

CHAPTER 6

COMBAT TECHNIQUES OF FIRE

Grenadiers must be trained in the standard methods of applying fire with a grenade launcher. A unit's grenadier program develops well-trained grenadiers who can survive and win on the battlefield. This chapter provides guidance on combat techniques, which include advanced gunnery, fire control methods, and application of fire.

Section I. ADVANCED GUNNERY

Advanced gunnery techniques reinforce basic gunnery and teach the grenadier how and when to use these basics in combat situations. Training advanced gunnery differs slightly from training basic gunnery. This section discusses in detail how to train characteristics of fire, classes of fire, range estimation, and fire commands. It also discusses the easiest and quickest means of applying firing techniques and delivering fire with the M203 grenade launcher.

6-1. CHARACTERISTICS OF FIRE

The characteristics of fire discussed in this section are defined as follows:

- a. **Trajectory.** This is the curve described in space by the fired round as it travels to its target. The trajectory rises as the sights are elevated.
- b. **Line of sight.** This is an imaginary line from the gun to the target, as seen through properly adjusted sights.
- c. **Ordinate.** This is the vertical distance at any point between the trajectory and the line of sight.
- d. **Maximum Ordinate.** This is the greatest vertical distance between the trajectory and the line of sight; it occurs at the highest point of the trajectory.
- e. **Danger Space.** This is the area where the round impact or the shrapnel from the round impact injures personnel or destroys the target.
- f. **Dead Space.** This is the area(s) where personnel or targets are safe from direct-fire weapons. Ditches, depressions, and ravines are examples of dead spaces.

6-2. CLASSES OF FIRE

Fire distribution is classified three ways.

- a. **With Respect to the Ground.** For the M203 grenade launcher, this class of fire refers only to plunging fire. This is fire that strikes the target from

a high angle and confines the danger space—for example, 40-mm grenades fired from the top of a hill follow an arcing trajectory and land in the valley. Figure 6-1 shows an example of plunging fire.

b. **With Respect to the Target.** This includes four ways to distribute fire (Figure 6-2).

(1) **Frontal.** Frontal fire is directed against a target's front, with the target facing or moving toward the firing position.

(2) **Flanking.** Flanking fire is directed against the target's flank.

(3) **Oblique.** Oblique fire is directed against a target moving or facing at an angle rather than directly toward or perpendicular to the gun.

(4) **Enfilade.** Enfilade fire is directed along the length of a target and may be frontal or flanking, depending on which way the target is facing.

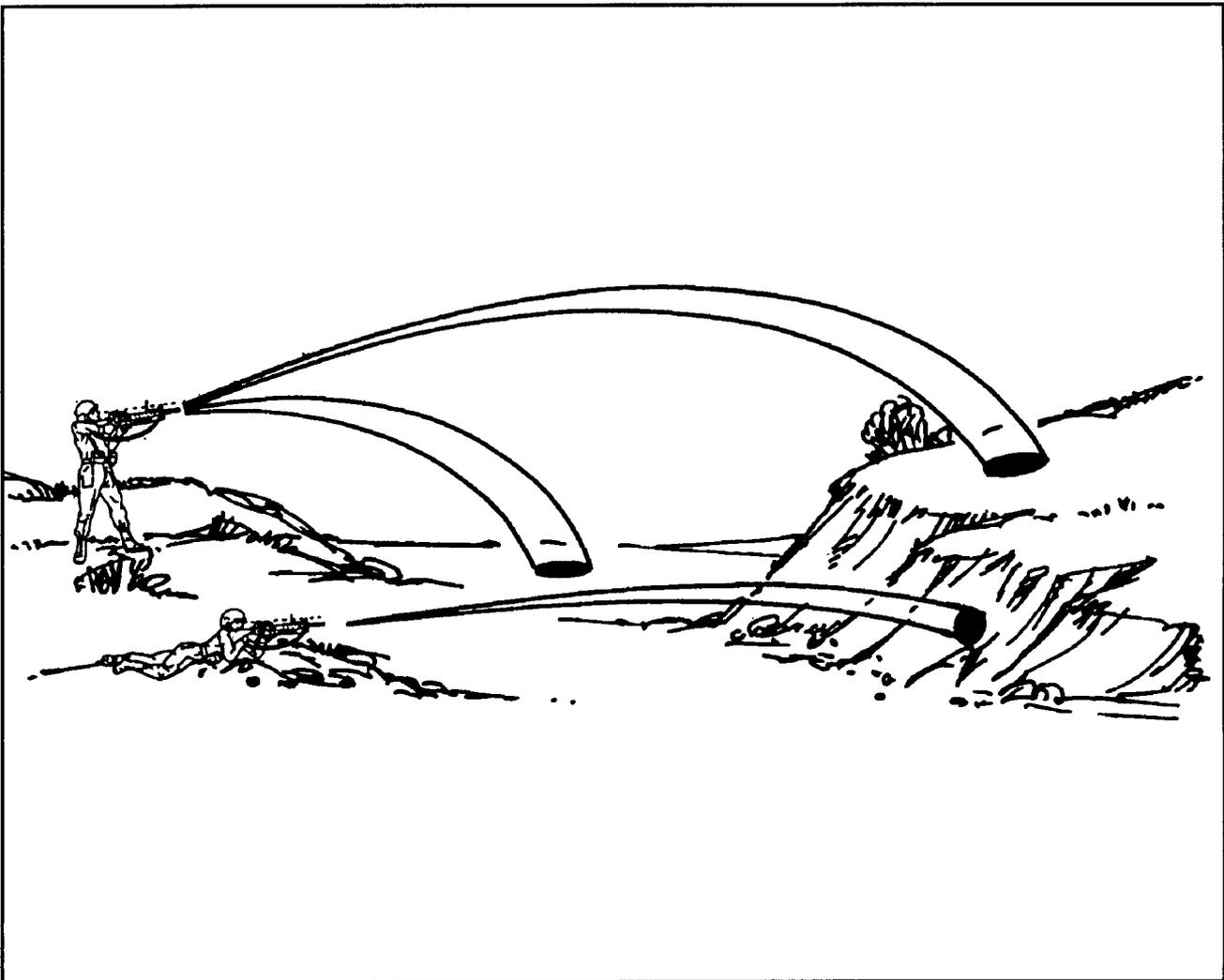


Figure 6-1. Plunging fire.

