Tactical Employment of the M240B MG and M249 SAW weapon systems.
071-SAWE14 / Version 1.0
Effective Date 08 Mar 2013

SECTION I. ADMINISTRATIVE DATA

All Courses Including This Lesson

Course Number	Version	Course Title
None		

Task(s) Taught(*) or Supported

Task Number	Task Title
Individual	
071-000-0005 (*)	Prepare a Range Card for a Machine Gun
071-025-0008	Construct a Fighting Position for an M240B Machine Gun
071-326-5770	Prepare a Platoon Sector Sketch
071-326-5771	Prepare a Squad/Section Sector Sketch
071-COM-0608 (*)	Use Visual Signaling Techniques
071-025-0005 (*)	Correct Malfunctions of an M240B Machine Gun
Collective	
07-3-9013	Conduct Action on Contact
07-3-1333	Knock Out a Bunker
07-3-9018	Enter and Clear a Building (Section-Platoon)
07-3-9020	Establish a Patrol Base
07-3-9021	Clear a Trench Line
07-2-3000	Conduct Support by Fire (Platoon-Company)
07-2-9003	Conduct a Defense (Platoon-Company)
07-3-1072	Conduct a Disengagement (Section-Platoon)

Reinforced Task(s)

Task Number	Task Title
071-025-0022	Engage Targets with an M240B Machine Gun Using an AN/PAS-13 Thermal Weapon Sight
071-025-0026	Engage Targets with an M240B Machine Gun Using an AN/PAQ-4 Series Aiming Light
071-025-0030	Engage Targets with an M240B Machine Gun Using an AN/PEQ-2A-Series Aiming Light
071-025-0038	Engage Targets with an M240B Machine Gun using an AN/PEQ-15 Aiming Light

Knowledge

Knowledge Id	Title	Taught	Required
071-CMD-0092	Sector Sketch Requirements	Yes	Yes
071-COM-0007	Visual and Audio Signals	Yes	No
071-NAV-0021	Compass Operations	Yes	Yes
071-NAV-0022	Direction Finding Field Expedients	Yes	Yes
071-NAV-0025	Terrain Association	Yes	Yes
071-NAV-0026	Terrain Features	Yes	Yes
071-NAV-0027	Military Grid Reference System	Yes	Yes
071-NAV-0030	Grid Magnetic Angle	Yes	Yes
071-NAV-0032	Azimuths	Yes	Yes
071-OPN-0017	Safety Procedures	Yes	Yes
071-WPN-0076	Weapon Symbols	Yes	No
071-OPN-0029	Control Measures	Yes	No
071-OPN-0050	TO&E Equipment	Yes	No
071-WPN-0003	Demonstrate Knowledge of Ammunition Capabilities	Yes	No
071-WPN-0062	Infantry Weapons Ammunition	Yes	No
071-WPN-0064	Target Detection Techniques	Yes	No
071-WPN-0065	Range Estimation Techniques	Yes	No
071-WPN-0067	Firing Positions	Yes	No
071-WPN-0068	Firing Techniques	Yes	No
071-WPN-0073	Orienting the Range Card to the Terrain	Yes	No
071-WPN-0077	Range Cards	Yes	No
071-WPN-0078	Final Protective Lines	Yes	No
071-WPN-0079	Principal Direction of Fire	Yes	No
071-WPN-0080	Weapon Capabilities	Yes	No
071-WPN-0082	Methods used for Determining extent of Grazing Fire and Dead Space	Yes	No
071-WPN-0084	Annotating Required Range Card Data	Yes	No
071-WPN-0085	Methods of Determining Width and Depth of a Target	Yes	No
071-WPN-0086	Infantry Weapons Field Expedients	Yes	No

Skill

Skill Id	Title	Taught	Required
071-WPN-0028	Draw a Sector Sketch	Yes	No
071-WPN-0039	Identify Dead Space on a Range Card	Yes	No
071-WPN-0038	Determine Dead Space	Yes	No
071-WPN-0004	Identify Types of Ammunition	Yes	No
071-WPN-0052	Issue Fire Commands	Yes	No
071-CMD-0037	Demonstrate Technical and Tactical Proficiency	Yes	No
071-CMD-0008	Establish Fire Control Measures	Yes	No
071-CMD-0003	Issue Instructions	Yes	No
071-COM-0001	Ability to Use Hand and Arm Signals	Yes	No
071-COM-0004	Employ Visual Signaling Techniques	Yes	No
071-COM-0005	Employ Audio Signaling Techniques	Yes	No
071-NAV-0001	Ability to Estimate Range	Yes	Yes
071-NAV-0004	Determine Direction with a Compass	Yes	Yes
071-WPN-0042	Employ Field Expedient Firing Techniques	Yes	No
071-WPN-0030	Orient a Range Card to the Terrain	Yes	No

Administrative/ Academic Hours

The administrative/academic hours required to teach this lesson are as follows:

Academic	Resident Hours / Methods		
Yes	1 hr	40 mins	Conference/Demonstration
Yes	1 hr	15 mins	Practical Exercise (Hands-On)
Yes	3 hrs	25 mins	Conference/Discussion
Yes	0 hrs	0 mins	Test Review
Yes	0 hrs	0 mins	Test
Total Hours:	6 hrs	30 mins	

Test Lesson Number

Hours	Lesson Number
None	

Prerequisite Lesson(s)

Lesson Number	Lesson Title
None	

Training Material Classification

Security Level: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Foreign Disclosure Restrictions

FD7. This product/publication has been reviewed by the training/educational developers in coordination with the DOTD, MCoE, Ft Benning, GA 31905 FD authority. This product is NOT releasable to students from foreign countries.

References

Number	Title	Date	Additional Information
DA FORM 5517-R	STANDARD RANGE CARDS (LRA)	01 Feb 1986	
FM 3-21.8	THE INFANTRY RIFLE PLATOON AND SQUAD	28 Mar 2007	
FM 3-22.68	Crew-Served Machine Guns, 5.56-MM and 7.62-MM	21 Jul 2006	

Student Study Assignment

NONE.

Instructor Requirements

Complete a risk management worksheet. It is recommended that you use the ground risk assessment tools provided by the US ARMY COMBAT READINESS/SAFETY CENTER at https://grat.safety.army.mil/ako_auth/grat/default.aspx

Additional Support Personnel Requirements

Name	Student Ratio	Qty	Man Hours
NCOIC	1:32		

Equipment Required for Instruction

ID - Name	Student Ratio	Instructor Ratio	Spt	Qty	Exp
0000-00-0.C63317 - COMPASS LENSATIC	0:0	0:0	No	0	
1005-00-557-4621 - Elevation Mechanism	0:0	0:0	No	0	
113-00-000-C110 - Proxima C110 CDW Projector	1:32	0:0	No	0	No
5895-01-540-4543 - Computer, Laptop	1:32	0:0	No	0	No
6730-00-933-4871 - Screen, Projection	1:32	0:0	Yes	10	No
7520-00-079-2406 - EASEL,DISPLAY AND TRAINING	1:32	0:0	No	0	No

(Note: Asterisk before ID indicates a TADSS.)

Materials Required

Instructor Materials:

FM 3-22.68 CREW SERVED WEAPONS

FM 3-21.8 THE INFANTRY RIFLE PLATOON AND SQUAD

Student Materials:

Student handouts, pen or pencil, and writing paper.

Classroom, Training Area, and Range Requirements

ID - Name	Quantity	Student Ratio	Setup Mins	Cleanup Mins
17120-1200-16 GEN INST BLDG, 1200 SF, 16 PN		1:32	15	15

Ammunition Requirements

DODIC - Name	Exp	Student Ratio	Instruct Ratio	Spt Qty
None				

Instructional Guidance

NOTE: Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

Before presenting this lesson:

1. Have on hand identified reference material linked to the lesson plan.

2. Review presentation and develop a list of questions to use during class.

3. Review and prepare conference / discussion material presented.

4. Ensure all equipment listed for this lesson plan (LP) is present, operable, and set up for use before class.

5. Refer to the practical exercise of this lesson plan. When necessary develop additional situations to use during the practical exercise.

6. PowerPoint users: Ensure the SLI file you are using has been called up using Microsoft PowerPoint Viewer and SLI / slide 1 is showing on the screen before class.

7. Whenever noted, slides are available to assist in explanation of task steps. Use slides as needed during class or practical exercise to reinforce training. The instructor may choose to use / not use the LP SLIs as developed, modify the existing SLIs content / order or insert new material as is necessary based on audience analysis to assist in Soldier learning. Changes must be annotated as a pen / ink change on the vault file master LP, VIP LP, and instructor LP. Changes must be approved through Senior Instructor and TDCD 183rd RTI Development Team notified.

8. Whenever necessary, ask leading questions of Soldiers in order to prompt Soldier discussion.

9. Encourage Soldiers to relate their first hand experiences during the activities.

10. Facilitate this lesson using Instructor methodologies.

11. Control group activities using Instructor techniques.

Proponent Lesson Plan Approvals

Name	Rank	Position	Date
Robert Padin	Not available	Approver	08 Mar 2013

SECTION II. INTRODUCTION

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor (1:32/0)
Time of Instruction: 5 mins
Instructional Strategy: Large Group Instruction

Motivator

If any single event can be said to have transformed the history of warfare it was the perfection of the true automatic machine gun by Hiram Maxim in 1885. Its effect was far greater than the introduction of aircraft or nuclear weapons to the battlefield. Of all the hideous weapons of war produced in the twentieth century, none has exacted a more dreadful toll of human life than the machine gun.

The machine gun is not a “big rifle” that fires ammunition at a rapid rate. It is a scientifically designed and engineered weapon that has certain characteristics that are not applicable to the rifle. The effects of fire produced by machine guns is predictable and these effects must always be considered when employing or sighting guns. In order to employ the machine gun correctly, leaders at all levels must first have a sound knowledge of the theory of machine gun fire.

Terminal Learning Objective

NOTE. Inform the students of the following Terminal Learning Objective requirements.
At the completion of this lesson, you [the student] will:

Action:	Employ Infantry Platoon Machine Guns.
Conditions:	As a small unit leader in a classroom environment given a block of instruction, FM 3-22.68, 3-21.8, and a requirement to participate in classroom discussion.
Standards:	Develop plans for the tactical employment and control of fires for infantry platoon machineguns in accordance with FM 3-21.8 and FM 3-22.68.

Safety Requirements

Safety Requirements in a Classroom Setting:

Safety is of the utmost importance in any training environment. During the training process, commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken during the conduct of training.

Safety is everyone’s responsibility to recognize, mitigate, and report hazardous conditions.

Instructor note: The instructor will brief the students on the unit/facility SOP for classroom contingencies i.e. what doors will be used to exit the classroom, rally points, severe weather, WBGT/Kestrel set up, etc.

Safety Requirements other than Classroom Settings:

Safety must be paramount in the complex outdoor environment. During the training process, commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken while replicating realistic battlefield conditions.

Safety is everyone's responsibility to recognize, mitigate, and report hazardous conditions.

Instructor note: The instructor will brief the unit/site SOP and Risk Management Worksheet for all potential contingencies encountered during that training period/event i.e. WBGT/Kestrel set up, trail vehicles for PT/foot marches, severe weather, fire, evacuation routes, muzzle awareness, range safety briefs, required medical FLA with driver and medics with emergency equipment, student injury procedures, and rally points etc.

Risk Assessment Level

Low - All Army Instructors will conduct a Risk Assessment Worksheet (DA Form 7566, CRM Worksheet, Apr 05) prior to training and brief Soldiers on identified hazards and required controls.
Assessment: The operations officer, in cooperation with the principal instructor, will prepare a risk assessment using the before, during, and after checklist and the risk assessment matrixes contained in Risk Management FM 5-19.
Controls: See Attached DA Form 7566.
Leader Actions: See Attached DA Form 7566.

Environmental Considerations

NOTE: Instructor should conduct a Risk Assessment to include Environmental Considerations IAW FM 3-34.5, Environmental Considerations {MCRP 4-11B}, and ensure students are briefed on hazards and control measures.

Users must comply with all local environmental regulations and guidance while conducting training.

Evaluation

This lesson will be informally evaluated using checks on learning.

Instructional Lead-in

World War I

Battle of Somme- 1 July 1916- the deadliest day in the history of modern warfare. Mainly due to the advent of the machine gun.

Modern Day

AAR from action in Somalia in 1993 verified that the 7.62mm machinegun is still the Dismounted Infantry Platoon's most lethal weapon system.

The bulk of an Infantry Platoon's organic firepower is provided by the 7.62mm Machine gun, especially in the COE of today (MOUT, Close Combat, Mountain).

SECTION III. PRESENTATION

NOTE: Inform the students of the Enabling Learning Objective requirements.

A. ENABLING LEARNING OBJECTIVE

ACTION:	Identify characteristics and capabilities of Platoon Machine guns.
CONDITIONS:	As a small unit leader in a platoon, in a classroom environment, Instructor, block of instruction, FM 3-22.68, FM 3-21.8, and a requirement to participate in classroom discussion.
STANDARDS:	Identify characteristics and capabilities of Platoon Machine guns.

