire with respect to the target because it makes the best use of the beaten zone.



SUPPRESSIVE FIRE

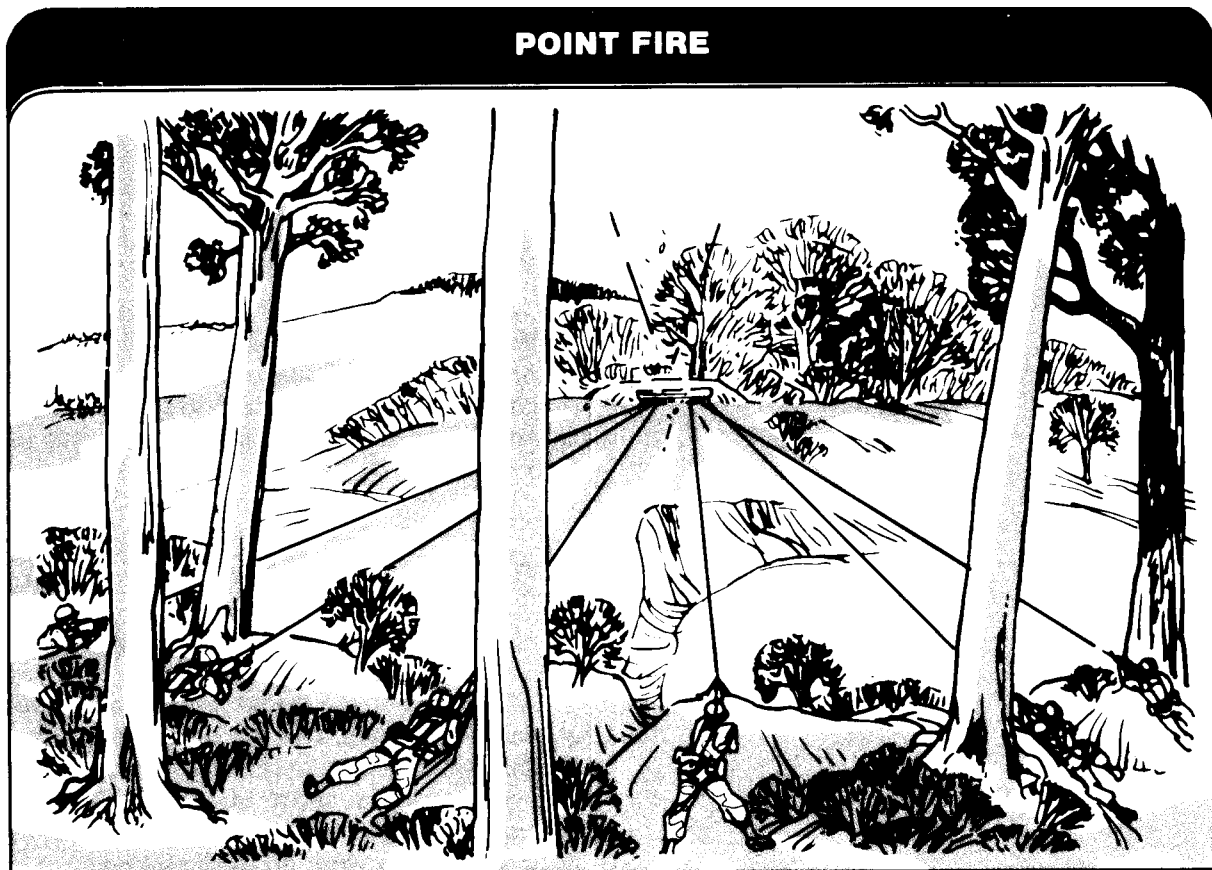
Fire directed at the enemy to keep him from seeing, tracking, or firing at the target is suppressive fire. It can be direct or indirect fire. Smoke placed on the enemy to keep him from seeing targets is also suppressive fire.

FIRE DISTRIBUTION

When firing at an enemy position, your leader will distribute his unit's fire to cover the position. There are two ways to distribute fire on a target — point fire and area fire.

METHODS OF DISTRIBUTION

Point Fire. This is fire directed at one point; for example, an entire team firing at one bunker.



Area Fire. This is fire directed to cover an area both laterally and in depth. If your leader wants fire on a woodline, he may first fire tracers to mark its center. Then, he may have the men on his left fire to the left of the tracers and those on his right fire to the right of the tracers. This is the best and quickest way to hit all parts of an area target.



In area fire, you will fire at likely enemy positions rather than a general area. Fire first at that part of the target relative to your position in the team. Then distribute your fire over an area a few meters to the right and left of your first shot.

COVERING THE TARGET AREA

AUTOMATIC RIFLEMAN

The part of the target which you, as an automatic rifleman, can hit depends on your position and the range to the target. When possible, you cover the entire target. When firing automatic fire, you tend to fire high; so fire low at first and then work up to the target.