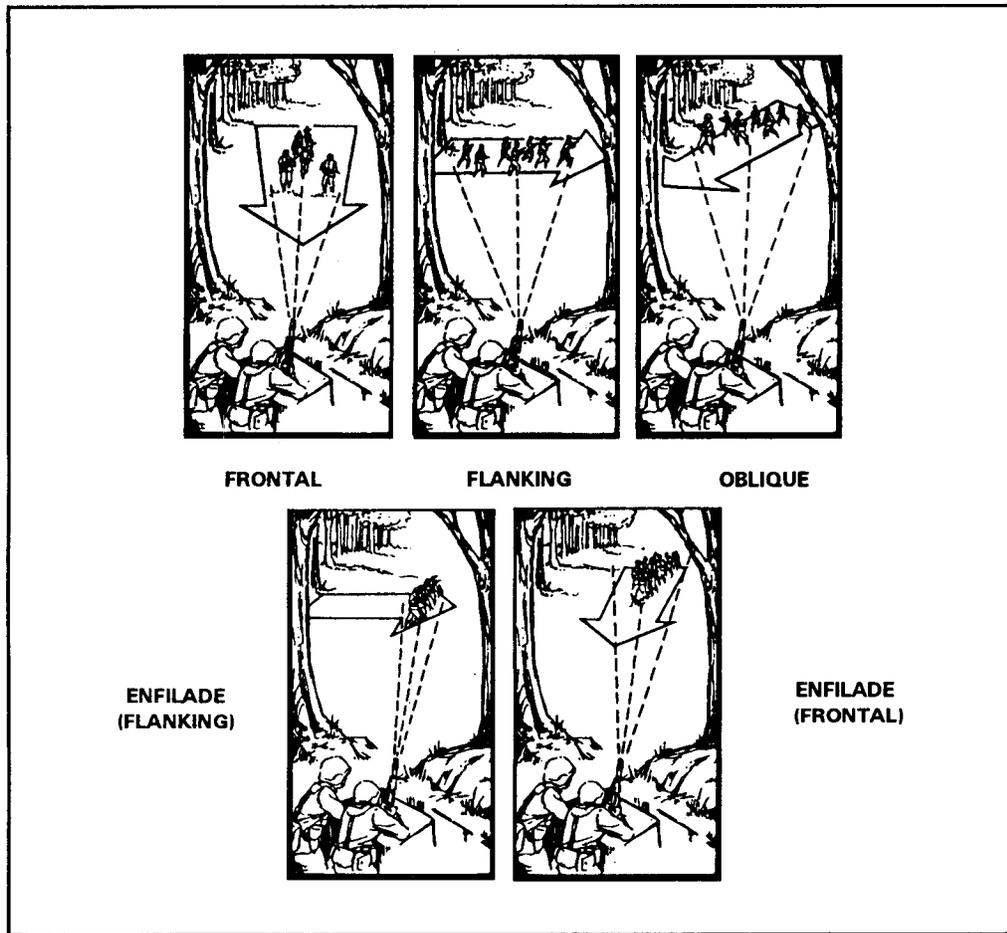


Figure 6-2. Classes of fire with respect to the target.

c. **With Respect to the Weapon.** This also includes four ways to distribute fire (Figure 6-3).

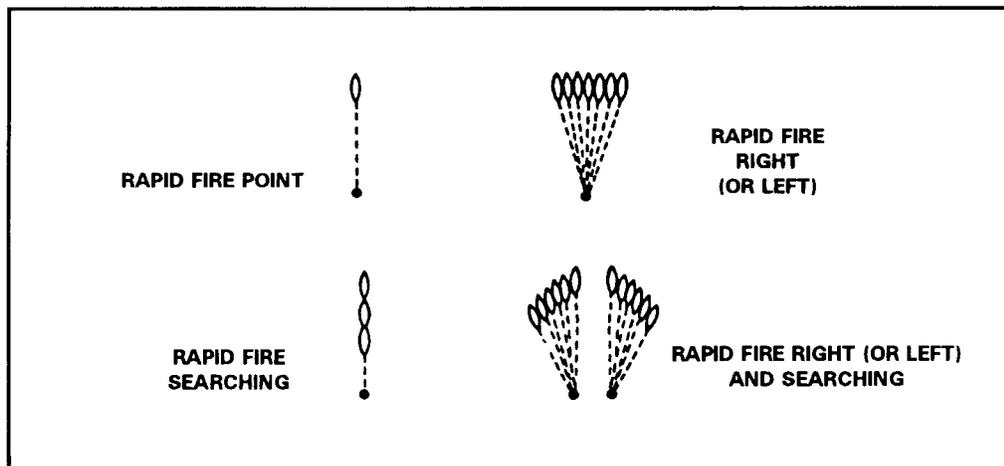


Figure 6-3. Classes of fire with respect to the weapon.

- (1) **Rapid fire point.** Distribute fire against a target with one aim point.
- (2) **Rapid fire right or left.** Distribution fire right to left or left to right without changing range. Use this against frontal or flanking targets.
- (3) **Rapid fire searching.** Distribute fire against a deep target, changing elevation, but not direction. Use this fire against enfilade targets.
- (4) **Rapid fire right or left and searching.** Distribute fire against a target with depth and width, changing elevation and direction. Use this fire against an oblique target.

