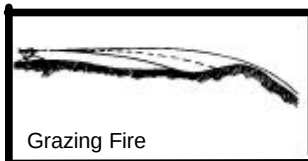
METHODS OF APPLICATIONS OF FIRE

• **Grazing Fire**: occurs when the center of the cone of fire does not rise more than 1 meter above the ground. When firing on level or uniformly sloping terrain, the gunner can obtain a maximum of 600 meters of grazing fire.
• **Plunging Fire**: occurs when the danger space is confined to the beaten zone. Plunging fire also occurs when firing at long ranges, from high ground to low ground, into abruptly rising ground, or across uneven terrain, resulting in a loss of grazing fire at any point along the trajectory.
• **Frontal Fire**: long axis of the beaten zone at right angle to front of target
• **Flanking Fire**: Flanking fire is firing at the side of a target
• **Oblique Fire**: long axis of the beaten zone at angle (<90^0) to front of the target
• **Enfilade Fire**: long axis of the beaten zone coincides or nearly coincides with the long axis of the target; Most desirable type of fire… maximizes the effects
• **Final Protective Fire/Line(FPL):** An FPL is a predetermined line along which grazing fire is placed to stop an enemy assault. If an FPL is assigned, the machine gun is sighted along it except when other targets are being engaged. Fire must be delivered during all conditions of visibility.

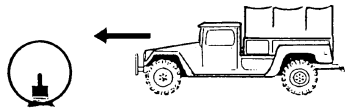

Grazing Fire


Plunging Fire

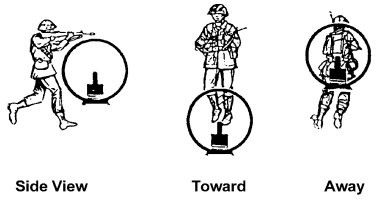
ENGAGING MOVING TARGETS: LEADS

SPEED	RANGE OF TARGET (Vehicle)		
15 mph	300 meters	500 meters	900 meters
	1/2 X Target length	1 X Target length	2 X Target lengths

