

INTRODUCTION TO MACHINE GUN EMPLOYMENT

General Employment Considerations.

M240G. The table below lists considerations for the M240G for offensive and defensive employment.

Offense	<ul style="list-style-type: none"> • Best and most often used in a support by fire (SBF) position to provide a heavy volume of accurate suppressive fire. • At times, may be employed as a part of the assault element (i.e. movement to contact scenario). • Consider defilade if you can provide an observer with communication to the guns.
Defense	<ul style="list-style-type: none"> • If terrain <ul style="list-style-type: none"> • Allows grazing fire, employ to flanks, along the long axis of the terrain features if possible, and assign interlocking, grazing FPLs across unit's frontage. • Will not permit FPLs, assign PDFs along likely avenues of approach. • Any given gun can be assigned only a PDF or a FPL, but not both. Many situations will allow you to assign FPLs to some guns and PDFs to others. • Do not forget the large number of SAWs available to cover avenues of approach; they may aid in duplicating fires of some of your guns and their missions. • Remember, the SAW is a light machinegun and is capable of being mounted on a tripod if necessary.

M2 .50 Caliber/MK19 (Heavy Machine Guns). M2 and MK19 are both in the heavy machine gun platoon of the infantry battalion. Only six can be employed at a time by the platoon, so select the mix, if any, of guns you require to accomplish your mission. Aside from being found in the infantry battalions, these heavy machine guns are also found Marine Corps wide within several supporting establishments and are primarily used to fill the role of providing unit self protection (for example, a heavy gun mounted on a five-ton).

The table below lists employment considerations for the M2 and the MK19 based on desired effects.

Effects	M2	MK19
Against armor	<ul style="list-style-type: none"> • Armor penetration decreases dramatically with increased range. • Cannot penetrate the frontal armor of a BMP past 600 meters. 	Is best with <ul style="list-style-type: none"> • A maximum effective range of 1500 meters. • With armor penetration of 2 inches of homogeneous steel out to 2,200 meters.
Against personnel	<ul style="list-style-type: none"> • Is effective, due to higher volume of fire and 1000 meters of grazing fire. • Well suited to either FPL or PDF in the defense. 	Is also highly effective against personnel due to its 15-meter ECR from the 40mm projectile.
Against aircraft	Best suited for this role.	<ul style="list-style-type: none"> • Limited at best. • Most effectively employed against helos or slower fixed wing aircraft.
Of firing through vegetation	Will fire effectively through almost any vegetation.	<ul style="list-style-type: none"> • Rounds will be severely affected by vegetation, in most cases causing premature detonation of rounds. • Remember, minimum-arming range of round is 18 to 40 meters.

Other employment considerations for the M2 and MK19 are

- In the attack.
 - Mix the guns for desired effect. Pin enemy down with accurate suppressive fires from M2 and hit him with MK19. If the enemy attempts to run from the MK19 fires, they present themselves as targets to the M2. This is the combined arms concept at work using organic infantry weapons.
 - The M2 is best utilized from a SBF position when supporting a maneuver element.
- In the defense.
 - The MK19 is assigned PDFs to cover avenues of approach, obstacles, defiles, choke points or dead space. Remember that this weapon cannot fire an FPL because of the nature of its ammunition and its trajectory. Slower rates of fire and high explosive ammunition are perfectly suited for PDF missions in the defense. Consider employing MK19s in defilade in the defense.
 - The M2 is well suited for FPLs due to its 1000 m of grazing fire and high volume of fire.
 - All heavy machine guns are well suited to be employed from positions to the rear of front lines, to take advantage of their longer range capabilities by firing overhead of friendly troops, provide greater protection for these guns, and offer maneuverability in employing them from a variety of locations as the situation demands.
- Indirect fire.
 - Both weapons are capable of indirect fire.
 - MK19s can be very effective when employed from friendly reverse slopes against enemy reverse slopes.
 - Observers are required in all cases to spot the impact of rounds and to relay adjustment data to the guns.
- Complimentary effects.
 - Heavy machine gun platoon can fire six guns, in any mix, simultaneously.
 - Mix for desired results.