6-3. RANGE ESTIMATION

The grenadier must be able to estimate range. This enables him to hit targets with the first round and to adjust and shift fire, *if necessary*. He often estimates range visually, using one of three methods:

- a. **100-Meter Unit-of-Measurement Method.** Visualize 100 meters on the ground (this takes practice). Then estimate how many 100-meter units lie between you and the target (Figure 6-4).

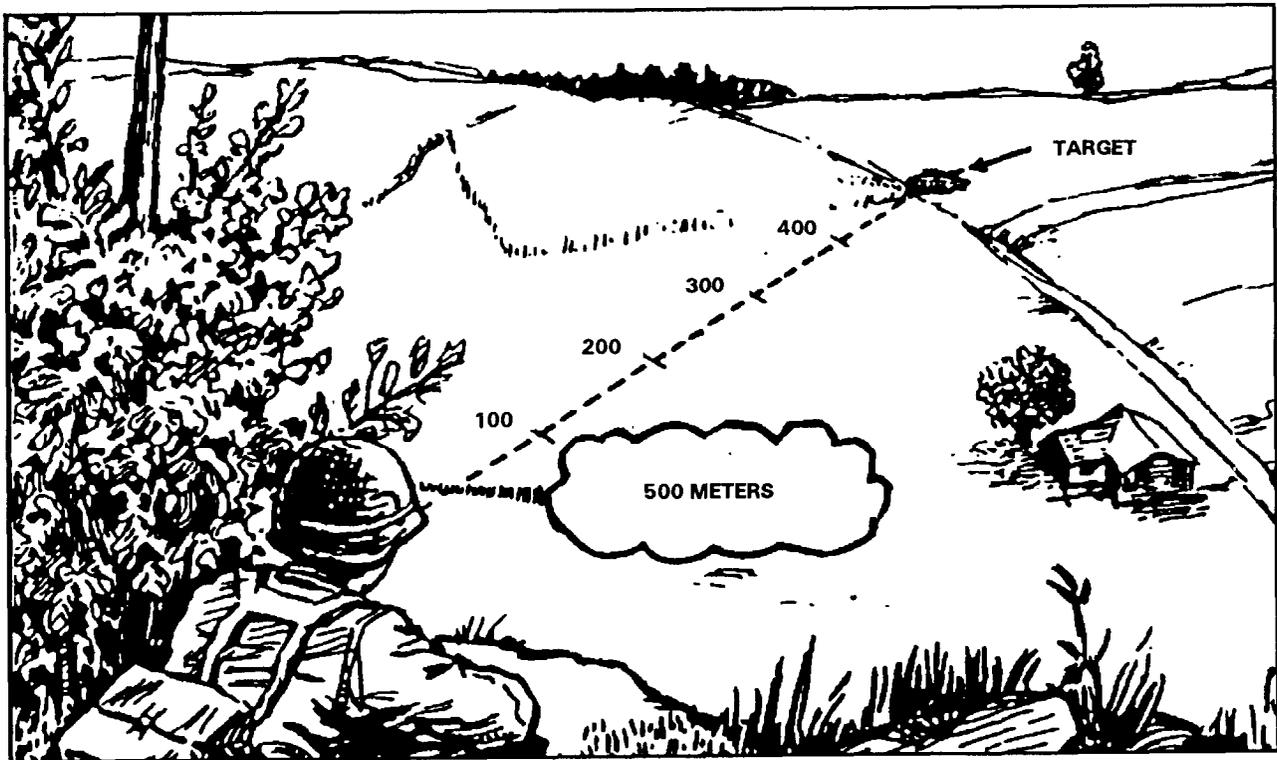


Figure 6-4. Application of the 100-meter unit of measurement method.

- b. **Appearance-of-Objects Method.** Memorize the sizes and shapes of familiar objects as they appear at different ranges. Remember to consider the factors that affect the appearance of objects (Table 6-1).

Factors that affect range estimation	Factors that cause underestimation of range	Factors that cause overestimation of range
Target detail, outline clarity	Target is mostly visible, and its outline is clear.	Target is only somewhat visible or is seen as small relative to its surroundings.
Nature of terrain or position of observer	Target is located across a depression that is mostly hidden from view.	Target is located across a depression that is visible.
	Target is located at a ground level below that of the observer.	Target is located at a ground level above that of the observer.
	Target is located down a straight, open road or along a railroad.	Target is located where vision is narrowly confined such as in streets, draws, or forest trails.
		Target is located across uniform surfaces like water, snow, desert, or fields of grain.
Light and atmosphere	Target is brightly lit, or the sun is shining from behind the observer.	Target is poorly lit, as at dawn or dusk, or in rain, snow, or fog, or is obscure because the sun is in the eyes of the observer.
	Target contrasts sharply with the background, or is silhouetted due to its size, shape, or color.	Target blends into the background or terrain.
		Target is visible in the clear air of high altitudes.

Table 6-1. Factors that affect visual range estimation.

c. **AN/PVS-4 Method.** Using a target six feet tall, such as a soldier—

(1) Look through the reticle, place the base of the target (or the soldier's feet) on the horizontal line, and try to match the target's height to one of the vertical lines. The number under the line is the distance to the target in hundreds of meters. For example, the distance to the soldier shown in A, Figure 6-5 is 400 meters.

(2) If the soldier is too tall to match to the top half of a vertical line, then match his height to a whole vertical line. Halve the number under the line to obtain the distance to him in hundreds of meters. For example, the distance to the soldier shown in B, Figure 6-5 is 200 meters.