ELO A - LSA 1. Learning Step / Activity ELO A - LSA 1. M249 Machine guns.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 10 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

a. The 5.56-mm M249 machine gun supports the soldier in both the offense and defense. The M249 provides a medium volume of close and continuous fire the soldier needs to accomplish the mission. With it, units can engage the enemy along with the capability of individual weapons with controlled and accurate fire. The medium-range, close defensive, and final protective fires delivered by the M249 MG form an integral part of a unit's defensive fires.

b. Description

(1) The M249 machine gun is a gas-operated, air-cooled, belt or magazine-fed, automatic weapon that fires from the open-bolt position. It has a maximum rate of fire of 850 rounds per minute. Primarily, ammunition is fed into the weapon from a 200-round ammunition box containing a disintegrating metallic split-link belt. As an *emergency* means of feeding, the M249 machine gun can use a 20- or 30-round M16 rifle magazine but increases the chance of stoppages. This gun can be fired from the shoulder, hip, or underarm position; from the bipod-steadied position; or from the tripod-mounted position.

(2) General Data:

(a) Ammunition:

1. 5.56-mm ball and tracer (4:1 mix) ammunition is packaged in 200-round drums, each weighing 6.92 pounds.

2. Blank.

3. Dummy.

(b) Tracer burnout, 900 meters (+).

(c) Length of M249, 40.87 inches.

(d) Weight of M249, 16.41 pounds.

(e) Weight of tripod mount M122 with traversing and elevating mechanism and pintle, 16 pounds.

(f) Maximum range, 3,600 meters.

(g) Maximum effective range, 1,000 meters with the tripod and T&E.

(3) Area:

(a) Tripod, 1,000 meters.

(b) Bipod, 800 meters.

(4) Point:

(a) Tripod, 800 meters.

(b) Bipod, 600 meters.

(c) Suppression, 1,000 meters.

(d) Maximum extent of grazing fire obtainable over uniformly sloping terrain, 600 meters.

(5) Height of M249 on tripod mount M122A1, 16 inches.

(6) Rates of Fire:

(a) Sustained, 100 rounds per minute. Fired in 6- to 9-round bursts with 4 to 5 seconds between bursts (change barrel every 10 minutes).

(b) Rapid, 200 rounds per minute. Fired in 6- to 9-round bursts 2 to 3 seconds between bursts (change barrel every 2 minutes).

(c) Cyclic , 650 to 850 rounds per minute. Continuous burst (change barrel every minute).

(7) Basic load, ammunition, 1,000 rounds (in 200-round drums).

(8) Tripod:

(a) Elevation, tripod controlled, +200 mils.

(b) Elevation, tripod free, 445 mils.

(c) Depression, tripod controlled, -200 mils.

(d) Depression, tripod free, -445 mils.

(e) Traverse, controlled by traversing and elevating mechanism, 100 mils.

(f) Normal sector of fire (with tripod), 875 mils.

Check on Learning: Summarize the learning activity.

Review Summary: Conduct a Summary Review.

ELO A - LSA 2. Learning Step / Activity ELO A - LSA 2. M240B Machine Gun.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 10 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

a. The M240B machine gun supports the rifleman in both offensive and defensive operations. The M240B provides the heavy volume of close and continuous fire needed to accomplish the mission. The M240B is used to engage targets beyond the range of individual weapons, with controlled and accurate fire. The long-range, close defensive, and final protective fires delivered by the M240B form an integral part of a units defensive fires.

b. Description:

(1) The M240B is a general-purpose machine gun. It can be mounted on a bipod, tripod, aircraft, or vehicle. The M240B is a belt-fed, air-cooled, gas-operated, fully automatic machine gun that fires from the open bolt position. Ammunition is fed into the weapon from a 100-round bandoleer containing a disintegrating metallic split-link belt. The gas from firing one round provides the energy for firing the next round. Thus, the gun functions automatically as long as it is supplied with ammunition and the trigger is held to the rear. As the gun is fired, the belt links separate and are ejected from the side. Empty cases are ejected from the bottom of the gun. A spare barrel is issued with each M240B, and barrels can be changed quickly as the weapon has a fixed head space. However, barrels from different weapons should not be interchanged. The bore of the barrel is chromium plated, reducing barrel wear to a minimum.

(2) Ammunition, 7.62-mm ball, tracer, armor-piercing:

WARNING: Blank, Dummy, and Armor-piercing round is not authorized for training.

(a) Tracer burnout, 900 meters.

(b) Length of the M240B, 49 inches.

(c) Weight of the M240B, 27.6 pounds.

(d) Weight of tripod-mount M122A1 tripod with/flex-mount, complete 20 pounds.

(e) Maximum range, 3,725 meters.

(f) Maximum effective range, 1,100 meters with tripod and T&E.

(3) Area:

(a) Tripod, 1,100 meters.

(b) Bipod, 800 meters.

(4) Point:

(a) Tripod, 800 meters.

(b) Bipod, 600 meters.

(5) Suppression, 1,800 meters.

(6) Maximum extent of grazing fire obtainable over level or uniformly sloping terrain, 600 meters.

(7) Height of the M240B on the tripod mount M122A1, 17.5 inches.

(8) Rates of fire:

(a) Sustained, 100 rounds per minute fired in 6- to 9-round bursts and 4 to 5 seconds between bursts (barrel change every 10 minutes).

(b) Rapid, 200 rounds per minute fired in 10- to 13-round bursts and 2 to 3 seconds between bursts (barrel change every 2 minutes).

(c) Cyclic, 650 to 950 rounds per minute in continuous bursts (barrel change every minute).

(9) Basic load of ammunition (three-man crew), 900 to 1200 rounds.

(10) Tripod:

(a) Elevation, tripod controlled, 247 mils.

(b) Elevation, tripod free, +300 mils.

(c) Depression, tripod controlled, -200 mils.

(d) Traverse, controlled by T&E mechanism, 100 mils.

(e) Normal sector of fire (with tripod), 875 mils.

(f) Free gun, 6,400 mils.

c. M240 Family:

(1) M240B – U.S. Army ground (infantry) version of the M240/M240E1. Replaces the M60 series machine guns.

(2) M240C – Coaxially mounted version. The M240C is the right hand variant of the M240 currently used on the U.S. M2 and M3 Bradley fighting vehicles. The M240C is identical to the M240 except for the ammunition feed cover and feed tray.

(3) M240H – Aviation variant which will replace the M60D. The M240E5 will use the same receiver and barrel as the M240B but will have a spade grip trigger assembly. It will also require a unique mounting interface and pintle to properly interface with the helicopter platform.

(4) M240E1 – Pintle-mounted version.

d. All weapons in the M240 family can be converted to right hand feed using M240C feeder components.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review.

CHECK ON LEARNING (ELO A): Conduct a check on learning and summarize the ELO.

REVIEW SUMMARY(ELO A): Conduct a Summary Review.

B. ENABLING LEARNING OBJECTIVE

ACTION:	Identify techniques used to deliver effective machine gun fire.
CONDITIONS:	As a small unit leader in a platoon, in a classroom environment, Instructor, block of instruction, FM 3-22.68, FM 3-21.8, and a requirement to participate in classroom discussion.
STANDARDS:	Identify techniques used to deliver effective machine gun fire.

ELO B - LSA 1. Learning Step / Activity ELO B - LSA 1. Characteristics of Fire

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Effects

a. Each gunner must know the effects of the rounds they fire. Many more factors influence the path and strike of the rounds besides the application of the fundamentals. These additional factors include, among others, the velocity of the round, gravity, terrain, atmospheric conditions, and the differences between each type of round. When a burst is fired from a machine gun, no round follows the exact same path. The contributing factors that affect the flight of each round are:

(1) The Gunner - Regardless of which firing position the gun is fired from; the gun will move while firing bursts. This is because the MG is fired from the open bolt position and when the trigger is squeezed the operating group moves forward with the top locking lug on the bolt stripping the round out of the link belt and forcing the round forward and down into the chamber. The bolt is then locked in the chamber by the clockwise rotation of the bolt. After the round is fired, expanding gasses are forced onto the gas piston to move the operating rod to the rear, at the same time the bolt unlocks from the chamber and is forced to the rear. This continual internal movement will cause vibrations which cause each round to travel on a separate path.

(2) Ammunition - Although modern day ammunition is very good, it does vary slightly in metal composition and actual make up. The condition in which the ammunition is in when it is fired Eg:-wet, dirty, oily etc. will influence the flight of a round.

(3) The Firer - The firer is influenced by the vibration of the gun, and is unable to maintain the same sight picture and firing position.

(4) Air Disturbances - The round can pass through hot or cold air disturbances, which will vary the flight paths of the rounds. Gusts of wind will also cause the round

to travel on separate paths.

(5) Clarity of Target - The firer's sight picture will also differ if the target is obscured by smoke or dust. The differing sight picture when firing the gun will cause rounds to travel on varying paths.

(7) Even if the gun were placed in a weapon clamp and fired, due to some of the above factors the rounds would not follow the same path.

The trajectory

b. The trajectory is the path of the round in flight. The gunner must know the machine gun trajectory to effectively fire the weapon throughout its full range. The path of the round is almost flat at ranges up to 300 meters; then it begins to curve, and the curve becomes greater as the range increases.

Maximum ordinate

c. Maximum ordinate is the highest point the trajectory reaches between the muzzle of the weapon and the base of the target. It always occurs about two-thirds of the distance from the weapon to the target. The maximum ordinate increases as the range increases.

Cone of Fire

d. 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

e. 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.

(1) 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.

(2) When fire is delivered on terrain sloping down and away from the machine gun, the beaten zone becomes longer.

(3) When fire is delivered on rising terrain, the beaten zone becomes shorter. The

terrain has little effect on the width of the beaten zone.

Range effects on Beaten Zone

f. As range increases, the beaten zone becomes shorter and wider, due to the increased angle of descent at long ranges. The following are the dimensions of the beaten zones at various ranges for M240B:

(1) Range: 500m (1m wide x 110m long).

(2) Range: 1000m (2m wide x 75m long).

(3) Range: 1500m (3m wide x 55m long).

(4) Range: 2000m (4m wide x 50m long).

g. Knowledge of the dimensions of the beaten zones at any range will assist you in the sighting and employment of your machine guns, especially in defense.

Terrain effects on Beaten Zone

h. Ground will have a marked effect on the length of the beaten zone. A cone of fire striking a steep hillside will cover a very small area of ground and produced a small beaten zone. The same cone of fire striking a gentler slope will produce a slightly larger beaten zone. On level ground the beaten zone will be still larger. The largest beaten zone will result where the fall of ground conforms to the trajectory of the round.

Danger Space

i. The danger space is the space between the machine gun and the target where the trajectory does not rise above 1.8 meters (the average height of a standing soldier). This space includes the area of the beaten zone. When the machine gun is fired on level or uniformly sloping terrain at a target less than 700 meters away, the trajectory does not rise above the average height of a standing soldier. When targets are engaged on level or uniformly sloping terrain at ranges greater than 700 meters, the trajectory rises above the average height of a standing soldier, therefore, not all the distance between the machine gun and the target is danger space.

Check on Learning: Conduct a check on learning and summarize the learning activity.

1. What is the Beaten Zone?

A. Is the elliptical pattern formed by the rounds striking the ground or the target.

2. What is the Cone of Fire?

A. 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.

3. What is Maximum Ordinate?

A. Maximum ordinate is the highest point the trajectory reaches between the muzzle of the weapon and the base of the target.

Review Summary: Conduct a Summary Review.

ELO B - LSA 2. Learning Step / Activity ELO B - LSA 2. Clases of Fire.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 20 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Classes of Fire

a. Machine gun fire is classified with respect to the ground, the target, and the weapon.

Respect to the Ground

b. Grazing Fire. Grazing fire occurs when:

(1) The center of the cone of fire does not rise more than 1 meter above the ground.

(2) Firing on level or uniformly sloping terrain.

(3) The gunner can obtain a maximum of 600 meters of grazing fire.

c. Plunging Fire. Plunging fire occurs when:

(1) The danger space is confined to the beaten zone.

(2) Firing at long ranges, from high ground to low ground.

(3) Into abruptly rising ground.

(4) Across uneven terrain, resulting in a loss of grazing fire at any point along the trajectory.

Respect to the Target

d. Frontal Fire, Frontal fire is when the long axis of the beaten zone is at a right angle to the front of the target. An example is when firing at the front of a target.

e. Flanking Fire,Flanking fire is firing at the side of a target.

f. Oblique Fire, Oblique fire is when the long axis of the beaten zone is at an angle other than a right angle to the front of the target.

g. Enfilade Fire, Enfilade fire is when the long axis of the beaten zone coincides or nearly coincides with the long axis of the target. This type of fire is either frontal or flanking. It is the most desirable type of fire with respect to a target, because it makes maximum use of the beaten zone.

Respect to Weapon

h. Fixed Fire, Fixed fire is fire delivered against a point target when the depth and width of the beaten zone covers the target. Fixed fire also means only one aiming point is necessary to provide coverage of the target.

i. Traversing Fire, Traversing fire is fire distributed in width by successive changes in direction. The gunner selects successive aiming points throughout the width of the target. These aiming points must be close enough to ensure adequate coverage but not so close as to waste ammunition.

j. Searching Fire. Searching fire is fire distributed in depth by successive changes in elevation. The gunner selects successive aiming points in depth. The changes made in each aiming point will depend on the range and slope of the ground.

k. Traversing and Searching Fire, Traversing and searching fire is fire distributed in width and depth by successive changes in direction and elevation. Combining traversing and searching provides good coverage of the target. Adjustments are made in the same manner as described for traversing and searching fire.

NOTE: Show Slide 36: Respect to Weapon

l. Free-Gun Fire, Free-gun fire is fire delivered against targets requiring rapid major changes in direction and elevation that cannot be applied with the T&E mechanism. To deliver this type of fire, the gunner removes the T&E mechanism from the traversing bar on the tripod, allowing the weapon to be moved freely in any direction.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review

CHECK ON LEARNING (ELO B): Conduct a check on learning and summarize the ELO.