Concept of Employment. Careful planning is required to maximize the effectiveness of all available machine gun assets. You must specifically determine the role of all weapons systems to support your tactical operations. During offensive operations the commander's decision on how he will employ his machine guns will be based on the four tactical classifications of machine gun fire described in the table below.

Classification of Machine Gun Fire	Description
Close support fires	<ul style="list-style-type: none"> • Fires delivered against enemy objectives directly opposing the advance of the attacking rifle units. • Some considerations to take into account when employing these types of fires include <ul style="list-style-type: none"> • Rates of fire • Location of lead trace of maneuver element • Signal plan for commencing, shifting, and ceasing fires
Long-range fires	<ul style="list-style-type: none"> • Fires delivered against targets in the rear of enemy forward positions that may directly influence a main efforts attack on a primary objective. • Terrain and weapon permitting, long-range fires are often assigned to machineguns when they can no longer provide close supporting fire to the attack.

Classification of Machine Gun Fire	Description
Flank protection fires	When the location or advance of an infantry unit creates an open or exposed flank, the machine guns are employed to protect it.
Fires in support of consolidation	<ul style="list-style-type: none"> • Enemy counterattack should be expected following seizure of an objective. Machine guns are used to protect the unit's consolidation and reorganization. • Employment of the guns on the objective should be planned and rapidly executed. • Many of the machine guns will have to be displaced from SBF positions. • The M249 SAW will provide immediate automatic firepower forward in support of consolidation until the medium and heavy machine guns displace. After the seizure of an enemy position or when the machine guns can no longer provide fire support from their positions, you must move them to a new location; this movement is a "displacement." • Displacement must be as rapid as possible to continue the mission of fire support or protection. • An acronym often used to describe this displacement process is MORT. This acronym (see Displacement Considerations after the table) allows us to remember some of the considerations associated with a machinegun crew's displacement.

Displacement Considerations. MORT stands for

- Method.
 - Echelon. When echelon or "leap frogging" is employed, one or two squads remain in position while the other(s) displace. This method ensures constant fire support or protection to the assaulting elements is uninterrupted. This method is often used when security is a must for both the assaulting element on the objective and for the machine gun crew. When the machine gun section displaces by echelon, the section leader displaces with the first element(s) to select new firing positions and to assign targets. The machine guns normally displace by squad and only under the strictest necessity will a squad be split and displace by team.
 - Unit. Upon seizure of an objective, the machine guns may no longer have a mission from their old positions. Since it is extremely important to have the guns on the objective to cover reorganization, they may then displace as a unit. This method is often used when time is of the essence, and it is crucial to have the machine gun section occupy a new position for firing.
- Objective. A machine gun section/unit must consider where they are going to displace to after they have completed firing or their position has become untenable. Most machine gun crews will displace either to
 - The objective that the assaulting element has occupied because the assaulting element plans to reorganize/defend from that position
 - Another support by fire position in preparation for follow-on attacks by the assaulting element on another objective.
- Route. Machine gun units must carefully consider the route that they will utilize to get to an objective area or another support by fire position. Routes may be assigned from the higher unit commander or left to the discretion of the machine gun unit leader. Regardless, all unit commanders should be made aware of this route. Guides from the supported unit may be considered for greater distances of displacement.
- Time. Consideration must be given to when the actual machine gun section/unit is to displace from their support by fire position. The time in which the actual unit displaces is often driven by a signal plan from the supported unit and should come in the way of a primary and alternate signal (for example, primary: radio, alternate: green star cluster). Time to displace is not limited by pyro, but also may include plugger time, ammo consumption (i.e. out of ammo).