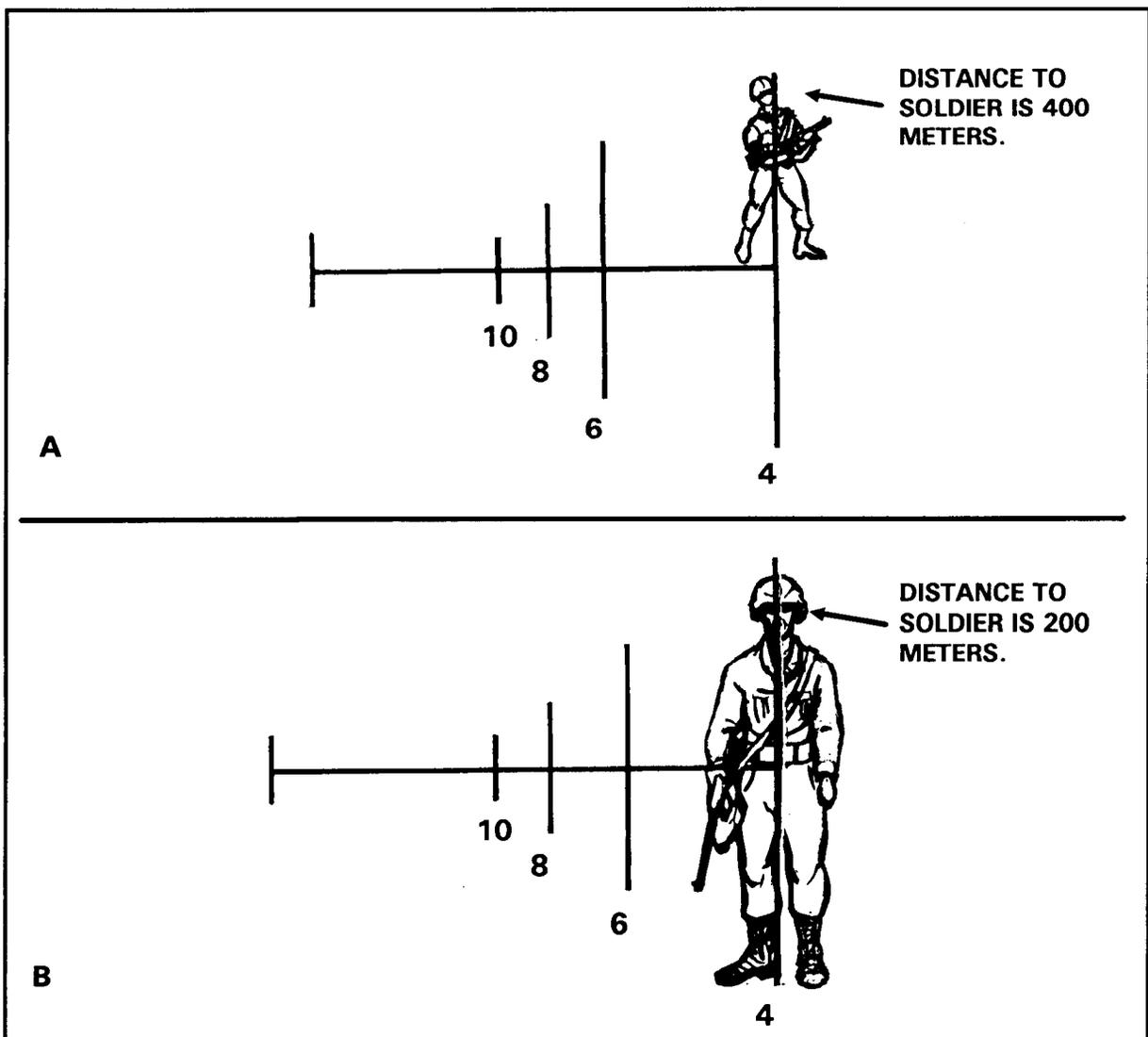


Figure 6-5. Range estimation using the AN/PVS-4 nightsight.

6-4. PREDETERMINED FIRES

Preetermined fires are used to cover such target areas as dead spaces and likely enemy avenues of approach and assault positions. Each squad leader prepares a sector sketch to help in planning the defense and controlling fire (Figure 6-6).