REVIEW SUMMARY(ELO B): Conduct a Summary Review

C. ENABLING LEARNING OBJECTIVE

ACTION:	Identify control measures for machine gun fire.

CONDITIONS:	As a small unit leader in a platoon, in a classroom environment, Instructor, block of instruction, FM 3-22.68, FM 3-21.8, and a requirement to participate in classroom discussion.
STANDARDS:	Identify control measures for machine gun fire.

ELO C - LSA 1. Learning Step / Activity ELO C - LSA 1. Distribution of Fire.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Distribution of MG fire

a. Types of targets presented to gunners in combat usually include enemy troops in various formations, which require distribution and concentration of fire. The gunners must thoroughly cover all targets in width and depth.

(1) Point targets/fixed fire require the use of a single aiming point :

(a) Enemy troops.

(b) Bunkers.

(c) Weapons emplacements.

(d) Lightly armored vehicles.

(2) Area targets, traversing and searching fire. Area targets can be very wide and deep. When they are, they require extensive traversing or searching fire. Area targets include those whose exact locations are unknown. Area targets include:

(a) Linear Targets (Traversing Fire) Linear targets are wide enough to require successive aiming points delivered via traversing fire.

(b) Thebeaten zone effectively covers the depth of the target area.

(c) Deep Targets (Searching Fire) Deep targets require successive aiming points delivered via searching fire.

b. The size and nature of the target determine how the gunner applies his fire. He

must manipulate the machine gun to move the beaten zone throughout the target area. He must control the rate of fire to adequately cover the target, but at the same time to conserve ammunition and preserve the barrel.

c. Distribution of fire, Distribute fire in width and depth on large targets such as enemy formations.

d. Concentration of fire, Concentrate fire on point targets such as automatic weapons or an enemy fighting positions.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review

ELO C - LSA 2. Learning Step / Activity ELO C - LSA 2. Rate of Fire.

Method of Instruction:	Conference/Discussion
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 10 mins
Instructional Strategy:	Large Group Instruction
Media Type:	Conference
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

Control of MG fire.

a. Rate of fire, use sustained, rapid, and cyclic rates of fire with the machine gun. These rates enable leaders to control and sustain your fire and to help you avoid destroying your barrel. More than anything else, the size of the target and ammunition supply dictate your rate of fire.

b. Sustained fire, this is the normal rate of fire for the gunner. Sustained fire for the m249 is 50 rounds per minute in bursts of 3 to 5 rounds, with 4 to 5 second intervals between bursts. 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.

c. Rapid fire, for all three weapons, the barrel should be changed after firing at a rapid rate for 2 minutes. This allows an exceptionally high volume of fire, but for only a short period of time

d. Cyclic fire, for all three weapons, uses the most amount of ammunition that can be used in 1Minute. Cyclic rate is achieved when the trigger is held to the rear uninterrupted for 1 Minute.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review

ELO C - LSA 3. Learning Step / Activity ELO C - LSA 3. Methods of Fire Control.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 20 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Predetermined MG fire

a. Predetermined fires organize the battlefield for the gunners. They allow the leader and gunner to select the most likely or tactically significant potential targets or target areas. These targets or areas include dismounted enemy avenues of approach, likely positions for automatic weapons, and probable enemy assault positions. Leaders allocate gunners individual sectors of fire, designate final protective lines, or specify a principal direction of fire and selected target areas. These preparations maximize the effectiveness of the machine gun in all visibility conditions. They enhance fire control by reducing the time required to identify targets, determine range, and manipulate weapons onto targets.

(1) Sector of fire-This is a target area assigned to an individual, a weapon, or a unit. Leaders normally assign each gunner a primary and a secondary sector of fire.

(2) Final Protective Fire-An FPF is an immediately available, prearranged barrier of fire. It is used to stop enemy movement across defensive lines or areas.

(3) Final Protective Line-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 sights along it, except when engaging other targets. An FPL becomes the machine guns part of the units final protective fire. Although an FPL is fixed in direction and elevation,
The gunner must make a small shift for searching. This keeps the enemy from crawling under the FPL, and compensates for terrain irregularities or the sinking of tripod legs in soft soil. Gunners fire on FPLs as needed, regardless of visibility conditions.

(4) Principal Direction of Fire-A PDF is just what it sounds like: the main direction of fire, usually into an area with good fields of fire or with a likely dismounted avenue of approach. Gunners firing on a PDF may also provide fire support to an adjacent unit. Machine guns are sighted on the PDF only in the absence of an assigned FPL. If a PDF is assigned and other targets are unengaged, machine guns continue to sight on the PDF. A PDF has the following characteristics.

(a) It is used only if an FPL is not assigned; it then becomes the machine guns part of the units final protective fires.

(b) Gunners determine the direction to wide targets by aiming on one edge of the target area and

noting the amount of traverse needed to cover the entire target.

(c) The gunner covers the entire wedge-shaped area from the muzzle of the weapon to the target, although elevation might start out set for a priority portion of the target.

(5) Grazing Fire-A good FPL covers the maximum area with grazing fire, which is effective over various types of terrain out to 600 meters. To graze fire as far out as possible over level or uniformly sloping terrain, the gunner sets the rear sight at 600 meters; selects a point on the ground that he estimates to be 600 meters from the machine gun; aims; fires; and adjusts on that point. To prevent enemy troops from crawling under grazing fire, he searches (downward) by lowering the muzzle of the weapon. To do this, he must separate his elbows.

(6) Dead Space-The extent of grazing fire and dead space is determined in two ways. Ideally, the gunner adjusts the machine gun for elevation and direction. A member of the squad then walks along the FPL, while the gunner aims through the sights. Anyplace that the Soldiers waist (midsection) falls below the gunners point of aim is dead space. The leader or gunner uses arm-and-hand signals to direct the walking Soldier and to accurately record the dead space and its location. Another way to designate dead space is to stand behind and to the flank of the weapon and watch while the gunner fires tracer ammunition.

(7) Primary Sector of Fire-The primary sector of fire is the area to be covered by an individual gunner or unit.

(8) Secondary Sector of Fire-The secondary sector of fire is a separate area covered by the same gun team. To establish a secondary sector of fire, the Soldier or unit moves the gun to an alternate firing platform. He does this by removing the gun from the tripod, and firing the secondary sector from the bipod-supported position.

Fire Control

b. Methods-Fire control includes all leader and Soldier planning, preparing, and applying of fire on a target.

(1) The leader selects and designates targets.

(a) Designates the midpoint.

(b) Flanks.

(c) Ends of a target.

(d) Unless they are obvious to the gunner.

(2) The gunner fires when ready.

(a) Adjusts fire.

(b) Regulates the rate of fire.

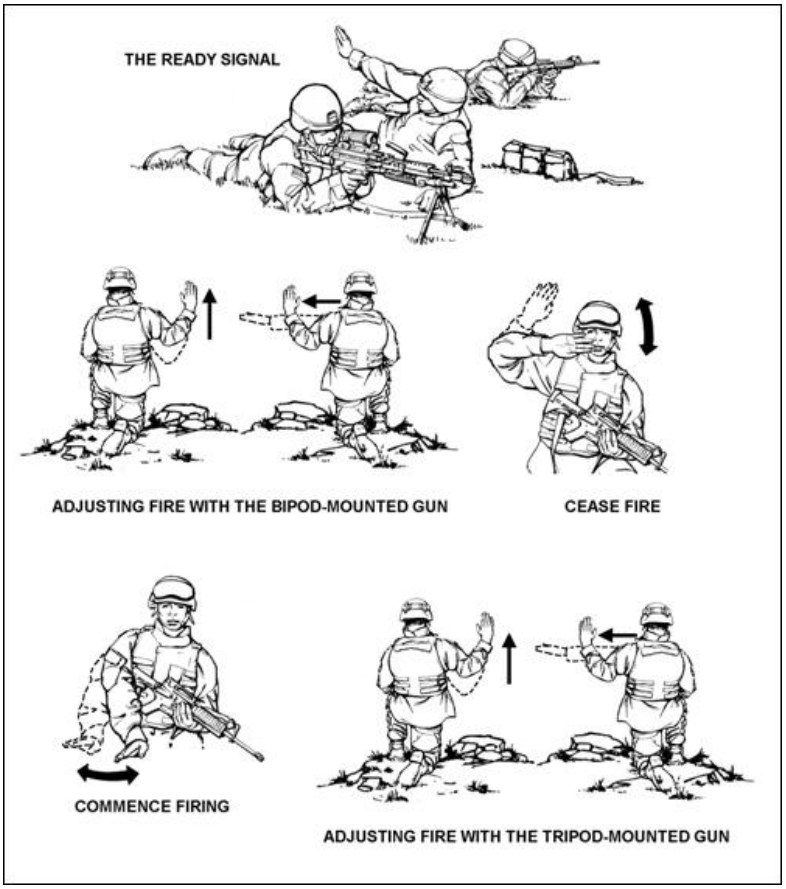
(c) Shifts between targets.

(d) Ceases fire.

(3) He continues to fire until the target is neutralized or until signaled or commanded otherwise.

(4) The noise and confusion of battle might limit the use of some of these methods. Therefore, the leader must choose the best method(s) to accomplish the mission. Verbal-Noise and distance reduce the effectiveness of verbal fire commands.

c. Arm-And-Hand Signals-This method obviously requires that the leader and gunner be able to see each other, and that the gunner know standard arm-and-hand signals. The leader gets the gunners attention and then points to the target. When the gunner signals "Ready," the leader commands FIRE.



Machine Gun Hand and Arm Signals.

d. Prearranged Signals-These include visible or audible signals such as casualty-producing devices and pyrotechnics (visible and audible), whistle blasts (audible), or tracers (visible). These signals should be defined in the unit SOP. For example, if a leader wants to shift fire at a certain time, he gives the

prearranged signal such as smoke or pyrotechnics. On seeing the signal, the gunner shifts his fire to a prearranged point.

e. Personal Contact-In many situations, the leader must issue orders directly to individual Soldiers. A small-unit leader uses personal contact more often than any other method. However, he must make maximum use of cover and concealment to keep from compromising his own location or those of the Soldiers.

f. Range Cards-When using this method of fire control, the leader must ensure all range cards are current and accurate. Once he does this, he can designate certain targets for certain weapons using limiting stakes or fire commands. He should also designate no-fire zones or restricted fire areas to others. For range cards to work well, each gunner must exercise self-discipline and must pay attention to detail.

g. Standing Operating Procedures-Standing operating procedures (SOPs) are actions to be executed without command. These procedures are developed during squad training. Using SOPs eliminates the need for many commands and simplifies fire control:

h. Gun team initiated fire control:

(1) Observation-Gunners continuously observe their sectors.

(2) Fire-Gunners open fire without command on appropriate targets that appear within their sectors.

(3) Check-While firing, the gunners periodically check with the leader for instructions.

(4) Return Fire-The gunners return enemy fire without order, concentrating fire on enemy automatic weapons.

(5) Shift Fire-Gunners shift their fires without command when more dangerous targets appear.

(6) Rate of Fire-When gunners engage a target, they initially fire at the rate necessary to gain and maintain fire superiority.

(7) Mutual Support-When two or more gunners engage the same target, and one gunner stops firing, the other increases his rate of fire and covers the entire target. When only one gunner is needed to engage a target, and the leader has alerted two or more, the gunner not firing aims at and follows the movements of the target. This way, he is ready to fire immediately if the other machine gun malfunctions or ceases fire before the target is destroyed.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review

ELO C - LSA 4. Learning Step / Activity ELO C - LSA 4. Fire Commands.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)

Time of Instruction: 0 hrs 35 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Fire Commands

a. Fire Commands-The leader gives a fire command to deliver effective fire on a target quickly and without confusion. When the leader decides to engage a target that is not obvious to the squad, he must provide them with the information they need to engage it effectively. He must alert them; give them the direction and range to and a description of the target, name the desired method of fire; and give the command to fire. The first time he gives a command to fire on a particular target, it is an initial fire command. Any changes to that command are considered subsequent fire commands.

Fire Control

b. Initial Fire Commands:

An initial fire command gives the gunner the information needed to adjust onto the target, to change the rate of fire after a fire mission has started, to interrupt fire, or to terminate the alert. All direct-fire commands share similar elements. A machine gun fire command has six elements: alert, direction, description, range, method of fire, and command to open fire. The gunners repeat each element of fire command as it is given.

(1) Alert-This element prepares the gunners for further instructions. The leader may alert both gunners in the squad and might have only one fire, depending upon the situation. To alert and have both gunners fire, the leader commands Fire Mission.
If he wants to alert both gunners, but he has only one fire, he commands Gun Number One, Fire Mission. In all cases, upon receiving the alert, the gunners load their machine guns and place them on Fire.

(2) Direction-This element indicates the general direction to the target and may be given in one or a combination of the following methods:

(3) Speak-The leader verbally announces the direction to the target relative to the position of the gunner:

(a) Front.

(b) Left Front.

(c) Right Front.

(4) Point-The leader designates a small or obscure target by pointing with his finger or aiming with a weapon. When the leader points with his finger, a Soldier standing behind him should be able to look over his shoulder, along the leaders arm and index finger, and see the target. When aiming his weapon at a target, a Soldier looking through the sights should be able to see the target.