Support Considerations. The machine guns of the weapons platoon and of the heavy machine gun platoon will support the infantry from any one of three methods of support:

- **General support.** When placed in general support, the guns fire in support of the entire unit. The commander retains control of his most responsive fire support units and can influence the battle by adjusting their employment to the changing situation. General support is the preferred method of employment, especially since the platoon commander has nine SAWs of his own.
- **Direct support.** A machine gun unit in direct support is assigned the mission of providing the fire requested by the supported unit. The unit being supported requests fires directly from the supporting unit commander (company commander). The supported unit commander assigns the guns a mission and targets; however, tactical control still remains with the machine gun section/squad leader.
- **Attachment.** Attachment is the placement of a unit in an organization where such placement is relatively temporary. The organization to which a unit is attached assumes complete tactical and administrative control over the unit, subject to any limitations (usually time) stipulated in the attachment order. Machine guns may be attached to a rifle platoon that cannot be supported from general or direct support positions because of the terrain or other conditions. The introduction of nine M249 SAWs to the rifle platoon has significantly reduced the occasions when the attachment of machine guns to the platoons would be warranted.

The table below depicts the three types of support and who is responsible for use of fires, tactical control, and administration and logistics.

	USE OF FIRES	TACTICAL CONTROL	ADMINISTRATIVE/ LOGISTICAL CONTROL
General support	Company commander	Weapons platoon commander	Weapons platoon commander
Direct support	Supported unit leader	Machine gun section/squad leader	Weapons platoon commander
Attached	Supported unit leader		

Characteristics of Machine Gun Fire. The table below describes the characteristics of machine gun fire.

Characteristic	Description
Trajectory	Arcing flight of a bullet or bullets through the air.
Ordinate	Elevation of flight path above the line of sight
Maximum ordinate	Two thirds of distance to target

Characteristic	Description
Cone of fire	<ul style="list-style-type: none"> • Machine guns fire multiple bullets with each burst • Rounds do not travel along identical flight paths due to several factors: <ul style="list-style-type: none"> • Ammunition differences • Gunner firing position • Recoil of weapon • Pattern that these different paths form is the cone of fire.
Beaten zone	<ul style="list-style-type: none"> • The ground hit and the elliptical pattern formed by the bullets is the beaten zone. • Because the cone of fire of an M240G is always two mils wide, the beaten zone is always two mils wide. • Understanding the effects of range and terrain on the beaten zone allows the machine gunner to manipulate the effects of his fires: <ul style="list-style-type: none"> • Uniform terrain: At short ranges the beaten zone will be long because of the initial trajectory and narrow because of the relatively short distance the bullet travels before it strikes the ground. As range increases, the beaten zone decreases in length because the bullets will be falling at a steeper angle and increases in width as the rotation of the bullet further affects dispersion. • Rising terrain: Terrain rising in the path of the cone of fire has the effect of abruptly stopping the rounds and creates a small beaten zone which nearly duplicates the pattern of the cone of fire on steeply rising terrain. • Falling terrain: When the terrain falls away before the gun, the beaten zone becomes longer and depending on the range, either long and narrow or long and wide.

Classifications of Machine Gun Fire. Machine gun fires are normally classified in relation to the

- Ground
- Target
- Gun

To maximize the effects of machine gun fires, you must be conversant in the following terms.

With Respect to the Ground.

- Danger space - when firing over terrain, and the trajectory of the round does not rise more than 1.8 meters above the ground (approximate height of the average man).
- Dead space - dead space exists any time a man's head drops below the line of aim/sight. Streams, ravines, obstacles, and depressions along the line of aim/sight may cause dead space.
- Plunging - fire where the danger space is practically confined to the beaten zone. Firing from low ground into high ground, high ground into low ground, and over long ranges can attain plunging.
- Grazing - fire approximately parallel to the ground where the center of the cone of fire does not rise more than one meter from the ground (see danger space).

With Respect to the Target.

- Flanking - fire delivered on the flank of a target, when the target is oriented 90 or more degrees away from the firing unit.
- Frontal - fire delivered on the front of a target, when the target is oriented on the firing unit.
- Oblique - fire delivered on the oblique of a target, when the target is oriented between 0 and 90 degrees to the firing unit.

- Enfilade - fire where the long axis of the beaten zone coincides with the long axis of the target. Enfilade fire is independent of the target's orientation and relies solely on the enemy's disposition of forces.

With Respect to the Gun.