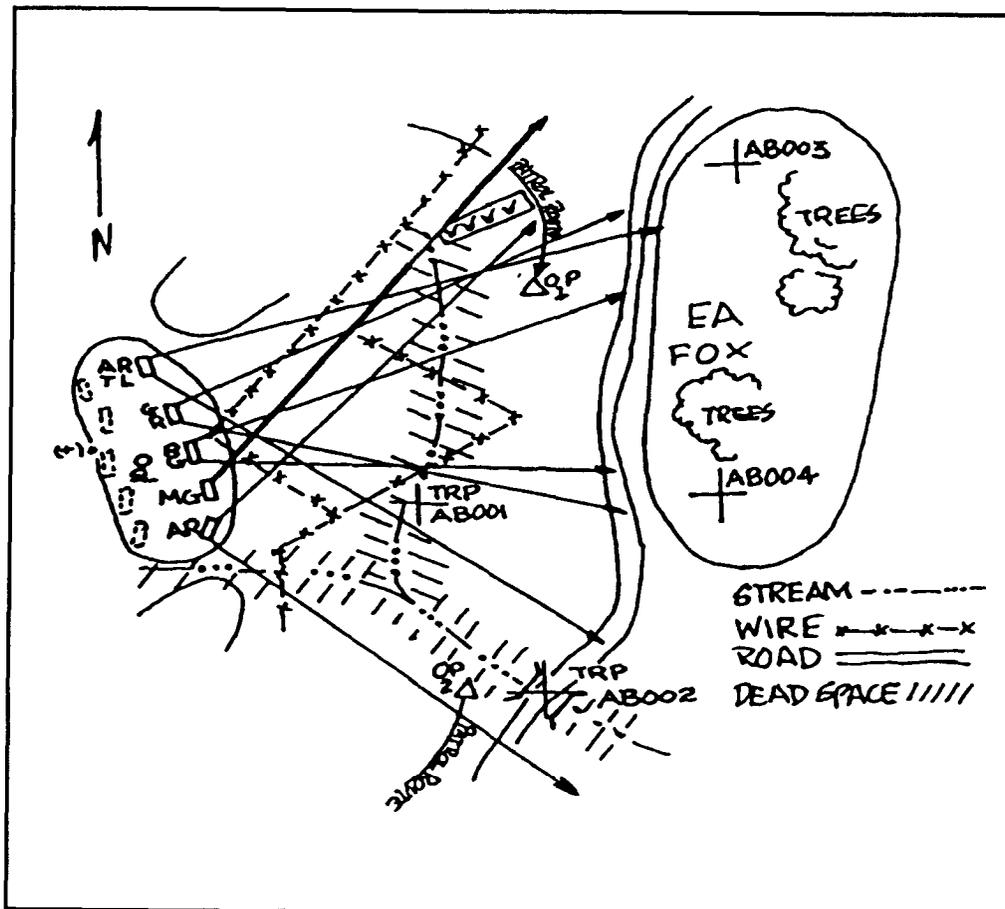


Figure 6-6. Example squad sector sketch.

a. **Determining Dead Space.** The extent of a dead space and the amount of grazing fire required to cover it may be determined by two methods: The first method requires the grenadier to lay the grenade launcher for elevation and direction and to clear the weapon. A member of the squad then walks along the direction line toward the target while the grenadier looks through his rifle sights. Dead space exists wherever the soldier's waist (midsection) falls below the grenadier's line of aim. The grenadier uses arm-and-hand signals to control the walking soldier. This method gives the grenadier an accurate indication of the location and depth of the dead space. The second method requires the grenadier to observe the flight of tracer ammunition from a position behind and to the flank of the weapon.

b. **Calling for Fire.** Predetermined targets, including the final protective line (FPL) or principal direction of fire (PDF), are engaged on order or IAW SOP. The signal used to call for these fires is normally stated in the defense order. Fires on predetermined targets may be controlled by arm-and-hand signals, voice commands, or pyrotechnic devices.

6-5. TYPES OF TARGETS

Targets for grenadiers in combat are most likely to be enemy troops. Different troop formations require different classes of fire distribution. Personnel targets have width and depth; the fire must thoroughly cover the area where the enemy is known or suspected to be. The targets may be easy or hard to find.

a. **Point Targets.** These are targets, such as enemy bunkers, windows, weapons emplacements, light-skinned vehicles, and troops, that have a single aiming point. The maximum effective range for point targets is 150 meters.

b. **Area Targets.** These may have considerable width and depth and may require extensive right or left and searching fire. A deployed platoon is one example of an area target. The grenadier must know how to engage area targets regardless of their sizes or shapes. The maximum effective range for area targets is 350 meters. Types of area targets are as follows:

(1) **Linear targets.** The grenadier sights on what appears to be center of mass. He fires the grenade launcher left and right across the target on successive aiming points (Figure 6-7).

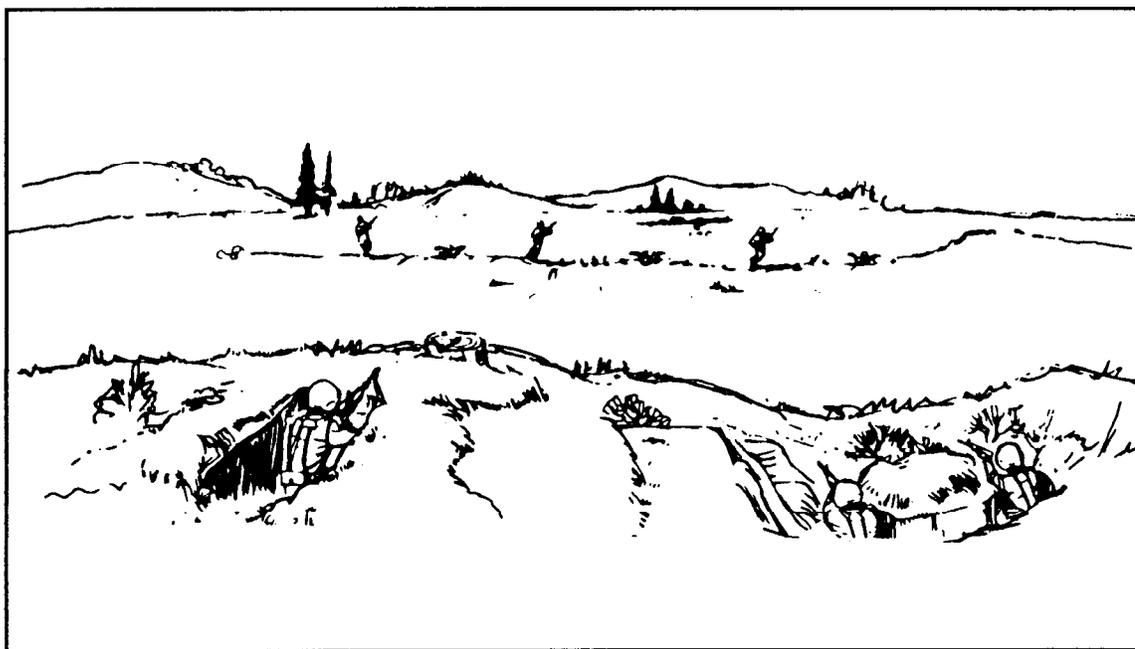


Figure 6-7. Linear targets.

(2) **Deep Targets.** The grenadier first lays on the center of mass of the target. He fires searching fire to the near end and then up to the far end of the target along successive aiming points (Figure 6-8).



Figure 6-8. Deep targets.