(5) Fire Tracer Ammunition-Tracer ammunition is a quick and sure method of designating a target that is not clearly visible. When using this method, the leader should first give the general direction to direct the gunner's attention to the target area. To preserve the element of surprise when using tracer ammunition, the leader gives all the elements of the fire command except the actual command to commence fire. His command can specify that he will fire tracers to signal the gunners to commence fire.

(a) Fire Mission.

(b) Front.

(c) Five Hundred.

(d) Watch My Tracer(s).

(6) Give Reference Points-Another way to designate obscure targets is to use easy-to-recognize reference points. All leaders and gunners must know the terrain features and the terms used to describe them. When the leader uses a reference point, he precedes the description of the target with the word REFERENCE. This avoids confusion, and gives the general direction to the reference point.

NOTE: Sometimes the reference point is outside the target area. At other times, you must designate a target using successive reference points.

(a) Fire Mission.

1. Front.
2. Reference: Bunker, Center Mass.
3. Target: Troops Extending Short One Hundred, Over One Hundred.
4. Four Hundred.
5. Fire.

(b) Fire Mission.

1. Front.
2. Reference: Bunker, Right Four Fingers, Center Mass.
3. Target: Troops Extending Short One Hundred, Over One Hundred.
4. Three Hundred.
5. Search.
6. At My Command.
7. Fire.
8. Gun Number One, Fire Mission.
9. Right Front.
10. Reference: Red-Roofed House, Left To Haystack, Left To Barn.

NOTE: The leader can use finger measurements to direct the gunner's attention to the right or left of reference points.

(a) Fire Mission.

(b) Left Front.

(c) Reference: Crossroads, Right Four Fingers

(7) Description-To properly apply fire, Soldiers must know the type of target they are to engage. The leader briefly describes the target to create a picture of it in the minds of the gunners. Of course, if the target is obvious, he can skip the description.

(8) Range-The leader always announces the estimated range to the target. This indicates how far the gunner must look for the target and tells him roughly what range setting to put on the rear sight. The leader announces the range in meters. However, since the meter is the standard unit of range measurement, he need not say the word "meters." Thus, with machine guns, the leader announces the range to the nearest hundred or thousand meters, for example, Three Hundred, or One Thousand.

(a) Fire Mission.

(b) Front.

(c) Reference: Knocked Out Tank, Left Two Fingers.

(d) Target: Troops.

(e) Three Hundred.

(9) Method of Fire-This element includes manipulation and rate of fire. Manipulation prescribes the class of fire with respect to the weapon. The leader announces it as:

(a) FIXED.

(b) TRAVERSE.

(c) SEARCH.

(d) TRAVERSE AND SEARCH.

(10) Rate refers to the volume of fire (sustained, rapid, or cyclic). Normally, the gunner uses a sustained rate of fire, so the leader omits the rate of fire from the fire command. The method of fire for the machine gun is usually 3- to 5-round bursts for the M249 or 6- to 9-round bursts for the M240B.

(a) Fire Mission.

(b) Front.

(c) Reference: Knocked-Out Tank, Left Two Fingers.

(d) Target: Troops.

(e) Three Hundred.

(f) Traverse.

(11) Command to Open Fire-When the leader wants the gunners to withhold fire so that they can surprise a target, or to ensure that both gunners open fire at the same time, he can start the command to commence fire with At My Command or At My Signal. When the gunners are ready to engage the target, they report "Ready" to the leader, who then commands FIRE when he desires.

(a) Fire Mission.

(b) Front.

(c) Troops.

(d) Four Hundred.

(e) At My Command Or At My Signal.

(f) Leader pauses until gunners are ready and fire is desired.

(g) FIRE (Gunners fire on prearranged command or signal).

NOTE: If immediate fire is required, command FIRE without pausing, and the gunners will fire when ready.

NOTE: Show Slide 45: Fire Control

b. Subsequent Fire Commands-The leader gives subsequent fire commands to adjust direction and elevation, to change current rates of fire, to interrupt fire, or to terminate the alert. If the gunner fails to properly engage a target, the leader must promptly correct him by announcing or signaling the desired changes. When the leader gives these changes, the gunner makes the appropriate corrections and resumes fire without further command.

(1) Direction and Elevation-The leader always adjusts for direction and elevation in meters; the number of fingers he uses equals the number of meters.

(a) The leader first adjusts fire for direction, for example, Right One Zero Meters or Left Five Meters.

(b) Then, he adjusts for elevation, for example, Add Five Meters or Drop One Five Meters. He can issue these changes orally or visually (arm-and-hand signals).

(2) Rate of Fire-The leader gives changes in the rate of fire orally or visually (arm-and-hand signals).

(3) Fire Command-To interrupt firing, the leader commands or signals Cease Fire. The gunners remain on the alert. They resume firing when the leader commands Fire.

(4) Termination-To terminate the alert, the leader commands:

(a) Cease Fire.

(B) End Of Mission.

Fire Control

(5) Doubtful Elements And Corrections-When the gunner is in doubt about any element of the fire command, he replies "Say again range, target." The leader then repeats the command, saying, The Command Was, repeating the element in question, and then continuing with the rest of the fire command.

(a) When the leader makes an error in the initial fire command (in this example, Six Hundred is the element he wants to correct), he immediately says Correction, gives the corrected element (in this example, Three Hundred), and then continues with the rest of the fire command.

1. Fire Mission.
2. Front.
3. Troops.
4. Six Hundred.
5. Correction.
6. Three Hundred.
7. Traverse.
8. At My Command.

(b) When the leader makes an error in a subsequent fire command, he says Correction, and then repeats the entire subsequent fire command.

1. Left Five Meters, Drop One Meter.
2. Correction.
3. Left Five Meters, Drop One Hundred Meters.

c. Abbreviated Fire Commands-Fire commands need not be complete to be effective. In combat, the leader gives only the elements the gunner needs to place quick and effective fire on a target. During training, however, he practices using all of the elements. This gets gunners in the habit of thinking and reacting properly. Once the gunner receives his initial training in fire commands, he should receive additional training

on how to react to abbreviated fire commands, delivered by one of the following methods:

(1) Oral Signals-To direct the gunner to place the fire of one machine gun on an enemy machine gun, the leader commands:

(a) Gun Number One, Fire Mission.

(b) Machine Gun.

(c) Four Hundred.

(d) Fire.

(2) Arm-And-Hand Signals-Noise and distance can make verbal communication between leader and gunners impossible. However, if they can see each other, they can use visual or manual (arm-and-hand) signals, such as "Im ready," "Are you ready?" to control fire. When the leader wants just one of the gunners to act or move, he gives a preliminary signal to that gunner only. Common arm-and-hand signals for fire control include:

(a) Ready-The gunner indicates that he is ready to fire by yelling "Up" or by having the assistant gunner raise a hand overhead toward the leader.

(b) Commence Fire or Change Rate of Fire-The leader brings his hand (palm down) to the front of his body about waist level, and moves it horizontally in front of his body. To signal that he wants the gunner to increase his rate of fire, the leader moves his hand faster, and vice versa.

(c) Change Direction or Elevation-The leader extends his arm and hand in the new direction and indicates the amount of change by the number of fingers he extends:

1. Each finger represents a 1 mil, or 1 meter, change.
2. He spreads the extended fingers so the gunner can count them more easily.
3. If the desired change is more than 5 meters, the leader extends his hand repeatedly to indicate the total amount of change.
4. For example, he indicates RIGHT NINE by extending all five fingers once and four fingers the next time, for a total of nine fingers.

(d) Interruption or Cessation of Fire-The leader raises his arm and hand (palm out) in front of his forehead, then lowers his arm and hand sharply.

(e) Other Signals-The leader can devise other signals to control his weapons. A detailed description of arm-and-hand signals is given in FM 21-60.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review

CHECK ON LEARNING (ELO C): Conduct a check on learning and summarize the ELO.

REVIEW SUMMARY(ELO C): Conduct a Summary Review

D. ENABLING LEARNING OBJECTIVE

ACTION:	Identify the elements of a machine gun range card.
CONDITIONS:	As a small unit leader in a platoon, in a classroom environment, Instructor, block of instruction, and a requirement to participate in classroom discussion.
STANDARDS:	Identify the elements of a machine gun range card

ELO D - LSA 1. Learning Step / Activity ELO D - LSA 1. Range Card.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Unassigned
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Range Card

a. The standard range card (DA Form 5517-R) provides a record of firing data and helps the leader plan defensive fires. Using a range card improves fire control and expedites the engagement of predetermined targets. It also helps the gunner estimate ranges to other targets in the sector of fire. Each gunner makes two copies—one for his position and one for the squad leader. The squad leader uses his copy of each of the gunners range cards to prepare his squad sector sketch.

b. The gunner prepares the range card as soon as he occupies the position, and the gunner revises it constantly. The gunner includes the following information on the range card:

(1) Weapon symbol.

(2) Sector of fire.

(3) Primary direction of fire or final protective line.

(4) Range, azimuth, and number label to predetermined targets.

(5) Dead space.

(6) Distance and azimuth from a known point or coordinates (reference point).

(7) Magnetic North arrow.

(8) Data section.

MG Weapons Symbols

Discuss weapon symbols.

Final Protective Line

c. Establishing Final Protective Line (FPL):

(1) The gunner uses the tripod to emplace the machine gun where he will be firing it. The gunner sketches the appropriate machine gun symbol on the range card, and orients (points) it toward the most dangerous target in the sector.

(2) The gunner aims the machine gun along the FPL, which is the same as either the left or right limit of the sector of fire.

(a) To set the limit, slide the T&E mechanism all the way to the left or right end of the traversing bar.

(b) Then, move the tripod until the barrel lines up on the FPL.

(c) The sector of fire is now set up with the FPL along one limit (side).

(3) The gunner always identifies the FPL as target number 1.

(4) To determine the range for all targets in the sector, the gunner ensures each circle, except the first one, represents a range (circumference) increment of 100 meters.

(a) The lowest setting on the M249 and M60 is 300 meters.

(b) The lowest on the M240B is 200 meters.

(c) Therefore, the innermost (first) circle represents a range from the gun (circumference) of either 200 or 300 meters.

(5) The gunner marks the range in the data section, just below the circles.

(6) The gunner draws the left or right limits from the weapon position to the machine guns maximum effective range.

(7) If the leader assigns an FPL, the gunner draws the machine gun symbol along that line (left or right limit. The leader determines the extent of grazing fire and the gunner sketches a shaded blade inside the FPL to represent it. The gunner indicates dead space along the FPL, if any, by breaks in the shaded area. The gunner records the ranges to the near and far edges of the dead space above the FPL, and the extent

of the grazing fire along the FPL. The leader determines the magnetic azimuth of the FPL, and the gunner records it below the shaded blade of the FPL. The gunner also records the elevation reading and other data in the data section.

(8) The gunner then draws the opposite primary sector limit. If a target lies on this line, he adds the target information to the data section. If the gunner cannot use the opposite side of the traversing bar to mark the opposite side of the primary sector, then he must record a direction reading in the sketch section.

(9) The gunner draws a broken line to represent the left and right limits of the secondary sector. The gunner labels the area between the primary and secondary sectors as dead space.

(10) The gunner draws an arrow in the magnetic North block (upper right hand corner), pointing in the direction of magnetic north.

(a) The gunner orients the firing position with a prominent terrain feature (recognizable on a map).

(b) The gunner obtains a magnetic azimuth between the terrain feature and the position, and he draws a line between these two points.

(c) The gunner draws barbed arrows along this line pointing in the direction the magnetic azimuth was taken.

(d) The gunner records the magnetic azimuth in mils or degrees below the line.

(e) In the absence of a prominent terrain feature the gunner marks the positions eight-digit grid coordinate on the range card, just below the position.

(11) The gunner records his unit designation (SQD, PLT, CO), and date in the box in the upper left-hand corner of the range card. For security, the gunner only designates up to company level.

(12) The gunner identifies all targets within his sector. For each, the gunner draws the appropriate symbol in the appropriate place in the sector of fire. In the primary sector of fire, the appropriate symbol is a target number within a circle.

(13) When the leader has assigned an FPL, it is always target number 1. The gunner numbers other targets in order of tactical importance.

Principal Direction of Fire

c. Establishing Principal Direction of Fire (FPL).

(1) If the leader does not assign an FPL, then the gunner locks the T&E mechanism on "0" on the traversing bar scale, and shifts the tripod until the muzzle points to the PDF. The gunner sketches the

machine gun symbol in the center of the left and right limits, pointed toward the PDF.

(2) To determine the range for all targets in the sector, the gunner ensures each circle, except the first one, represents a range (circumference) increment of 100 meters.

(a) The lowest setting on the M249 is 300 meters.

(b) The lowest on the M240B is 200 meters.

(c) Therefore, the innermost (first) circle represents a range from the gun (circumference) of either 200 or 300 meters.

(3) The gunner marks the range in the data section, just below the circles.

(4) The gunner draws the left or right limits from the weapon position to the machine guns maximum effective range.

(5) The gunner then draws the opposite primary sector limit. If a target lies on this line, the gunner adds the target information to the data section. If the gunner cannot use the opposite side of the traversing bar to mark the opposite side of the primary sector, then he must record a direction reading in the sketch section.

(6) The gunner draws a broken line to represent the left and right limits of the secondary sector. The gunner labels the area between the primary and secondary sectors as dead space.

(7) The gunner draws an arrow in the magnetic North block (upper right hand corner), pointing in the direction of magnetic north.

(a) The gunner orients the firing position with a prominent terrain feature (recognizable on a map).

(b) The gunner obtains a magnetic azimuth between the terrain feature and the position, and he draws a line between these two points.