- Fixed - little or no manipulation of the gun is required to obtain and maintain effect on target (can only be produced from a tripod with T&E).
- Traversing - fire delivered against a wide target requiring changes in direction. The beaten zones of each successive burst should be adjacent to each other if not overlapping (may be produced from either a tripod or bipod).
- Searching - fire delivered against a target in depth requiring changes in elevation. The beaten zones of each successive burst should be adjacent to each other if not overlapping (may be produced from either a tripod or bipod).
- Traversing and searching - fire delivered against an oblique target requiring changes in both elevation and direction. The beaten zones of each successive burst should be adjacent to each other if not overlapping (may be produced from either a tripod or bipod).
- Swinging traverse - fire delivered against targets which require major changes in direction with little or no change in elevation. The beaten zones of each successive burst need not be adjacent to each other (may be produced from either a tripod or bipod).
- Free gun - fire delivered against moving targets that require major changes in both direction and elevation. The beaten zones of each successive burst need not be adjacent to each other (can only be produced from a tripod or vehicle mount).

Machine Gun Fighting Positions. As time permits, machine gun crews prepare primary, alternate, and supplementary firing positions (defined in the table below) that provide cover and concealment without restricting effective fire. In any of the positions covered in this handout, digging firing platforms where the gun will be placed lowers the gun. The platforms must not be so low that the gun cannot traverse across its sectors of fire. Lowering the gun reduces the height of frontal cover required.

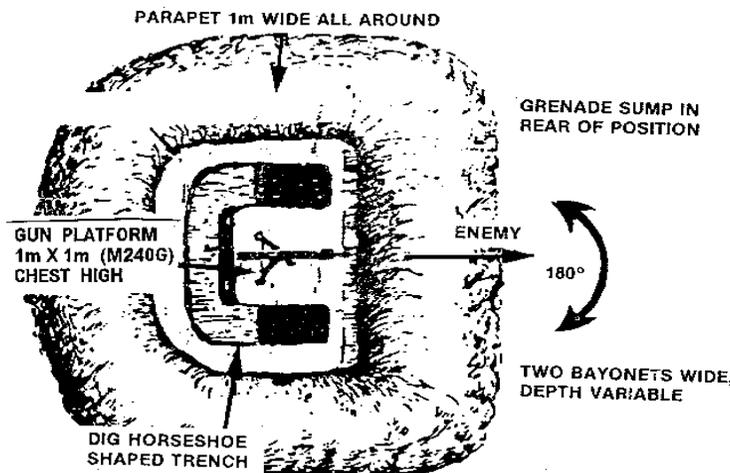
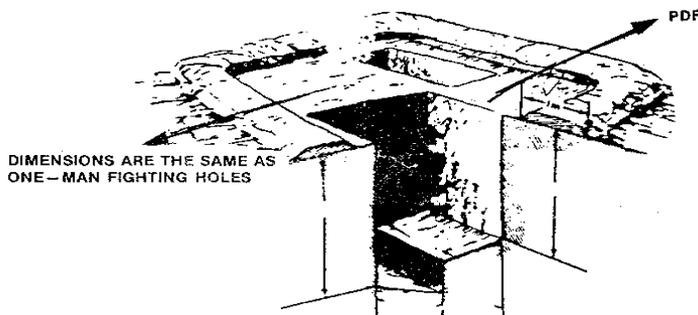
In a three-man crew, the ammunition bearer digs a one man fighting position to the flank where he can

- Provide security for the gun
- Observe and fire into the crew's primary and alternate sectors of fire
- Observe the gunner and assistant gunner
- Also bring ammo to or replace one of the gunners. When possible the two positions are connected by a crawl trench.

The table below describes the different types of fighting positions.

Type of Fighting Position	Definition
Primary	A position from which the gun can fire on its primary sector of fire.
Alternate	Another separate prepared position from which the gun can still fire on its primary sector of fire.
Supplemental	Another separate prepared position from which the gun fires a secondary or alternate sector of fire.