(3) **Linear targets with depth.** The grenadier lays on the target's center of mass. He then moves the grenade launcher left and right across the target, selecting successive aiming points at different ranges (Figure 6-9).



Figure 6-9. Linear targets with depth.

6-6. DECONTAMINATION

Leaders must try to reduce the penetration of contaminants and lessen exposure to them. Contaminated material is disposed of IAW SOP.

a. **Nuclear.** Wipe off the weapon with warm soapy water. Otherwise, use towelettes or rags. (FM 3-5 provides details.)

b. **Biological.** Use towelettes from the M258A1 kit to wipe off the weapon. If these are not available, wash with soap and water.

c. **Chemical.** Use soap and water or towelettes as for biological contamination.

Section II. FIRE CONTROL

Fire control includes all leader and soldier actions in planning, preparing, and applying fire on a target. The leader selects and designates targets, indicating their width and depth or, in the ease of targets that are hard to identify, designates the distance from a reference point to the target's center of mass (Figure 6-10). He also designates the midpoint, flanks, or ends of a target unless these locations are obvious to the grenadiers. The grenadiers open fire when ready, adjust and regulate the rate of fire, and shift from one target to another. They cease fire only when the target is neutralized or the leader signals to cease fire.



Figure 6-10. Use of a reference point to identify a target.

6-7. METHODS OF FIRE CONTROL

The noise and confusion of battle may limit the methods of fire control used, so the leader must select the method(s) that will best accomplish the mission.

a. **Oral Commands.** The primary method of fire control is the oral fire command. This method is effective unless noise or distance prevents the grenadier from hearing the leader.

b. **Arm-and-Hand Signals.** This method of fire control is effective only if the grenadiers know the standard arm-and-hand signals and can see the leader. The leader gets the grenadier's attention, then points to the target. When the grenadier returns the "Ready" signal, the leader commands FIRE.

c. **Prearranged Signals.** This method of fire control can include visual or sound signals such as those that can be produced by a whistle, pyrotechnics, or casualty-producing device. The SOP must define the signals to be used, and all squad members must understand them. If the leader wants to shift fire at a certain time, he gives a prearranged signal such as smoke or pyrotechnics. When they see this signal, grenadiers shift their fire to a prearranged point.

d. **Personal Contact.** This method of fire control is the one most frequently used by small-unit leaders. Many situations require the leader to move to individual soldiers to issue orders. If so, he must use cover and concealment to avoid disclosing their positions. Once there, he gets the grenadier's attention, points out the new target, and commands FIRE.

e. **Standing Operating Procedure.** This method of fire control refers to actions executed without command. The SOP defines these actions and the events that initiate them. Using an SOP simplifies the leader's job of fire control.

f. **Range Cards.** This method of fire control requires the leader to ensure all range cards are current and accurate. Then he should designate dead spaces, specific targets, no-fire zones, and restricted fire areas. The key to this method is the disciplined grenadier who pays attention to detail and can understand the areas the squad leader wants covered by fire.

6-8. FIRE COMMANDS

Leaders give fire commands to get effective fire on a target quickly and without confusion. When the leader decides to engage a target that is not obvious to the grenadier, he must give the grenadier enough information to effectively engage the target. After he alerts the grenadier, the leader must give a target direction, description, and range; then he must name the method of fire and give the command to fire. Leaders may give initial and subsequent fire commands: initial fire commands initiate fire on a target; subsequent commands adjust, interrupt, or change the rate of fire, or terminate the alert.

a. **Initial Fire Commands.** Initial fire commands for grenade launchers have six elements. The grenadiers repeat each element of the fire command as the leader gives it:

ALERT
DIRECTION
DESCRIPTION
RANGE
METHOD OF FIRE
COMMAND TO OPEN FIRE

(1) **Alert.** This element prepares the grenadiers to receive further instructions. The leader may alert both grenadiers in the squad, but only fire one of them (command one of them to fire). To alert and fire both grenadiers, the leader announces "Grenadier." To alert both but fire only one, he announces "Grenadier Number One (Two)." The nonfiring grenadier lays on the target to take up the mission in case the primary grenade launcher malfunctions.

(2) **Direction.** The leader may use one or more of the following methods to indicate the general direction to the target:

(a) **Speaking.** The leader can state where the target is relative to the grenadier's position.

(b) **Pointing.** The leader can point with his arm or aim with a weapon to give the direction to a small or obscure target. When he points with his arm, someone standing behind him should be able to look over his shoulder, sight along his arm and index finger, and locate the target. A soldier looking through the sights of a weapon aimed at a target should be able to see the target.

(c) **Firing tracers.** The leader can fire tracer ammunition to quickly and surely direct the grenadier to a target that is not clearly visible. He should first give the general direction to draw the grenadier's attention to the target area. To prevent the loss of surprise caused by the use of tracer ammunition, the leader fires only after he has given all of the elements of the fire command *except* the command to fire. The leader may then fire his individual weapon or may fire one or more bursts from a machine gun. Because tracer fire is the last element of the fire command, it is the grenadier's signal to open fire.

GRENADIER
FRONT
300
WATCH MY TRACER(S)

(d) **Using reference points.** The leader may use easy-to-recognize reference points to direct the grenadier to an obscure target. The leader uses the word "reference" before he describes the terrain feature used to designate

the target. He does this to avoid confusion. He should also give the general direction to the reference point. (The reference might be a shift from a known point.) All leaders and grenadiers must know terrain features and the terminology used to describe them (FM 21-26).

GRENADIER NUMBER ONE
FRONT
REFERENCE: LONE PINE TREE (reference point)

GRENADIER NUMBER ONE
FRONT
REFERENCE: CROSSROADS RIGHT 200 (shift from a known point)

(3) **Description.** Unless the target is obvious, the leader may describe the target briefly. This enables the grenadiers to picture the type of target so they can properly apply their fire.