(c) The gunner draws barbed arrows along this line pointing in the direction the magnetic azimuth was taken.

(d) The gunner records the magnetic azimuth in mils or degrees below the line.

(e) In the absence of a prominent terrain feature the gunner marks the positions eight-digit grid coordinate on the range card, just below the position.

(8) The gunner records his unit designation (SQD, PLT, CO), and date in the box in the upper left-hand corner of the range card. For security, the gunner only designates up to company level.

(9) The gunner identifies all targets within his sector. For each, the gunner draws the appropriate

symbol in the appropriate place in the sector of fire. In the primary sector of fire, the appropriate symbol is a target number within a circle.

Check on Learning: Conduct a check on learning and summarize the learning activity.

Review Summary: Conduct a Summary Review

CHECK ON LEARNING (ELO D): Conduct a check on learning and summarize the ELO.

REVIEW SUMMARY(ELO D): Conduct a Summary Review

E. ENABLING LEARNING OBJECTIVE

ACTION:	Prepare a Range Card for a Machine Gun.
CONDITIONS:	As a gunner, in a defensive fighting position, given a tripod-mounted machine gun with a traversing and elevation (T&E) mechanism, an assigned primary sector of fire with recognizable targets (either a FPL [final protective line] or PDF [principal direction of fire]), a secondary sector of fire with recognizable targets, blank DA Forms 5517-R, Standard Range Card, a pencil, a lensatic compass, and a map of your assigned sector of fire.
STANDARDS:	Complete the marginal information on the standard range card, sketch the primary sector of fire, develop the sketch for the primary sector of fire, record the gun firing data, sketch the secondary sector of fire, label the dead space, record the position of the machine, make a duplicate range card, and prepare alternate and supplementary positions.

ELO E - LSA 1. Learning Step / Activity ELO E - LSA 1. Complete the marginal information located at the top and center of the standard range card.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Notes: Range cards should be prepared as soon as you have a primary sector of fire and a designated defensive position, regardless of the length of stay, and update as necessary.

1. Complete the marginal information located at the top and center of the standard range card.
a. Record the squad, platoon, and company designations.

Note: Do not record unit designations higher than company.

b. Record the relative direction of magnetic north.

(1) Use the magnetic north symbol.
(2) Orient the range card to the terrain.
(3) Determine magnetic north.

c. Record your defensive position as primary, alternate, or supplementary.

d. Record the date and time the range card was prepared.

e. Record the type of machine gun used (SAW, M60, M240, M2).

f. Record the incremental distance of the nine range circles.

Note: If the distance to this terrain feature is less than 450 meters then each circle represents 50 meters. If the distance is between 450 and 900 meters then each circle represents 100 meters. If the distance to this terrain feature is greater than 900 meters then each circle represents 200 meters.

(1) Use the farthest prominent terrain feature that is within the gun's range.
(2) Determine the distance that each range circle represents.
(3) Record the distance.
(4) Draw this terrain feature on the sketch.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 2. Learning Step / Activity ELO E - LSA 2. Sketch the primary sector of fire using either an FPL or PDF.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(2:32/0)
Time of Instruction:	0 hrs 5 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

2. Sketch the primary sector of fire using either an FPL or PDF.
a. Sketch the primary sector of fire using a PDF.
(1) Draw a basic machine gun symbol pointing in the direction of the PDF.
(2) Draw two solid lines, one for the left limit and one for the right limit to the left and right of the machine gun symbol.

Note: These limits should be 437 mils to the left and right of the PDF unless reduced by the presence of friendly positions. Both lines are drawn out to the maximum range of the weapon or to the ninth range circle, whichever is less. If the gunner cannot use the maximum traverse to establish a left or right firing limit, then he must record the

actual direction of the limit at the end of the arrow or line.

b. Sketch the primary sector of fire using a FPL.
(1) Draw a basic machine gun symbol (an arrow) as a long line down the appropriate left or right limit.
(2) Draw another long arrow for the opposite limit (left or right).

Note: This represents the line formed by the maximum traverse of the tripod-mounted machine gun (875 mils). Both arrows are drawn out to the maximum range of the weapon or to the ninth range circle, whichever is less.

(3) Sketch the grazing fire and dead space along the FPL.

Note: Grazing fire is represented by a shaded blade on the inside of the FPL line while dead space is represented by breaks in this shaded blade. If the enemy situation prevents a person from walking the FPL, then the gunner estimates the locations and limits of dead space and the maximum range of grazing fire, recording the results on the sketch as appropriate.
(a) Observe soldier walking the FPL.
(b) Look through or over the sights of the machine gun.
(c) Adjusts the elevation to achieve maximum amount of grazing fire out to the 600 meters maximum range of grazing fire.
(d) Record the actual maximum range of grazing fire at the end of the shaded blade
(e) Identify any area of dead space by determining where this person drops below the weapon's LOS and where he returns to the LOS.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 3. Learning Step / Activity ELO E - LSA 3. Develop the sketch for the primary sector of fire.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(2:32/0)
Time of Instruction:	0 hrs 5 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

3. Develop the sketch for the primary sector of fire.
a. Identify all prominent terrain features within the primary sector of fire.

Note: Where enemy elements may position themselves during periods of limited visibility, such as road junctions, buildings, and ditches as targets.

b. Sketch an appropriate symbol for each target at the targets approximate position within the primary sector of fire.

c. Number all targets consecutively, beginning with the number 2, in order of tactical importance and circle the target number.

Note: The FPL or PDF, whichever is used, is numbered as target 1.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 4. Learning Step / Activity ELO E - LSA 4. Record the gun firing data in appropriate space of the data section.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(2:32/0)
Time of Instruction:	0 hr 0 min
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

4. Record the gun firing data in appropriate space of the data section.

a. Record the target numbers, in numerical order.

b. Record DIRECTION/DEFLECTION' data in the appropriate block.

Note: Confirm the T&E mechanism is properly connected and the center traversing handwheel is on the center mark. Block one is always either the FPL or the PDF and uses unique data.

(1) Record FPL data by writing either "L" or "R" whichever traversing limit designates the FPL (Block 1 only).

(2) Record PDF data by writing either "0" if the tripod is centered on the PDF or the actual left or right direction/deflection of the PDF (Block 1 only).

(3) Record data for all other targets.

(a) Laying the gun on the base of the target.

(b) Determine the direction of the barrel (L or R).

(c) Reading the direction on the traversing bar at the left edge of the traversing bar slide.

(d) Record the direction (Figure 5).

c. Record ELEVATION data in the appropriate block.

(1) Record, for FPL only, any elevation change used to obtain the maximum distance of grazing fire (Block 1 only).

(2) Record the actual elevation for PDF and all other targets.

(a) Ensure the barrel is in line with the target.

(b) Rotate the elevating handwheel until the sight picture reaches the base of the target.

(c) Determine the elevation.
_1_ Read the number above the first visible line on elevating screw scale (including the "+" or "-").
_2_ Read the number on the elevating handwheel.
(d) Recording these two numbers in the elevation column separated by a slash.

d. Record the RANGE data, in meters, in the appropriate block.
(1) Record for an FPL, the maximum achieved distance of grazing fire.
(2) Record for the PDF and all other targets the distance to the target.

e. Record any special ammunition required in the AMMO block.

f. Describe the target in the block labeled DESCRIPTION.
(1) Record an FPL as "FPL".
(2) Record a PDF as "PDF".
(3) Describe all other targets by providing a simple description of the target.

g. Record REMARKS in the appropriate block.
(1) Record the elevation change, for the FPL only that causes the rounds to strike the ground at the beginning of the first dead space.
(2) Record data for Large (Deep) targets that defines the target's depth.
(a) Lay the weapon on target.
(b) Record target number.
_1_ Write and circle the target number in the remarks section.
_2_ Write the letters "TD" (target depth).
_3_ Write the already determined elevation and the word "to".
(c) Rotate the elevating handwheel until the sight picture reaches the top of the target.
(d) Determine the depth.

Note: This is a second elevation reading, which can be done by reading the number above the first visible line on elevating screw scale (including the "+" or "-") and then reading the number on the elevating handwheel.

(e) Record these two numbers after the "to".

Note: Example TD +50/15 to +50/22.

(3) Record data for Linear targets that defines the target's width.
(a) Record target number.
_1_ Write and circle the target number in the remarks section.
_2_ Write the letters "TW" (target width) followed by some blank space and then a slash.
(b) Lay the gun on the target using existing data.

Note: The initial target data should lay the gun on the most dangerous point of the target, which may be anywhere on the target.

(c) Traverse from this initial lay point, to the most dangerous edge of the target.
_1_ Count the number of MILS.
_2_ Note the direction (L or R) of movement.
(d) Record this data to the right of the slash.
(e) Traverse the gun to the opposite edge of the target counting the total number of MILS.
(f) Record this data to the left of the slash.

Note: Example TW 15 / L8.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 5. Learning Step / Activity ELO E - LSA 5. Sketch the secondary sector of fire.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

5. Sketch the secondary sector of fire.
a. Draw a "V" using two broken lines to represent the left and right limits of the secondary sector of fire. See Figure 2 or Figure 3.
b. Sketch identified targets in the secondary sector of fire.
c. Record the range (in meters) to each target above the target's sketch.
d. Employ field expedient firing aids for the secondary sector.
e. Sketch the field expedient firing aid above the target for ease of identification.

Note: Firing data is not determined for the secondary sector of fire as the tripod remains fixed in the primary firing position. To fire in the secondary sector of fire, the gun is dismounted from the tripod, moved, and fired in the bipod mode. The gunner uses field expedient firing aids for targets in the secondary sector.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 6. Learning Step / Activity ELO E - LSA 6. Label the area between the primary and secondary sectors as dead space.

Method of Instruction: Conference/Demonstration

Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

6. Label the area between the primary and secondary sectors as dead space.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 7. Learning Step / Activity ELO E - LSA 7. Record the position of the machine gun.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

7. Record the position of the machine gun.

a. Use the Grid Method.

(1) Determine the eight-digit grid coordinate of the gun.

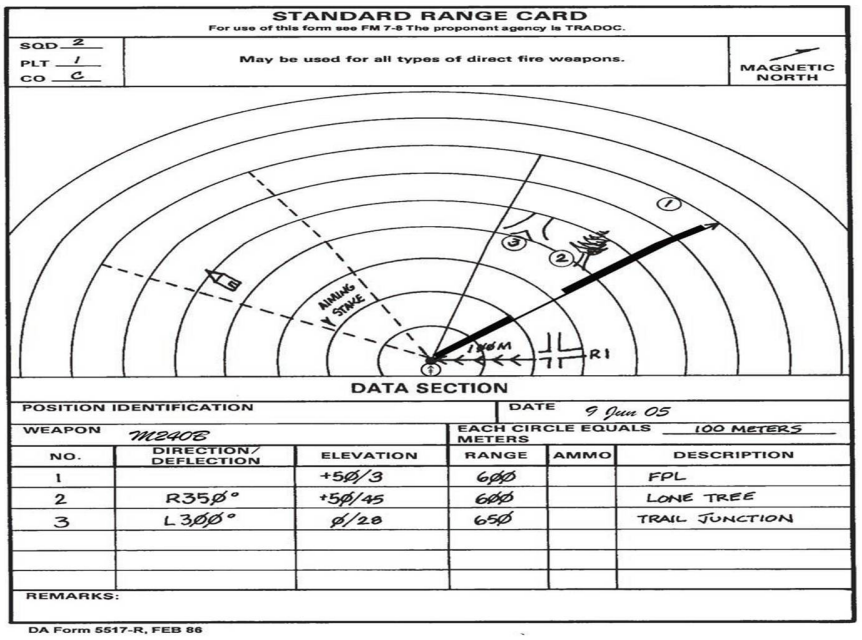
(2) Record the coordinate directly below the gun position.

b. Use the Reference Point Method.

(1) Orient the firing position to a prominent terrain feature (recognizable on a map) no more than 1000 meters away.

(2) Draw a line between these two points, with barbed arrows pointing to the gun position.

(3) Determine the azimuth from the terrain feature to the gun position.



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

SQD 2
PLT 1
CO C

May be used for all types of direct fire weapons.

MAGNETIC NORTH

AIMING STAKE

DATA SECTION

POSITION IDENTIFICATION | DATE 9 Jun 05

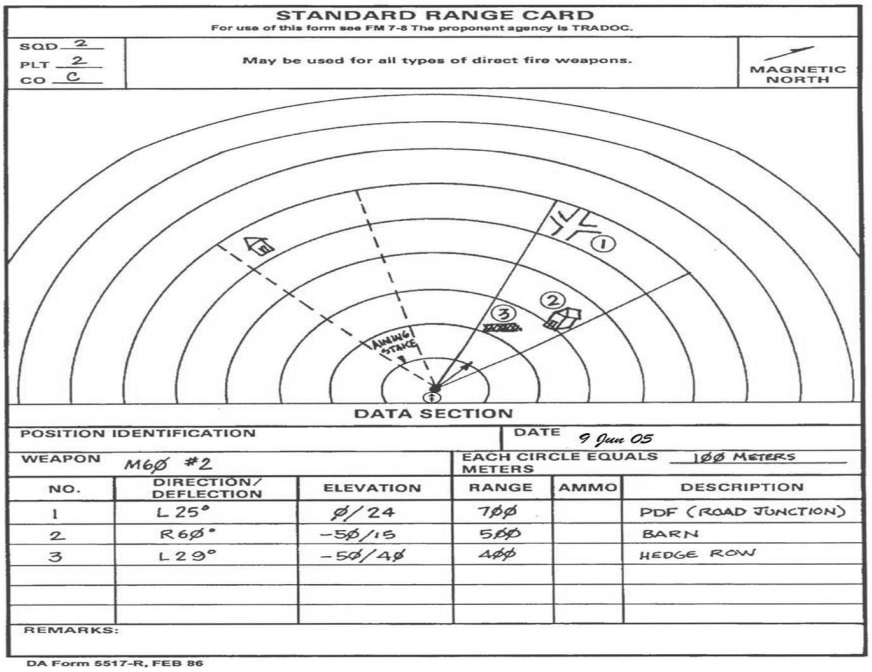
WEAPON M240B | EACH CIRCLE EQUALS METERS 100 METERS

NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1		+5Ø/3	6ØØ		FPL
2	R35Ø°	+5Ø/45	6ØØ		LONE TREE
3	L3ØØ°	Ø/2Ø	65Ø		TRAIL JUNCTION

REMARKS:

DA Form 5517-R, FEB 86

Range Card with FPL.