Type of Fighting Position	Definition						
T-Shaped	<ul style="list-style-type: none"> • Preferred position. • Provides <ul style="list-style-type: none"> • Primary and alternate sectors of fire • Cover to the front. • With the M240G, <ul style="list-style-type: none"> • Tripod is used on the side that covers the primary sector • Bipod legs are used on the side that covers the alternate mission. • When changing from primary to alternate sides, the machine gun is moved, but the tripod remains in place (see three diagrams below). <table border="1" data-bbox="391 558 1419 1192"> <thead> <tr> <th data-bbox="391 558 678 590">Description</th> <th data-bbox="678 558 1419 590">Diagram</th> </tr> </thead> <tbody> <tr> <td data-bbox="391 590 678 894">T-shaped position, firing primary sector</td> <td data-bbox="678 590 1419 894">  </td> </tr> <tr> <td data-bbox="391 894 678 1192">T-shaped position, firing secondary sector</td> <td data-bbox="678 894 1419 1192">  </td> </tr> </tbody> </table> <ul style="list-style-type: none"> • When digging a T-shaped position (see diagram below), <ul style="list-style-type: none"> • The hole is dug about armpit deep. When frontal cover is high and thick enough, the spoilage is used to build flank and rear cover. • Grenade sumps should be located at the end of each leg of the position <div data-bbox="646 1325 1182 1675"> <p>G PLATFORMS</p>  </div>	Description	Diagram	T-shaped position, firing primary sector		T-shaped position, firing secondary sector	
Description	Diagram						
T-shaped position, firing primary sector							
T-shaped position, firing secondary sector							

Type of Fighting Position	Definition
L-Shaped	<ul style="list-style-type: none"> • When only one sector of fire is assigned, only one half of the position is dug (L-shape) (see diagram below). • The FPM must parallel either arm of the "L." The L-shaped position should always be improved upon to make a "T" or horseshoe-shaped position. 
Horseshoe-Shaped	<ul style="list-style-type: none"> • The open end of the horseshoe is toward the enemy (see diagram below). • Allows for easy 180-degree traverse across the front, but provides less <ul style="list-style-type: none"> • Frontal cover than the T-shaped position • Protection from indirect fire than the "T"-shaped position • The firing platform is located within the horseshoe. • Spoilage is used to provide cover all around the position 
Two-Hole	<ul style="list-style-type: none"> • Uses two one-man fighting holes at 90-degree angles (see diagram below). • Provides excellent protection for the gunner and assistant gunner but allows only limited traverse of the gun. • Each hole is dug as a standard one-man fighting hole. • When switching from the primary to the alternate sectors of fire, the gunner and the assistant gunner switch roles. 

Range Determination. The machine guns are BZOed based on the squad leader's ability to estimate range effectively. The range plates of the rear sights are set to the squad leader's range estimations. A number of deliberate and field expedient techniques exist to estimate range. Select the most efficient and use it. Effective range estimation or determination cannot be over-emphasized.

ADDRAC. You are already familiar with the basic fire command, ADDRAC. The same fire commands are used, with minor modifications, to control the fires of a machine gun squad:

- Alert: Mandatory.
 - FIRE MISSION = both guns fire.
 - NUMBER ONE, FIRE MISSION = only one gun fires the mission.
 - FIRE MISSION, NUMBER TWO = gun number two fires the mission, but gun number one tracks the mission and is prepared to support it immediately on command.
- Direction: (Only when not obvious).
- Description: (Only when not obvious).
- Range: Mandatory.
- Assignment/method: This element is used only if specific assignments are required to
 - Divide the target
 - Assign a class of fire
 - Designate a rate of fire
- Control: Mandatory. Always used to control proper timing of commencement of fires.