(4) **Range.** The leader estimates the range and announces it to the nearest hundred meters but, because the meter is the standard unit range measurement, he omits the word “meters.”

GRENADIER
FRONT
REFERENCE: BARN RIGHT 100
TARGET—TROOPS IN THE OPEN (description)
300 (range in meters)

(5) **Method of fire.** The leader announces the class of fire with respect to the weapon and, unless the fire command requires the grenadier engage with rapid fire, the number of rounds to use.

GRENADIER
FRONT
REFERENCE: SHIFT FROM MACHINE GUN BUNKER
RIGHT 200
TARGET—TROOPS IN THE OPEN
300
RAPID FIRE RIGHT AND SEARCH (class of fire with respect to weapon)

(6) **Command to open fire.** The leader may preface the command to commence firing with AT MY COMMAND or AT MY SIGNAL. He withholds fire this way to surprise the enemy or to allow both grenadiers to open fire at

the same time. After both grenadiers respond “Ready,” the leader commands FIRE at his discretion. If the leader wants immediate fire, he simply commands FIRE without pausing, and the grenadiers fire as soon as they are ready.

GRENADIER
FRONT
TROOPS IN THE OPEN
300
AT MY COMMAND or
AT MY SIGNAL (Leader pauses until grenadiers
are ready and fire is desired)
(or prearranged signal)

FIRE

b. **Subsequent Fire Commands.** The leader issues subsequent fire commands to adjust direction and elevation, to change the number of rounds to fire after a fire mission is in progress, to interrupt fires, or to terminate the alert. If the grenadier engages a target incorrectly, the leader promptly corrects his fire by announcing or signaling desired changes. The grenadier corrects and resumes firing without further command. The leader adjusts direction first—for example, RIGHT 50; LEFT 100. He adjusts elevation second—for example, ADD FIVE ZERO; DROP FIVE ZERO. Third, he adjusts the number of rounds. He interrupts fire by signaling or announcing CEASE FIRE, or terminates the alert by signaling or announcing CEASE FIRE, END OF MISSION.

c. **Doubtful Elements and Corrections.** The grenadier repeats doubtful elements so the leader will repeat the element—for example, if the range to the target was unclear or inaccurate, the grenadier announces “Say again range, target.” The leader then announces “The command was,” repeats the element in question, and continues with the fire command. The leader can also correct fire commands as follows:

(1) **Initial fire command.** Announce “Correction” then give the corrected element.

GRENADIER
RIGHT FRONT
TROOPS IN THE OPEN
400
CORRECTION
300
RAPID FIRE RIGHT
AT MY COMMAND

(2) **Subsequent fire command.** Correct an error by announcing “Correction” and repeating the entire subsequent fire command.

LEFT FIVE ZERO, ADD FIVE (subsequent fire command)

CORRECTION

LEFT FIVE ZERO, ADD FIVE ZERO (correction)

d. **Abbreviated Fire Commands.** Fire commands need not be complete to be effective. In combat, the leader gives only the elements necessary to place fire on a target quickly and without confusion. During training, he uses all the elements to enable grenadiers to learn how they are used. After grenadiers receive initial training in fire commands, they should learn to react to abbreviated fire commands, which may be given orally or by arm-and-hand signals.

(1) **Oral method.** If the leader wants to place the fire of one grenade launcher on an enemy machine gun bunker he has located, he will say—

GRENADIER NUMBER ONE
MACHINE GUN BUNKER
400
FIRE

(2) **Arm-and-hand method.** To control fire when battlefield noise or distance to the grenadier is too great, the leader must use arm-and-hand signals (Figure 6-11). When he wants a specific grenadier to execute an action or movement, he gives a preliminary signal to that grenadier only. The following signals are commonly used by both the leaders and grenadiers:

(a) **Ready.** The grenadier gives this signal to indicate that he is ready to fire. He raises his hand or arm above his head toward the leader.

(b) **Commence firing.** The leader gives this signal by bringing his hand (palm down) to the front of his body about waist level, and moving it horizontally in front of his body.

(c) **Move over or shift fire.** The leader gives this signal by raising his hand (on the side toward the new direction) and moving it across his body to the opposite shoulder, palm to the front; then, with his arm and hand extended, he swings his arm in a horizontal arc to point in the new direction. For slight changes in direction, he moves his hand from the latest position to the desired direction of movement.

(d) **Interrupt or cease firing.** The leader gives this signal by raising his arm and hand (palm outward) in front of his forehead and bringing it downward sharply.

(e) *Other signals.* The leader devises other signals to control his weapons. (FM 21-60 provides a detailed description of arm-and-hand signals.)