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

AIMING STAKE

DATA SECTION

POSITION IDENTIFICATION | DATE 9 Jun 05

WEAPON M6Ø #2 | EACH CIRCLE EQUALS METERS 1ØØ METERS

NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1	L 25°	Ø/24	7ØØ		PDF (ROAD JUNCTION)
2	R6Ø°	-5Ø/15	5ØØ		BARN
3	L29°	-5Ø/4Ø	4ØØ		HEDGE ROW

REMARKS:

DA Form 5517-R, FEB 86

Range Card with PDF

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO E - LSA 8. Learning Step / Activity ELO E - LSA 8. Make a duplicate copy of the range card.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

8. Make a duplicate copy of the range card.

a. Ensure one range card stays at the machine gun position.

b. Ensure one range card is given to the squad or platoon leader.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the ELO.

ELO E - LSA 9. Learning Step / Activity ELO E - LSA 9. Prepare range cards for alternate and supplementary positions.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

9. Prepare range cards for alternate and supplementary positions.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

CHECK ON LEARNING (ELO E): What are your questions pertaining to the preparation of a range card.

REVIEW SUMMARY(ELO E): Conduct a review and summarize the ELO.

F. ENABLING LEARNING OBJECTIVE

ACTION:	Perform machine gun crew drills.
CONDITIONS:	In a field environment given all PPE, a machine gun, tripod, T&E, and pintle.
STANDARDS:	Perform individual crew drill actions to place the gun into operation, take the gun out of action, and react to malfunctions as the machine gunner, assistant machine gunner, and ammo bearer for both bipod firing and tripod firing situations.

ELO F - LSA 1. Learning Step / Activity ELO F - LSA 1. Crew Drill description.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 5 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

A. The machine gun crew drill trains squad and platoon Soldiers in the fundamentals of machine gun operation. It gives them confidence in their individual and collective abilities to put the machine gun into action wit precision and speed. Rotation of duties ensures that each Soldier learns the duties of each crew position. Precision develops from learning and practicing correct procedures correctly. This includes inspecting the machine gun before firing it, and observing all safety procedures. Precision is more important than speed. Only after they achieve precision should they work on speed. The crew drill is conducted with preliminary gunnery and is part of the 10-meter and transitionfiring practice and qualification, concurrently during other courses of fire, or anytime at the discretion of the unit commander. The organization for crew drill described in this section is for training crews in the fundamentals of machine gun operation. However, some tactical situations require a different organization.
To instill realism and relate the crew drill to actual situations, the unit leader should vary his method of instruction. Possible approaches to this method of instruction include--
1. Conduct the crew drill from the prone position.
2. Initiate the crew drill from all types of tactical formations.
3. Perform the crew drill in simulated tactical situations.

The crew drill, as discussed here, involves the leader and one machine gun crew. The machine gun crew has three members (a gunner, assistant gunner, and ammunition bearer).
All commands are given by a leader. This leader may be a team leader, squad leader, or someone placed in charge of the crew. The gunner and assistant gunner repeat all commands. After the machine gun is mounted, the assistant gunner transmits all signals from the leader to the gunner and from the gunner to the leader.

B. Composition of the Machine Gun Team and common equipment breakdown.
DAY
Leader - Binoculars, M4, compass.

Gunner - Machine gun, compass, MGO, two bandoleers (with dummy ammunition).

Assistant Gunner - Binoculars, M4, spare barrel case (spare barrel and accessories), T&E mechanism, pintle assembly, and three bandoleers (with dummy ammunition).

Ammunition Bearer - Compass, M4, tripod, and four bandoleers (with dummy

ammunition).

NIGHT

Leader - AN/PVS-14, M4 with AN/PAQ-15, compass.

Gunner - Machine gun, compass, AN/PVS-14, AN/PEQ-15, or AN/PAS-13, two bandoleers (with dummy ammunition).

Assistant Gunner - AN/PVS-14, , M4, spare barrel case (spare barrel and accessories), T&E mechanism, and three bandoleers (with dummy ammunition).

Ammunition Bearer - AN/PVS-14, M4, compass, tripod, pintle assembly, and four bandoleers (with dummy ammunition).

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO F - LSA 2. Learning Step / Activity ELO F - LSA 2. Initial Crew Drill Formation.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

A. The leader commands, "FORM FOR CREW DRILL".
1. The crew forms in a file, with five steps between each crewmember, in this order: gunner, assistant gunner, and ammunition bearer.
2. The gunner is five steps from and facing the leader.
3. When the crewmembers reach their positions, each assumes the prone position and is ready for the crew drill.

Check on Learning: What are your questions concerning the crew drill formation.

Review Summary: Having discussed the crew drill formation, we will now discuss cross training procedures.

ELO F - LSA 3. Learning Step / Activity ELO F - LSA 3. Cross-Training Procedures.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a

A. Duties rotate during the crew drill to train each Soldier in the duties of all crewmembers.

B. The command to rotate duties is, "FALL OUT, GUNNER".

1. At this command, the gunner becomes the ammunition bearer, the assistant gunner becomes the gunner, and the ammunition bearer becomes the assistant gunner.

2. When crewmembers have assumed their new positions, they call out their new duties in order:

a. AMMUNITION BEARER.

b. ASSISTANT GUNNER.

c. GUNNER.

Check on Learning:	What are your questions on the cross training drill?
Review Summary:	We have discussed the cross training drill, we will now discuss bipod fire drills.

ELO F - LSA 4. Learning Step / Activity ELO F - LSA 4. Bipod Fire Drills.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 15 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

A. INSPECTION FOR BIPOD FIRE

1. An inspection of equipment is made at the beginning of each exercise.

B. LEADER

1. After the crew forms up for crew drill, the leader commands, "INSPECT EQUIPMENT BEFORE FIRING, BIPOD".

2, On hearing this command, each crewmember inspects his equipment:

C. GUNNER

1. Every night, the gunner checks the NVD, but every time he inspects, he must--

a. Check the ammunition first, and ensure that the ammunition is properly linked and free of dirt and corrosion, and that the double link is up (ready for loading).

b. Place the cloth slings over his shoulder (except for one bandoleer, which he prepares for loading).

c. Inspect the machine gun.

d. Take his position parallel to the machine gun, with his head on-line with the feed tray.

e. Hold the machine gun with his left hand, use his right hand to lower the bipod legs and then rest the machine gun on the bipod.

f. Attach the bandoleer to the machine gun.

g. Place the safety on "F," pull the cocking handle to the rear, place the safety on "S," returns the cocking handle to the forward position, raise the cover assembly.

h. Call for the cleaning rod and receive it from the assistant gunner.
i. Crawl forward, and then run the cleaning rod through the barrel to ensure it is clear.
j. Check the flash suppressor for cracks.
k. Check the front sight for tightness and for damage to the blade.
l. Check the carrying handle to ensure that it can be positioned so it will out of the way during aiming and firing.
m. Ensure that the barrel is securely locked to the receiver.
n. Return the cleaning rod to the assistant gunner.
o. Move to the rear of the machine gun and check the moving parts in the feed cover.
p. Ensure that the feed cam is clean and properly lubricated.
q. Push back and forth on the feed cam to check for freedom of movement.
r. Push on the belt feed pawl to ensure that it has spring tension.
s. Push on the cartridge guides to ensure that they a have spring tension.
t. Push the belt-holding pawl to ensure that it has spring tension.
u. Lower and latch the cover (without inserting the belt).
v. Pull the trigger to check the functioning of the safety.
w. Place the safety on "F," pull the cocking handle to the rear, pull the trigger, ease the bolt forward manually with the cocking handle.
x. Check the rear sight.
D. ASSISTANT GUNNER
1. Remaining in a prone position, the assistant gunner begins by inspecting his ammunition. He takes the cleaning rod from the carrying case and assembles the cleaning rod, and then he must--
a. Take the T&E mechanism from the case and prepare it as follows:
1. Rotate the elevating handwheel, exposing 1 1/2 inches or the width of two fingers) of threads above the elevating handwheel.
2. Rotate the traversing slide sleeve, exposing 1 1/2 inches or the width of two fingers) of threads below the elevating handwheel.
3. Center the traversing mechanism.
4. Check to ensure that the locking mechanism that attaches to the machine gun is present and in working order.
5. Replace the T&E mechanism in on the case.
b. Remove the spare barrel from the spare barrel case.
1. Check the barrel.
2. Check the flash suppressor for cracks.
3. Check the front sight for tightness and for damage to the blade.
4. Check the pintle assembly for proper functioning.
5. Place the spare barrel its case.
c. After the gunner returns the cleaning rod, the assistant gunner disassembles the cleaning rod and returns it to the accessory pocket. Then, he checks the other items in the case including the ruptured cartridge extractor, bore brush, chamber brush, receiver brush, and heat-protective mitten for serviceability.
d. Finally, he checks his night vision.
E. AMMUNITION BEARER

1. Remaining in a prone position, the ammunition bearer inspects his ammunition as described above for gunner and assistant gunner. He then inspects the tripod and the pintle assembly. Night personnel also check their NVDs.
a. Ensure that the front leg will unfold properly and the rear legs unfold and lock securely in place with the sleeve latch.
b. Check the sleeve latch to ensure that it has spring tension and will function.
c. Check the pintle assembly to ensure that it locks into the pintle bushing and that the pintle rotates freely within the bushing.
d. Check to ensure that the T&E mechanism will lock on the traversing bar and move freely when unlocked for major changes in direction.
e. Unlock the pintle and T&E mechanism from the tripod and return to the assistant gunner.
f. Fold the rear legs by unlocking the sleeve latch and fold the front leg so that the tripod is in the carrying position.
F. INSPECTION REPORT
1. When crewmembers have finished inspecting the equipment, they call out their reports, without command, starting from the rear.
a. "Ammunition bearer correct" (or reports deficiencies).
b. "Ammunition bearer and assistant gunner correct" (or reports deficiencies).
c. "Gunner all correct" (or reports deficiencies).

PLACEMENT INTO ACTION (BIPOD)
A. To place the machine gun into action, the Soldiers do the following:
1. The leader must--
a. Point where he wants the machine gun mounted and command, "MOUNT MACHINE GUN HERE".
b. Point in the direction of fire and add, "FRONT".
c. Raise his fist to shoulder level, thrusts it several times in the direction of the selected position, and command, "ACTION".
1. At the command "ACTION", the gunner must--
a. Stand and grasp the carrying handle with his left hand
b. Grasp the top of the stock with his right hand
c. Raise the machine gun to a carrying position (muzzle to the front).
d. Move to the selected position.
e. Place the machine gun on the ground and assume a prone position to the rear of it.
f. Position the carrying handle so that it will be out of the way during aiming and firing.
g. Align the machine gun in the direction of fire and set the rear sight.
h. Place the safety on "F," pulls the bolt to the rear, then return the safety to "S."
i. Return the cocking handle to the forward position.
j. Raise the feed cover, place the first round of ammunition in the cartridge feed tray groove, and close the feed cover, ensuring that the round remains in the cartridge feed tray groove.
k. Pull the machine gun into his shoulder and put the safety on "F."

WARNING: BOLT POSITION, In tactical situations, where noise discipline is critical to mission success, carry the M240B with the bolt locked to the rear. Only trained gun crews may load the M240B, and then only on command. In training situations , load and carry the M240B with the bolt forward.

l. The assistant gunner times his movements so that he arrives at the position as the gunner is assuming the prone position. Then, the assistant gunner must--
1. Lie prone on his left hip, feet to the rear, and on the left side of the gunner.
2. Place the spare barrel case parallel to the gun with the zippered side towards the machine gun.
3. Open the case and remove the spare barrel. Place the spare barrel on the case, muzzle to the front and even with the muzzle of the machine gun.
4. The ammunition bearer times his movements so that he arrives at the position as the assistant gunner is assuming the prone position. The ammunition bearer must--
a. Place the folded tripod one step to the left of the muzzle of the machine gun and on line with the machine gun.
b. Unsling his bandoleers and place them next to the folded tripod legs.
c. Lie prone 10 meters to the left and on line with the position, provide security, and prepare to fire into the target area with his rifle.
5. When ready to fire, the gunner must put the safety lever on "F" and report "Up." The assistant gunner must signal "Ready" to the leader.