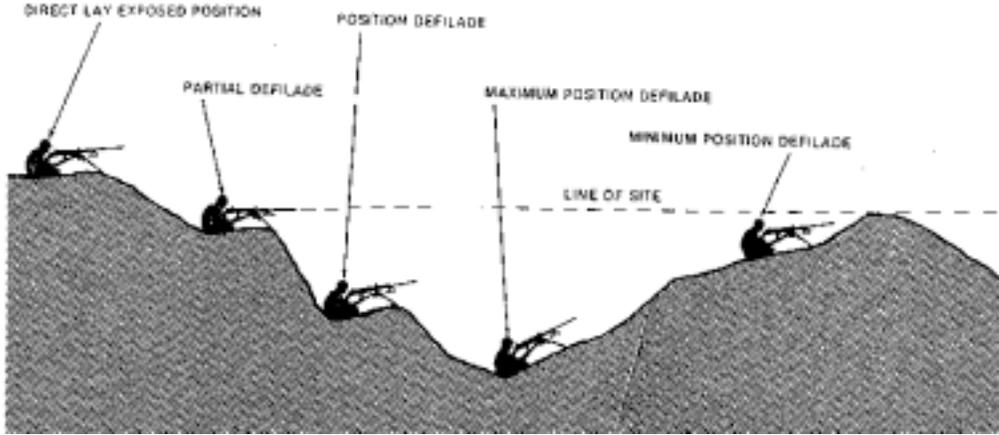
Subsequent fire commands will always be required to adjust and control the missions as they progress. Subsequent fire commands will be used to

- Adjust fires
- Change rates of fire
- Cease fire
- End the mission

Predetermined Targets. Predetermined targets have been discussed in previous classes. Predetermined targets are used to determine firing data for use on range cards. Determination of target data will allow first-round hits on targets under any conditions of visibility. Predetermined targets can be used in offense or defense, but deliberate firing of machine guns could spoil surprise and give away machine gun positions. In the defense, predetermined fires establish firing data for PDFs and FPLs, as well as other probable targets.

Range Cards. See Appendix A of this student handout.

Eight Principles of Machine Gun Employment. The table below describes the eight principles of machine gun employment, remembered using the acronym PICMDEEP.

	Principle	Description
P	Pairs	<ul style="list-style-type: none"> Employ in pairs to retain squad integrity. Guns employed in pairs should <ul style="list-style-type: none"> Not be separated by intervening terrain. Be employed 35 meters apart if possible, terrain dictating. Duplicate fires to ensure continuous fire support even if one gun goes down. Allows for talking guns, uninterrupted fires during immediate action drills, etc. A SAW may be substituted if the situation dictates and even mounted on a tripod if necessary.
I	Interlocking fires	<ul style="list-style-type: none"> Reinforce and double the firepower employed across a unit's frontage. Ensure that no area goes uncovered, especially when grazing fires intersect.
C	Coordination	Use of appropriate weapons to fire on appropriate targets to <ul style="list-style-type: none"> Maximize effectiveness of all weapons systems employed Conserve ammunition for weapons not used Conceal gun positions as long as possible.
M	Mutual support	If one gun is overrun, the other gun in the squad must be able to fire upon the position.
D	Defilade	<ul style="list-style-type: none"> Fires allow the guns to fire from behind terrain masks and to remain free from both enemy direct fire weapons and observation by enemy forward observers. Such fires can be extremely effective, and crew survivability will be dramatically enhanced. Diagram below depicts <ul style="list-style-type: none"> Minimum and maximum position defilade Partial defilade Direct lay areas 
E	Enfilade	Attempt to strike the enemy so that the long axis of the beaten zone coincides with the long axis of the target.
E	Economy	<ul style="list-style-type: none"> Always engage targets with appropriate weapons systems to <ul style="list-style-type: none"> Maximize effectiveness of various ammunition types. Conserve ammunition on all systems. Do not engage single enemy personnel with machine guns.
P	Protection	<ul style="list-style-type: none"> Obvious consideration demands the careful construction of fighting positions and the proper construction of alternate positions to the maximum extent possible. When the guns reveal their positions by firing, the enemy will bring maximum attention to their destruction. Their positions must be altered frequently, and new positions must be awaiting their relocation to minimize loss of their fires. Both cover and concealment are critical.

References.

FMFRP 6-15, *Machine Guns and Machine Gun Gunnery*
 MCWP 3-15.1, *Machine Guns and Machine Guns Gunnery*
The Rise and Fall of the "Emma Gees" by Captain K. A. Nette.