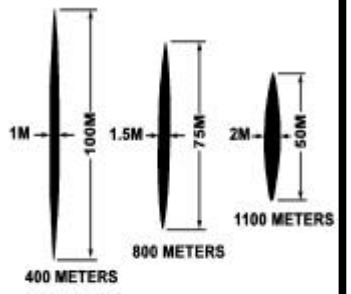
VEHICLE



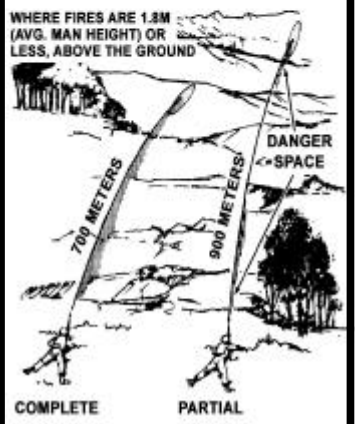
PERSONNEL

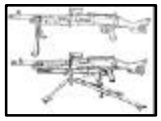


RELATIVE SIZE AND SHAPE OF BEATEN ZONE



DANGER SPACE

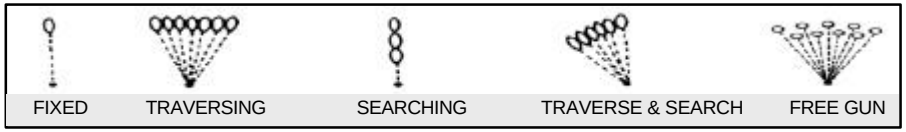




GTA 07-10-001
Machine Gunner's Card

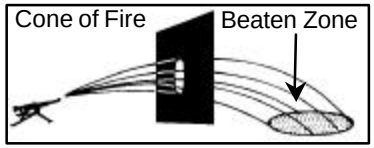
Ref: FM 3-22.68 Date: June 2002

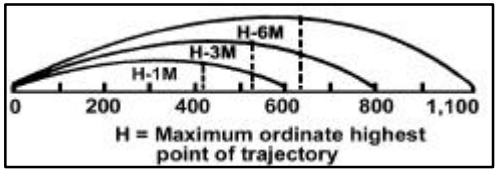
• **Point Targets**: require the use of a single aiming point. Examples of point targets are enemy soldiers, bunkers, weapons emplacements, and lightly armored vehicles. Fixed fire is delivered at point targets.
• **Area Targets**: Area targets may have considerable width and depth and may require extensive traversing and searching fire. These include targets in which the exact location of the enemy is unknown. The following are varieties of area targets likely to be engaged.
- ***Linear Targets***. Linear targets have sufficient width to require successive aiming points (traversing fire). The beaten zone effectively covers the depth of the target area. Traversing fire is delivered at linear targets.
- ***Deep Targets***. Deep targets require successive aiming points (searching fire). Searching fire is delivered at deep targets.
- ***Linear Targets with Depth***. Linear targets with depth have sufficient width requiring successive aiming points in which the beaten zone does not cover the depth of the target area. A combined change in direction and elevation (traversing and searching) is necessary to effectively cover the target with fire Traversing and searching fire are delivered at linear targets with depth.



KEY MACHINE GUN DEFINITIONS

• **Cone of Fire**: When several rounds are fired in a burst from any machine gun, each round takes a slightly different trajectory. The pattern these rounds form on the way to the target is called a cone of fire. This pattern is caused primarily by vibration of the machine gun and variations in ammunition and atmospheric conditions.





• **Beaten Zone:** The beaten zone is the elliptical pattern formed by the rounds striking the ground or the target. The size and shape of the beaten zone changes when the range to the target changes or when the machine gun is fired on different types of terrain. On uniformly sloping or level terrain, the beaten zone is long and narrow. As the range to the target increases, the beaten zone becomes shorter and wider. When fire is delivered on terrain sloping down and away from the machine gun, the beaten zone becomes longer. When fire is delivered on rising terrain, the beaten zone becomes shorter. The terrain has little effect on the width of the beaten zone.

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

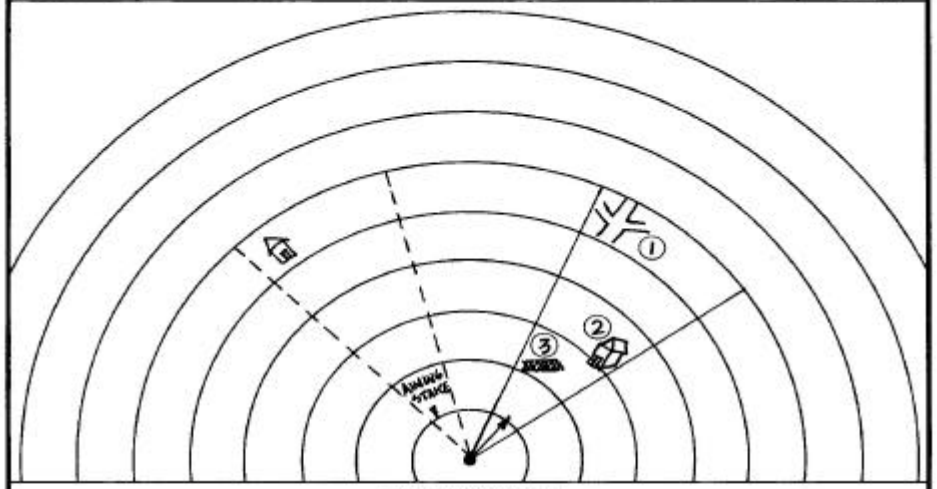
STANDARD RANGE CARD

For use of this form see FM 7-8 The proponent agency is TRADOC.

SQD 2
PLT 2
CO C

May be used for all types of direct fire weapons.