BARREL-CHANGING PROCEDURES (BIPOD).
A. To ensure proficiency and speed in changing barrels, the barrel changing process is included in crew drill.
1. When the gunner has reported "Up" and the assistant gunner has signaled "Ready," the leader commands, "CHANGE BARRELS".
2. The gunner ensures that the bolt is to the rear, puts the safety on "S," and puts the stock on the ground. Next, he moves his left hand to the top of the stock to ensure the weapon stays parallel to the ground. He puts his right hand under the handguard and forearm assembly. This helps to support the machine gun while the assistant gunner removes the barrel.
3. The assistant gunner (wearing the heat-protective mitten) unlocks the barrel locking lever, removes the barrel, and places the barrel on the spare barrel case. He holds the spare barrel inserts it into the machine gun.
4. The gunner ensures that the barrel is locked and secured in the receiver of the machine gun. He moves the safety lever to "F," assumes the correct firing position, and reports "Up." The assistant gunner signals "Ready" to the squad leader.

REMOVAL FROM ACTION (BIPOD)
A. To take the machine gun out of action, the leader commands and signals, "OUT OF ACTION". The gunner and assistant gunner repeat the command.
1. As soon as he hears the command or sees the signal for "OUT OF ACTION", the

ammunition bearer slings his rifle and moves to the position. Once there, he finds and slings the bandoleers that he left earlier. He picks up the tripod and moves 15 steps to the rear of the machine gun. There, he lies prone, facing the position with the tripod in front of him.

2. The assistant gunner places the spare barrel and the heat-protective mitten in the spare barrel case. Before standing, he closes the spare barrel case just enough to hold the spare barrel and the T&E mechanism. He moves 10 steps to the rear of the position and lies prone, facing the position. At this time, he fully closes the spare barrel case.

3. The gunner must--

a. Place the stock on the ground and ensure that the bolt is to the rear

b. Place the safety on "S" and raise the feed cover.

c. Remove the ammunition from the tray, puts it into the bandoleer, and close the bandoleer.

d. Examine the chamber to ensure that it is clear

e. Close the feed cover and pull the cocking handle to the rear.

f. Put the safety on "F" and pull the trigger slowly, while gently easing the bolt forward.

g. Stand and pivots on his right foot

h. Without turning the machine gun, raise it to his left hip and move five steps to the rear.

i. Look to ensure that the ammunition bearer and assistant gunner are in their positions.

j. Lie prone, facing the position with the machine gun on your right.

k. Fold the bipod legs alongside the barrel and report "Up" to the squad leader.

Check on Learning:	What are your questions on the bipod crew drills?
Review Summary:	Having discussed the bipod firing crew drills, we will now turn our attention to the tripod firing crew drill.

ELO F - LSA 5. Learning Step / Activity ELO F - LSA 5. Tripod Fire Drills.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 15 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

A. INSPECTION FOR TRIPOD FIRE

1. Inspecting equipment for tripod training is the same as for bipod training, except the command that the leader's command is, "INSPECT EQUIPMENT BEFORE FIRING TRIPOD".

a. The gunner inspects the tripod legs, and then folds them to their position alongside the barrel.

PLACEMENT INTO ACTION (TRIPOD)

A. The leader commands and signals, "MACHINE GUN TO BE MOUNTED HERE, FRONT, ACTION".

B. Placement of machine gun into action.

1. Upon the command "ACTION", the ammunition bearer stands, holds the tripod with his right hand, and moves forward to the position. He kneels on his right knee and rests the shoes of the rear tripod legs on the ground, with the mount in a vertical position. Steadying the mount with his right hand near the tripod head, he raises the front leg with his left hand. He grasps his right shoe with his right hand and his left shoe with his left hand. Then, he uses his body to raise the tripod chest high. He separates the tripod legs with a quick jerk. Ensuring that the sleeve latch engages the sleeve, he places the tripod on the ground with its front leg pointing in the direction of fire. He rises to his feet and stamps the rear tripod shoes into the ground. He then unslings his bandoleers and places them on line with the front leg of the tripod, one step to the left. He moves 10 meters to the left of the position, unslings his rifle, lies prone, provides security, and prepares to fire into the target area.

2. The assistant gunner times his movements so that he arrives at the position just as the ammunition bearer leaves. The assistant gunner places the spare barrel case (with zippered side facing the tripod) parallel to and on line with the spot where the muzzle of the machine gun is when it is mounted. He lies on his left side, with his hip near the left tripod shoe. He unzips the spare barrel case and removes the spare barrel and the equipment needed to mount the machine gun. He places the spare barrel on the spare barrel case with the muzzle forward.

3. The gunner also times his movements, arriving at the position just as the assistant gunner assumes the prone position. The gunner stands, holds the carrying handle in his left hand and the stock in his right, and raises the gun to the carrying position (muzzle to the front). He mounts the machine gun on the tripod. He then positions the carrying handle to the right to keep it from interfering with aim and fire. Then, he raises the rear sight assembly and lies prone.

4. The assistant gunner helps the gunner mount the machine gun to the tripod. They secure the pintle and T&E mechanism are securely locked in place and working properly.

5. The gunner places the safety on "F," pulls the bolt to the rear, places the safety on "S," and returns the cocking handle to the forward position.

WARNING- BOLT POSITION- In tactical situations, where noise discipline is critical to mission success, carry the M240B with the bolt locked to the rear. Only trained gun crews may load the M240B, and then only on command. In training situations , load and carry the M240B with the bolt forward.

6. The assistant gunner places the first round of ammunition in the tray groove and supports the belt.

7. The gunner closes the cover, takes the correct position and grip, places the safety on "F," and reports "Up."

8. The assistant gunner signals "Ready" to the squad leader.

BARREL-CHANGING PROCEDURES (TRIPOD)

A. When the gunner has reported "Up" and the assistant gunner has signaled "Ready," the leader commands, "CHANGE BARRELS".

1. The gunner ensures that the bolt is to the rear and puts the safety on "S." He also helps the assistant gunner change the barrel, if needed.

2. The assistant gunner (wearing the heat-protective mitten) unlocks the barrel locking lever, removes the barrel, and places the barrel on the spare barrel case. He secures the spare barrel and inserts it into the machine gun. To ensure that it locks to the receiver, he rotates the carrying handle to the right (M240B).

3. The gunner ensures that the barrel is locked and secured in the receiver of the machine gun. He moves the safety lever to "F," assumes the correct firing position, and reports "Up." The assistant gunner signals "Ready" to the squad leader.

REMOVAL FROM ACTION (TRIPOD)

A. At the command, "OUT OF ACTION", the gunner ensures that the bolt is to the rear, places the safety on "S," and raises the cover. The assistant gunner removes the ammunition from the tray, returns it to the bandoleer, and closes the bandoleer. The gunner inspects the chamber to ensure that it is clear; closes the cover; pulls the cocking handle to the rear; puts the safety on "F"; pulls the trigger, easing the bolt forward. The gunner unlocks the rear of the machine gun from the tripod.

1. The assistant gunner helps the gunner in dismounting the rear of the machine gun. He puts the spare barrel and heat-protective mitten into the case and closes it enough to hold the contents. He stands, moves 10 steps to the rear of the position, and lies prone, facing to the front. After receiving all mounting equipment from the ammunition bearer, he puts it in the spare barrel case and fully closes the spare barrel case.

2. After the assistant gunner leaves, the gunner stands, lowers the rear sight, and holds the carrying handle with his left hand. With his right hand, he dismounts the front of the machine gun from the tripod. Holding the stock with his right hand, he pivots to his right as he raises the machine gun to the carrying position. He then moves five steps to the rear of the position and lies prone, facing to the front.

3. The ammunition bearer rises, slings his rifle, moves to the machine gun, and secures his bandoleers, timing his arrival so that the gunner and assistant gunner is clear of the tripod. He grasps the tripod with his left hand and moves five steps to the rear of the position. He turns, facing the front, and kneels on his right knee. He places the tripod in a vertical position with the rear shoes on the ground and supports it with his right hand near the head of the tripod. At this time, he hands the assistant gunner all mounting equipment. He reaches up with his right hand down the right leg, and releases the sleeve latch. He then grasps the shoes and closes the tripod legs. He lowers the tripod to the ground, head to the left, lies prone behind it, and reports, "UP."

Check on Learning: What are your questions on the tripod fire crew drill.

Review Summary: Having discussed the tripod fire crew drill, we will now

discussed advanced training, placing the machine gun into action from the prone.

ELO F - LSA 6. Learning Step / Activity ELO F - LSA 6. Training in the Prone Position.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 5 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

A. PRONE POSITION

1. Machine gun crew drill, as previously described, is an excellent training vehicle. This paragraph discusses the second phase of the crew drill. Train the prone position only to add realism to training.

B. INSPECTING EQUIPMENT BEFORE FIRING

1. The inspection of equipment for crew drill from the prone position is the same as that for bipod training and tripod training.

C. PLACING THE MACHINE GUN INTO ACTION

1. The leader commands and signals the following, just as he does for bipod training. With one exception, training with the bipod is the same crewmembers stay off their feet.
2. They use the low crawl.
3. Once in position, they do everything from the prone position. The command is, "MOUNT THE MACHINE GUN HERE, FRONT, ACTION".

B. TRAINING WITH THE TRIPOD

1. Upon the command, "ACTION".
a. The ammunition bearer crawls forward to the designated position.
b. Extends the front leg of the tripod.
c. Grasping the rear legs firmly, he emplaces the front leg. Applying downward pressure, he emplaces the rear legs. He then crawls to a position about 10-meters to the left of the machine gun and gets into a good firing position with his rifle.
d. The assistant gunner crawls forward, timing his movement to arrive as the ammunition bearer leaves.
e. Positioning himself on the left side and facing the tripod.
f. He places the spare barrel case alongside the tripod, unzips the case, and removes the spare barrel and mounting equipment.
2. The procedures for mounting the machine gun on the tripod remain the same except all are performed in a prone position and all movements are in the low crawl.

C. TAKING THE MACHINE GUN OUT OF ACTION

1. The procedures for taking the machine gun out of action are performed in a prone position and all movements are in the low crawl.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO F - LSA 7. Learning Step / Activity ELO F - LSA 7. Correct Malfunctions.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 15 mins
Instructional Strategy:	Large Group Instruction / Demonstrator
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

A. Malfunctions occur when a mechanical failure causes the weapon to fire improperly. Defective ammunition or improper operation by the gunner is not considered a malfunction. Sluggish operation and uncontrolled fire are the most common malfunction. If cleaning and lubricating the weapon fails to fix the problem, then the gunner turns it in to the unit armorer. Table 3-6 shows malfunctions, their probable causes, and the corrective actions.

B. Uncontrolled Fire (Runaway Gun)

1. Uncontrolled fire (the weapon continues to fire after the gunner releases the trigger). This is usually caused by the gunner’s failure to pull and hold the trigger all the way to the rear. The following are immediate actions for uncontrolled fire:

a. The gunner holds the weapon on target and fires the remaining ammunition.

b. The assistant gunner stops the weapon from firing by breaking the belt of ammunition.

c. The gunner as a last resort pulls the cocking handle to the rear thus, locking the bolt to the rear of the receiver.

C. Stoppages

1. A stoppage is any interruption in the cycle of functioning caused by faulty action of the weapon or faulty ammunition. Stoppages are classified by their relationship to the cycle of functioning.

D. Immediate Action

1. The gunner takes immediate action to reduce a stoppage without seeking the cause. For example, the gunner conducts immediate action when a misfire or cook off occurs. The gunner keeps the weapon on his shoulder while performing immediate action procedures.

2. Definitions:

a. A misfire is the failure of a chambered round to fire. Such failure can be due to an

ammunition defect or faulty firing mechanism.
b. A cook off is the firing of a round due to the heat of a hot barrel and not to the firing mechanism. Cook offs can be avoided by applying immediate action within 10 seconds of a failure to fire.

E. Immediate Action Drill
1. Grasp the cocking handle (palm up) and pull it to the rear.
2. Look at the ejection port to see if a cartridge case, belt link, or round is ejected.
a. If nothing is ejected:
1. Lock the bolt to the rear.
2. Return the cocking handle forward.
3. Place the safety to "S" and proceed to step 2 or 3 to take remedial action.
b. If a cartridge or round is ejected:
1. Return the cocking handle to the forward position.
2. Aim and fire the weapon at the target.
3. If the weapon does not fire, place the weapon on "S" and proceed to step 2 or 3 to take remedial action.

F. Remedial Action
1. Remedial action is any action taken to determine the cause of a stoppage and to restore the weapon to an operational condition. Do this only if immediate action fails to fix the problem.

G. Remedial Action Drill for a cold weapon (one that has fired less than 200 rounds in two minutes).
1. Ensure cocking handle is forward and weapon is on safe.
2. Keep weapon oriented on target area.
3. Ensure your face is not directly over the feed cover.
4. Raise the feed cover.
5. Remove the belt of ammunition.
6. Inspect for rounds in the chamber.
a. If there are no rounds in the chamber--
1. Reload and attempt to fire at the target.

Note: If the weapon fires, the stoppage has been corrected.

2. If the weapon fails to fire take immediate action (step 1).
3. If the weapons still fails to fire, clear the weapon.
4. Disassemble and inspect the weapon.
5. Clean, lubricate, and replace damaged or missing parts, as required.
b. If a cartridge is in the chamber:
1. Close the cover.
2. Attempt to fire.
3. If the weapon fires, reload and continue mission.

4. If the weapon does not fire, continue to next step.
5. Lock bolt to the rear.
6. Remove the barrel and remove the cartridge from the chamber using a cleaning rod.
7. Insert the cleaning rod through muzzle end of barrel and gently tap out cartridge.
8. Clear the weapon.
9. Disassemble and inspect the weapon and ammunition.
10. Clean, lubricate, and replace damaged or missing parts, as required.
11. Load and attempt to fire.
12. If weapon fails to fire, turn in for maintenance.