APPENDIX A

Range Cards

Purpose. A range card is a rough terrain sketch that serves two purposes:

- A record of firing data
- A document for defensive fire planning

Preparation. Two copies of a range card are prepared:

- One is passed up the chain of command to assist in the preparation of the unit’s fire plan sketch.
- The other stays with the gun(s) to assist in the potential turnover of a firing position to another gun team.

Walking the FPL. An important aspect of preparing a range card for machine guns is the walking of the FPL; this is done

- Whenever practical and possible
- After the machine guns are set in firing positions to cover assigned sectors of fire and FPLs

The purpose of walking the FPL is to ascertain the extent of grazing fire and dead space, the latter of which must not only be noted on the range card but must be covered by another weapons system. Follow the steps in the table below when walking the dead space.

Step	Action
1	The gunner <ul style="list-style-type: none"> • Places himself behind the gun • Sets his sight on the limit of grazing fire • Lays the gun on an aiming point along the FPL.
2	The A-gunner walks the FPL using a standard and measured pace.
3	When the A-gunner drops off into a space where the gunner can no longer see him below the shoulder, the gunner shouts, "Mark."
4	The A-gunner, on his pace card, records the number of paces he has covered to that point. This process is continued until the A-gunner reaches the limit of grazing fire for the weapon.
5	This information is then incorporated into the range card.

Recording Information.

An FPL is drawn as a heavy line, shaded to signify grazing fire (see diagram on next page). Gaps are left in the heavy line to indicate dead space. The range is recorded to the near and far ends of the dead space and to the maximum extent of graze along the FPL. The firing data needed to engage this target and the magnetic azimuth (measure with a compass) is written on the range card. Although the range cards are not required to be drawn to scale, the magnetic azimuth will help higher headquarters do so if necessary.

STANDARD RANGE CARD
For use of this form see FM 7-8. The government is UNCL.

MGD
 PLT
 CO

May be used for all types of direct fire weapons.

MAGNETIC NORTH

DATA SECTION

POSITION IDENTIFICATION _____ DATE 10 JULY

WEAPON MG EACH CIRCLE EQUALS 150 METERS

NO.	DIRECTION/DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
<u>1</u>	<u> </u>	<u>+50/3</u>	<u>600</u>		<u>FPL</u>
<u>2</u>	<u>R275</u>	<u>+50/45</u>	<u>900</u>		<u>LONE TREE</u>
<u>3</u>	<u>L150</u>	<u>0/28</u>	<u>525</u>		<u>TRAIL JUNCTION</u>

REMARKS: ① -4
③ TW15/L7

DA FORM 827-8, JAN 88 Edition of FEB 88 with the latest units substituted

Range Card with Final Protective Line

Sector limits are designated by dashed lines and named either the right or left sector limit. The firing data is recorded. The elevation reading is not necessary using the T&E method, since the sector limit is a limiting point only and not subject to predetermined fire.

Other targets of tactical significance are predetermined, then sketched and recorded on the range card.

The targets are numbered consecutively from the FPL. The FPL is always target number one. When a principal direction of fire is the final protective fire, targets are numbered starting from either side.

The PDF is drawn as a solid line with an arrow, and the range is recorded to the near end of the avenue of approach. The firing data and a magnetic azimuth are also written in (see diagram below).

STANDARD RANGE CARD
For use of this form see FM 7-2. The progression is 100M.

May be used for all types of direct fire weapons

MAGNETIC NORTH

DATA SECTION

POSITION IDENTIFICATION 08451038 DATE 4 JULY

WEAPON MG EACH CIRCLE EQUALS _____ METERS

NO	DIRECTION/DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
<u>1</u>	<u>L035</u>	<u>0/24</u>	<u>400</u>		<u>PDF (WOODED RW)</u>
<u>2</u>	<u>R375</u>	<u>-50/15</u>	<u>625</u>		<u>BARN</u>
<u>3</u>	<u>L175</u>	<u>-50/40</u>	<u>725</u>		<u>HEDGE ROW</u>

REMARKS ① TW 17/R10 ② TW 3/L3 ③ TW 7/R3

DA FORM 8417-8, JAN 88 Edition of FEB 88 will be used until otherwise indicated.

Range Card with a Principle Direction of Fire