MAGNETIC NORTH



DATA SECTION

POSITION IDENTIFICATION | DATE 8 AUG 94

WEAPON M60 #2 | EACH CIRCLE EQUALS METERS 100 METERS

NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1	L 25°	Ø/24	700		PDF (ROAD JUNCTION)
2	R60°	-50/15	500		BARN
3	L 29°	-50/40	400		HEDGE ROW

REMARKS:

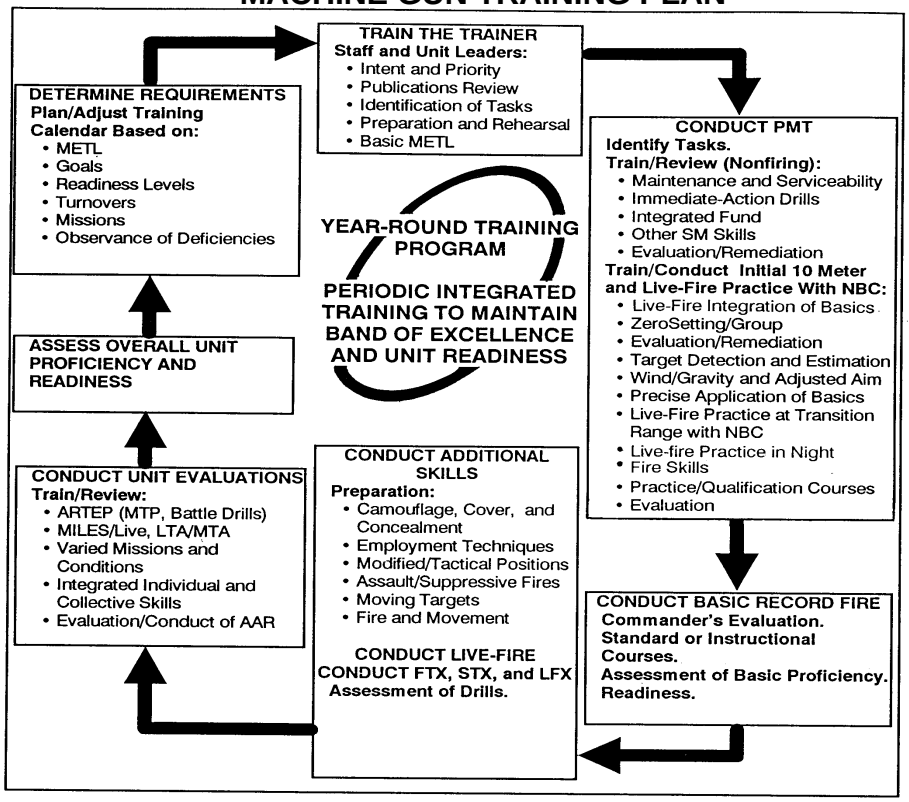
DA Form 5517-R, FEB 86

DANGER

OVERHEAD FIRE CANNOT BE SAFELY DELIVERED ON A TARGET AT GREATER THAN 850 METERS FROM THE MACHINE GUN, AND IT IS NOT DELIVERED OVER LEVEL OR UNIFORMLY SLOPING TERRAIN. ONLY AFTER SOLDIER SAFETY IS CHECKED AND VERIFIED. (SEE AR 385-63 FOR A COMPLETE SUMMARY OF TRAINING SAFETY REQUIREMENTS.)

NOTE: Do not deliver overhead fire if the range from the machine gun to the target is less than 350 meters or more than 850 meters

MACHINE GUN TRAINING PLAN



RATES OF FIRE AND BARREL CHANGE

• **Sustained Fire**: for the M249 is 85 rounds per minute in bursts of 3 to 5 rounds. The M60 and M240B are 100 rounds per minute in bursts of 6 to 9 rounds. The gunner pauses 4 to 5 seconds between bursts. The barrel should be changed after firing at sustained rate for 10 minutes. This is the normal rate of fire for the gunner.

• **Rapid Fire**: for the M249, M60, and M240B gunner is 200 rounds per minute in bursts of (6 to 8 M249) 10 to 12 rounds. The gunner pauses 2 to 3 seconds between bursts. The barrel should be changed after firing at a rapid rate for 2 minutes. This procedure provides for an exceptionally high volume of fire, but for only a short period.

• **Cyclic Fire**: uses the most ammunition that can be used in 1 minute. The cyclic rate of fire with the machine gun is achieved when the trigger is held to the rear and ammunition is fed into the weapon uninterrupted for one minute. Normal cyclic rate of fire for the M249 is 850 rounds, M60 is 550 rounds, and for the M240B is 650 to 950 rounds. Always change the barrel after firing at cyclic rate for 1 minute. This procedure provides the highest volume of fire that the machine gun can fire, but this adversely affects the machine gun, and should only be fired in combat during emergencies.