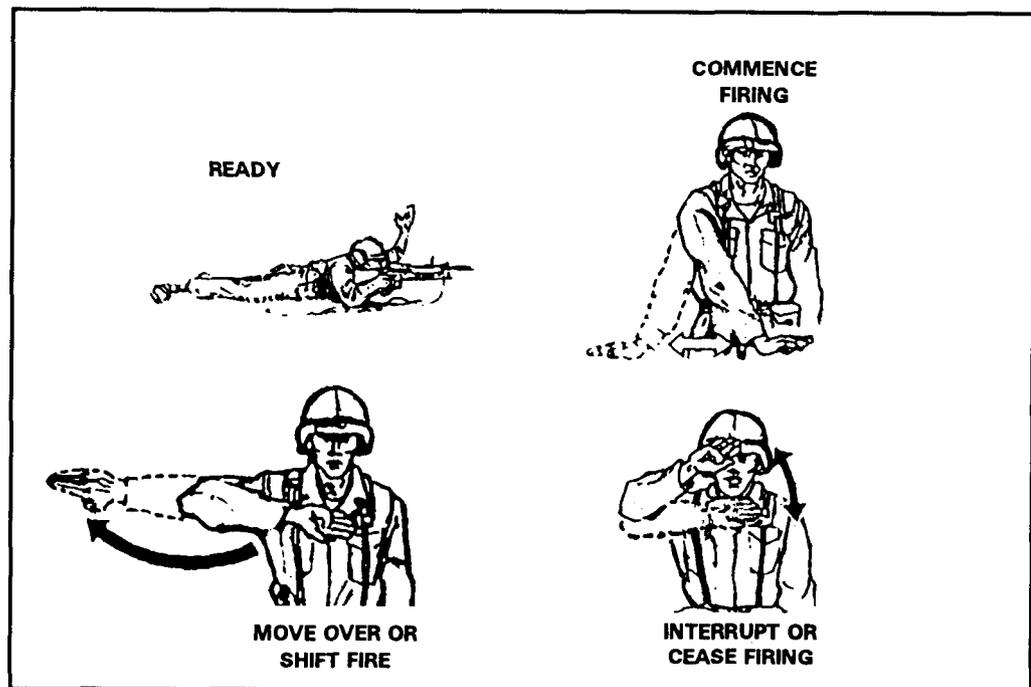


Figure 6-11. Arm-and-hand signals.

Section III. APPLICATION OF FIRE

Application of fire refers to the methods grenadiers must use to completely and effectively cover a target area. They can learn these methods only after they know what types of targets they may find in combat and how to properly distribute and concentrate their fire. Using these methods ensures they can react quickly and properly when they detect or are alerted to various types of targets.

6-9. SUPPRESSIVE FIRE

Grenadiers use suppressive fire to prevent the enemy from seeing, shooting at, or tracking a target. Suppressive fire is direct or indirect fire aimed near enough to the enemy's position to keep him from placing accurate fire on friendly forces.

6-10. OVERWATCH FIRE

Grenadiers use overwatch fire to cover other soldiers' movements. While overmatching, grenadiers perform the following tasks:

- a. They support the platoon by covering dead space.

- b. They learn the platoon's route and its plans.
- c. They select likely enemy positions and observe them continuously.
- d. They determine where to find and how to reach the best grenade launcher position.

6-11. AREA AND POINT FIRE

Grenadiers deliver point fire and area fire in width, in depth, or both. To distribute fire properly, they must know where to aim, how to adjust their fire, and where to move the grenade launcher.

a. **Point of Aim.** The grenadier must initially aim, fire, and adjust on a certain point on the target. He must adjust boldly, rapidly, and continuously. In most cases, the enemy leader and the communications section are in the center of the enemy's formation. Because soldiers in general tend to bunch up, the enemy troops may also be located near the center of the enemy formation. Unless a greater threat exists elsewhere, the grenadier should use the center of this concentrated target as the initial aiming point. The leader can use binoculars and help the grenadier adjust fire. For area targets, the grenadier should aim where the bursting radius will achieve its fullest effect.

b. **Direction.** The direction the leader gives depends on the type of target and on whether he wants one or two grenade launchers to engage the target. When a pair engage an area target (not a point target), they divide the target, then interlock and distribute their fire over it. After receiving the fire command, the grenadier(s) moves the grenade launcher(s) to aim in the designated direction(s) over the target.

6-12. TARGET ENGAGEMENT

The grenadier may be required to engage multiple targets using various combat techniques of fire for area and point targets.

a. A grenadier engages a point target using point fire (also called "rapid fire point"). If the target moves after the initial round is fired, the grenadier follows the movement of the target to keep fire on it.

b. Because an area target is designated by width and depth, the grenadier engages it by aiming and adjusting on the center of its mass, then moving left or right, searching to either flank to achieve the fullest effect of the bursting radius. When his fire reaches the target's flank, the grenadier reverses direction.

c. The grenadier engages a designated linear target by moving right or left, searching the weapon to distribute fire evenly on the target. He must engage the entire width of a linear target; its midpoint is the point of aim. The grenadier then moves in the opposite direction to cover the rest of the target.

d. The leader announces the range and extent (depth) of a deep target (in meters), using a reference point to designate its center of mass if the target is

hard to identify. The grenadier initially aims on the target's midpoint unless another part is more critical. He engages a deep target with searching fire (Figure 6-12). He searches down to an aiming point in front of the near end and back up to an aiming point beyond the far end, always trying to gain the fullest effect of the bursting radius.



Figure 6-12. Engagement of deep targets.

e. The leader can fire his rifle to identify a linear target with depth. He should not use the reference point method, because showing the angle of this type of target requires at least two reference points. The grenadier engages the midpoint of this target first, unless some other part of the target presents a greater threat. He moves left or right and searches to the near flank, then back to the far flank (Figure 6-13).

6-13. LIMITED VISIBILITY

Grenadiers have difficulty detecting and identifying targets in limited visibility, which also affects the leader's ability to control fire. He may instruct the grenadiers to fire without command as soon as targets become visible. Grenadiers should only engage targets they can identify, unless ordered to do otherwise. Leaders should fire tracer ammunition to help the grenadiers locate and engage targets during limited visibility. The center and flanks of the targets may not be clearly defined; each grenadier must observe his leader's tracers

and those from other squad weapons and cover what he believes to be the entire target.



Figure 6-13. Engagement of linear targets with depth.

6-14. OVERHEAD FIRE

Grenadiers deliver fire over the heads of friendly soldiers in combat **ONLY**, and then only when the fire command specifies. Terrain and visibility dictate when they can fire overhead safely. (AR 385-63 summarizes training safety requirements.)

WARNING

DO NOT FIRE OVERHEAD FIRE THROUGH TREES, BECAUSE ROUNDS MAY ARM AT 14 METERS, WHICH IS NEAR ENOUGH TO DEFLECT OFF NEARBY TREES OR STRUCTURES AND INJURE YOU.