MACHINE GUNNER

As a machine gunner, fire into the part of the target assigned to you by your leader.

DRAGON GUNNER

As a Dragon gunner, fire into the part of the target assigned to you by your leader. Fire only at targets such as armored vehicles and key weapons. If there are no Dragon targets, fire your rifle.

GRENADIER

As a grenadier, fire your first grenade into the center of the target. Then distribute your shots over the remaining target area.

FIRE CONTROL

WAYS TO COMMUNICATE FIRE CONTROL

Your leader will control your fire. The noise and confusion of battle will limit the use of some methods of control, so he will use the way or combination of ways that does the job.

Sound. This includes both voice and devices such as whistles and horns. Sound signals are good only for short distances. Their range and reliability are reduced by battle noise, weather, terrain, and vegetation. Voice communications may come directly from your leader to you or they may be passed from soldier to soldier.

Prearranged fire. In prearranged fire, your leader tells you to start firing once the enemy reaches a certain point or terrain feature. When using prearranged fire, you do not have to wait for an order to start firing.

Prearranged signals. In this method, your leader gives a prearranged signal when he wants you to start firing. This can be either a visual signal or a sound signal. Start firing immediately when you get the signal.

Soldier-initiated fire. This is used when there is no time to wait for orders from your leader.

Standing operating procedures (SOP). These can reduce the number of oral orders needed to control fire. SOPs must be known and understood by all members of the unit. Three SOPs are the search-fire-check SOP, the return-fire SOP, and the rate-of-fire SOP. A procedure for giving fire commands for direct fire weapons should also be SOP.

The search-fire-check SOP, follows these steps:

Step 1

- Search your assigned sectors for enemy targets.

Step 2

- Fire at any targets (appropriate for your weapon) seen in your sectors.

Step 3

- While firing in your sectors, visually check with your leader for specific orders.

The return-fire SOP tells each soldier in a unit what to do in case the unit makes unexpected contact with the enemy (in an ambush, for example). These instructions will vary from unit to unit and from position to position within those units.

The rate-of-fire SOP tells each soldier how fast to fire at the enemy. The rate of fire varies among weapons, but the principle is to fire at a maximum rate when first engaging a target and then slow the rate to a point that will keep the target suppressed. That helps keep weapons from running out of ammunition too fast.

FIRE COMMANDS

To help identify a target for a direct fire weapon and to control that weapon's fire, a leader may give a fire command to that weapon.

A fire command has the **following six parts**:

- ① Alert.
- ② Direction.
- ③ Target Description.
- ④ Range.
- ⑤ Method of Fire.
- ⑥ Command to Fire.

Alert. This gets your attention. The leader may alert you by calling your name or unit designation, by giving some type of visual or sound signal, by personal contact, or by any other practical way.

Direction. This tells you which way to look to see the target. The following are ways to give the direction to the target:

- Your leader may point to a target with his arm or rifle. This will give you the general direction of the target.
- Your leader may fire tracer ammunition at a target to quickly and accurately identify it. However, before firing, he should show you the general direction.
- Your leader may designate certain features as TRPs before contact is made with the enemy. Each TRP will have a number to identify it. He may give a target's direction in relationship to a TRP. For example FROM TRP 13, RIGHT 50. That means that the target is 50 meters to the right of TRP 13.

Target Description. This tells you what the target is. Your leader should describe it briefly, but accurately. For example MACHINE GUN POSITION IN THE WOODLINE.

Range. This tells you how far away the target is. The range is given in meters.

Method of Fire. This tells you who is to fire. It may also tell you how much ammunition to fire. For example, your leader may want only the grenadier to fire at a target. He may also want him to fire only three rounds. For example, he would say: GRENADIER, THREE ROUNDS.

Command to Fire. This tells you when to fire. It may be an oral command, or a sound or visual signal. If your leader wants to control the exact moment of fire, he may say AT MY COMMAND, (then pause until he is ready) FIRE. If he wants your fire to start upon completion of the fire command, he will simply say FIRE (without pausing).

EXAMPLE OF ORAL FIRE COMMAND	
COMMAND	EXAMPLE
① ALERT _____	GRENADIER
② DIRECTION _____	STRAIGHT AHEAD
③ TARGET DESCRIPTION _____	SOLDIERS MOVING IN DITCH
④ RANGE _____	ONE HUNDRED
⑤ METHOD OF FIRE _____	FOUR ROUNDS
⑥ COMMAND TO FIRE _____	FIRE

Visual signals are the most common means of giving fire commands. Arm-and-hand signals, personal examples, and pyrotechnics are some of the things your leader may use for visual signals.

Your leader may use arm-and-hand signals to give fire commands when you can see him.

He may use flares and smoke grenades to mark targets in most conditions of visibility.

Your leader may use his weapon to fire on a target as a signal; you fire when he fires. Watch your leader and do as he does. He may use tracers to point out targets.