H. Take remedial action on a hot weapon (one that has fired more than 200 rounds in two minutes).
1. If nothing was ejected when you applied immediate action--
a. Ensure cocking handle is forward and weapon is on safe.
WARNING - During training, wait 15 minutes before applying remedial action. During combat, wait 5 seconds before applying remedial action because of the possibility of a "hang fire" or "cookoff". You can also change barrels, reload, and continue firing.
b. Keep weapon oriented on target area WITH COVER CLOSED.
c. Wait 15 minutes.
d. Clear the weapon and perform remedial action for cold gun (step 2).
2. If a cartridge or round is ejected--
a. Return the cocking handle to the forward position.
b. Aim and fire the weapon at the target.
c. If the weapon does not fire--
1. Clear the weapon.
2. Disassemble and inspect the weapon.
3. Clean, lubricate, and replace damaged or missing parts, as required.
4. Load and attempt to fire.
5. If weapon fails to fire, turn it in for maintenance.
I. Sluggish Operations
1. Sluggish operation is due to excessive friction caused by carbon build-up, improper lubrication, or burred parts.
2. Corrective action includes:
a. Cleaning
b. Lubricating
c. Inspecting
e. Replacing worn parts
3. The gunner may adjust the gas regulator to maintain the rate of fire until he has a chance to clean the machine gun.
J. Stuck Barrel
1. Stuck barrel is the result of the machine gun crew not properly cleaning the gas cylinder and gas regulator plug. During training or range firing, clear, disassemble, and clean the M240B immediately. In combat, clean it as soon as possible. If they cannot

properly clean the weapon in these situations, then the gun crew must:

a. Pull the cocking handle to the rear, locking the bolt. Return the cocking handle and place the safety on “S.”

b. Place the weapon on the ground or away from his face and open the cover, and then perform the four-point safety check.

c. (Gunner only) ensure that the barrel is still locked to the receiver with the carrying handle to the right.

d. (Assistant gunner only) place the heat protective mitten on your right hand and remove the gas regulator collar from the barrel, which is secured to the receiver.

e. With the gas regulator collar removed, remove the barrel (Section II).

f. (Assistant gunner only) After removing the barrel, remove the gas regulator collar and gas regulator plug from the spare barrel.

g. Insert the barrel into the socket of the receiver. Ensure that the gas regulator plug is going into the gas hole bushing.

h. (Assistant gunner only) Once the barrel is secured to the receiver, secure the gas regulator collar on the gas regulator plug.

i. (Gunner only) After ensuring the barrel is secured to the receiver (2 to 7 clicks) and the collar is secure, reload and continue firing.

Check on Learning: What are your questions concerning correcting malfunctions of the M240B Machine Gun?

Review Summary: We have discussed crew drills and immediate actions drills are there any questions?

CHECK ON LEARNING (ELO F): Conduct a check on learning ask students questions and correct misunderstandings.

REVIEW SUMMARY(ELO F): Conduct a review and summarize the ELO.

G. ENABLING LEARNING OBJECTIVE

ACTION:	Discuss TTPs / Lessons Learned.
CONDITIONS:	As a small unit leader in a platoon, in a classroom environment, Instructor, block of instruction, FM 3-22.68, FM 3-21.8, and a requirement to participate in classroom discussion.
STANDARDS:	Discuss TTPs/Lessons Learned.

ELO G - LSA 1. Learning Step / Activity ELO G - LSA 1. TTPs/Lessons Learned.

Method of Instruction: Conference/Discussion
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Conference
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

TTPs/Lessons Learned

a. Have Instructor discuss most current and relevant information on Tactics, Techniques, and Procedures (TTPs) being used for in the Contemporary Operational Environment (COE) for a group discussion.

b. Individual Soldier experiences are welcome and encouraged.

Check on Learning:	Conduct a check on learning and summarize the learning activity.
Review Summary:	Summarize and capture lessons learned.

CHECK ON LEARNING (ELO G):	Conduct a check on learning and summarize the ELO.
REVIEW SUMMARY(ELO G):	Conduct a Summary Review

SECTION IV. SUMMARY

Method of Instruction:	Conference/Discussion
Instr Type(I:S Ratio/Qty):	instructor(1:32/0)
Time of Instruction:	5 mins
Instructional Strategy:	Large Group Instruction

Check on Learning

2. Divide students into working groups. Students must consult with their peers before answering questions posed by the facilitator.

Questions Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.
Question: What is trajectory?
Answer: Trajectory is the path of the bullet in flight.
Question: What is the Maximum Ordinate?
Answer: The maximum ordinate is the highest point the trajectory reaches between the muzzle of the weapon and the base of the target.
Question: What are the classes of fire?
Answer: The machine gun fire is classified with respect to the GROUND, the TARGET, and the WEAPON.
Question: What are four (4) fires with respect to the target?
Answer: Fires with respect to the target includes frontal, flanking, oblique, and enfilade fires.
Question: What are four (4) fires with respect to the weapon?
Answer: Fires with respect to the weapon includes fixed, traversing, searching, and traversing and searching fires.
Question: What are prearranged signals in methods of fire control?
Answer: Prearranged signals are either visual or sound signals such as pyrotechnics or blasts on a whistle. These signals should be included in SOPs and understood by all squad members.
Question: What are the six (6) elements of fire commands for the machine gun?
Answer: The elements of fire commands are ALERT, DIRECTION, DESCRIPTION, RANGE METHOD OF FIRE, AND COMMAND TO OPEN FIRE.
Question: What is the purpose of subsequent fire commands?
Answer: These fire commands are used to make adjustments in direction and elevation, to change rates of fire after a fire mission is in progress, to interrupt fires, or to terminate the alert.
Question: What signal does the gunner use when he is ready to fire?
Answer: The gunner signals that he is ready to fire by raising his right hand and arm above his head toward the leader.
Question: What is the signal for interrupt or cease firing?
Answer: The leader raises his arm and hand, palm outward, in front of his forehead and brings it downward sharply.
Question: What is a point target?
Answer: A point target requires the use of a single aiming point.
Question: What is an area target?

Answer: An area target have considerable width and depth and may require extensive traversing and searching fire.
Question: What are the three (3) rates of fire for a machine gun?
Answer: The three rates of fire are sustained, rapid and cyclic.
Question: What type of fire is used when engaging a deep target?
Answer: When engaging a deep target, the automatic rifleman must use a searching fire.
Question: What is a sector of fire?
Answer: A sector of fire is an area to be covered by fire that is assigned to an individual, a weapon, or a unit.
Question: What is a Final Protective Fire (FPF)?
Answer: An FPF is an immediately available prearranged barrier of fire to stop enemy movement across defensive lines or areas.
Question: What is a Final Protective Line (FPL)?
Answer: An FPL is a predetermined line along which grazing fire is placed to stop an enemy assault.
Question: What is a Principal Direction of Fire (PDF)?
Answer: A PDF is a direction of fire assigned priority to cover an area that has good fields of fire or has a likely dismounted avenue of approach.

Review/ Summary

Summarize the learning objective.

SECTION V. STUDENT EVALUATION

Testing Requirements	This lesson will be informally evaluated using checks on learning.
Feedback Requirements	Feedback is essential to effective learning. Schedule and provide feedback on the assessment and any information to help answer Soldiers' questions about the training exercise.

Appendix A - Viewgraph Masters

Tactical Employment of the M240B MG and M249 SAW weapon systems.
071-SAWE14 / Version 1.0

Sequence	Media Name	Media Type
None		

Appendix B - Test(s) and Test Solution(s)

PRACTICAL EXERCISE(S)/SOLUTION(S) FOR LESSON 071-SAWE14 Version 1.0

PRACTICAL EXERCISE SHEET 071-SAWE14 PE1

Title

Recorded the gun firing data in appropriate space of the data section.

Lesson Number/Title

071-SAWE14 Version 1.0 / Tactical Employment of the M240B MG and M249 SAW weapon systems.

Security Classification

Unclassified

Introduction

Tell the Soldier what is expected of him by reviewing the task standards. Stress to the Soldier the importance of observing all cautions, warnings, and dangers to avoid injury to personnel and, if applicable, damage to equipment.

Motivator

Your ability to accurately complete a range card will greatly assist in your success during engagments during limited visibility operations.

Enabling Learning Objective

NOTE. The instructor should inform the students of the following Enabling Learning Objective covered by this practical exercise. (ELO ELO E)

At the completion of this lesson, you [the student] will:

Action:	Prepare a Range Card for a Machine Gun.
Conditions:	As a gunner, in a defensive fighting position, given a tripod-mounted machine gun with a traversing and elevation (T&E) mechanism, an assigned primary sector of fire with recognizable targets (either a FPL [final protective line] or PDF [principal direction of fire]), a secondary sector of fire with recognizable targets, blank DA Forms 5517-R, Standard Range Card, a pencil, a lensatic compass, and a map of your assigned sector of fire.
Standards:	Complete the marginal information on the standard range card, sketch the primary sector of fire, develop the sketch for the primary sector of fire, record the gun firing data, sketch the secondary sector of fire, label the dead space, record the position of the machine, make a duplicate range card, and prepare alternate and supplementary positions.

Safety Requirements

In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Risk Assessment Level	None
Environmental Considerations	**NOTE:** Instructor should conduct a Risk Assessment to include Environmental Considerations IAW FM 3-100.4, Environmental Considerations in Military Operations, Appendix G, and ensure students are briefed on hazards and control measures. Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects.
Evaluation	Grade the Soldiers using the task performance measures. Retrain Soldiers who do not receive a GO. Re-test Soldiers until they achieve a GO.
Instructional Lead-in	Tell the Soldier what is expected of him by reviewing the task standards. Stress to the Soldier the importance of observing all cautions, warnings, and dangers to avoid injury to personnel and, if applicable, damage to equipment.
Resource Requirements	*Instructor Materials:* See the lesson plan resources. *Student Materials:* See the lesson plan resources.
Special Instructions	Provide the Soldier with the equipment and/or materials described in the conditions statement.
Procedures	Break the students down into 8 man groups, have each group cover down on one machine gun. One Instructor will grade each student individually.
Feedback Requirements	Feedback is essential to effective learning. Schedule and provide feedback on the assessment and any information to help answer Soldiers' questions about the training exercise.

SOLUTION FOR
PRACTICAL EXERCISE 071-SAWE14 PE1

1. Completed the marginal information located at the top and center of the standard range card.
2. Sketched the primary sector of fire using either an FPL or PDF.
3. Developed the sketch for the primary sector of fire.
4. Recorded the gun firing data in appropriate space of the data section.
5. Sketched the secondary sector of fire.
6. Labeled the area between the primary and secondary sectors as dead space.
7. Recorded the position of the machine gun.
8. Made a duplicate copy of the range card.
9. Prepared range cards for alternate and supplementary positions.

PRACTICAL EXERCISE SHEET 071-SAWE14 PE2

Title

Crew Drill and Remedial Action PE.

Lesson Number/Title

071-SAWE14 Version 1.0 / Tactical Employment of the M240B MG and M249 SAW weapon systems.

Security Classification

Unclassified

Introduction

Tell the Soldier what is expected of him by reviewing the task standards. Stress to the Soldier the importance of observing all cautions, warnings, and dangers to avoid injury to personnel and, if applicable, damage to equipment.

Motivator

Crew drill are the essential base task that must be mastered to ensure the machine gun teams success on the battlefield.

Enabling Learning Objective

NOTE. The instructor should inform the students of the following Enabling Learning Objective covered by this practical exercise. (ELO ELO F)

At the completion of this lesson, you [the student] will:

Action:	Perform machine gun crew drills.
Conditions:	In a field environment given all PPE, a machine gun, tripod, T&E, and pintle.
Standards:	Perform individual crew drill actions to place the gun into operation, take the gun out of action, and react to malfunctions as the machine gunner, assistant machine gunner, and ammo bearer for both bipod firing and tripod firing situations.

Safety Requirements

In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Risk Assessment Level

None

Environmental Considerations

NOTE: Instructor should conduct a Risk Assessment to include Environmental Considerations IAW FM 3-100.4, Environmental Considerations in Military Operations, Appendix G, and ensure students are briefed on hazards and control measures.

Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects.

Evaluation	Grade the Soldiers using the task performance measures. Retrain Soldiers who do not receive a GO. Re-test Soldiers until they achieve a GO.
Instructional Lead-in	Tell the Soldier what is expected of him by reviewing the task standards. Stress to the Soldier the importance of observing all cautions, warnings, and dangers to avoid injury to personnel and, if applicable, damage to equipment.
Resource Requirements	*Instructor Materials:* See the lesson plan resources. *Student Materials:* See the lesson plan resources.
Special Instructions	Provide the Soldier with the equipment and/or materials described in the conditions statement.
Procedures	Break the students down into 3 man groups, have each group cover down on one machine gun. One Instructor will grade each team.
Feedback Requirements	Feedback is essential to effective learning. Schedule and provide feedback on the assessment and any information to help answer Soldiers' questions about the training exercise.

SOLUTION FOR
PRACTICAL EXERCISE 071-SAWE14 PE2

1. Placed the gun into operation for bipod fire.

2. Placed the gun into operation for tripod fire.

3. Took the gun out of operation.

4. Demonstrated immediate action procedures.

5. Demonstrated remedial action procedures.

6. Demonstrated procedures to correct a run away gun.

Appendix D - Student Handouts

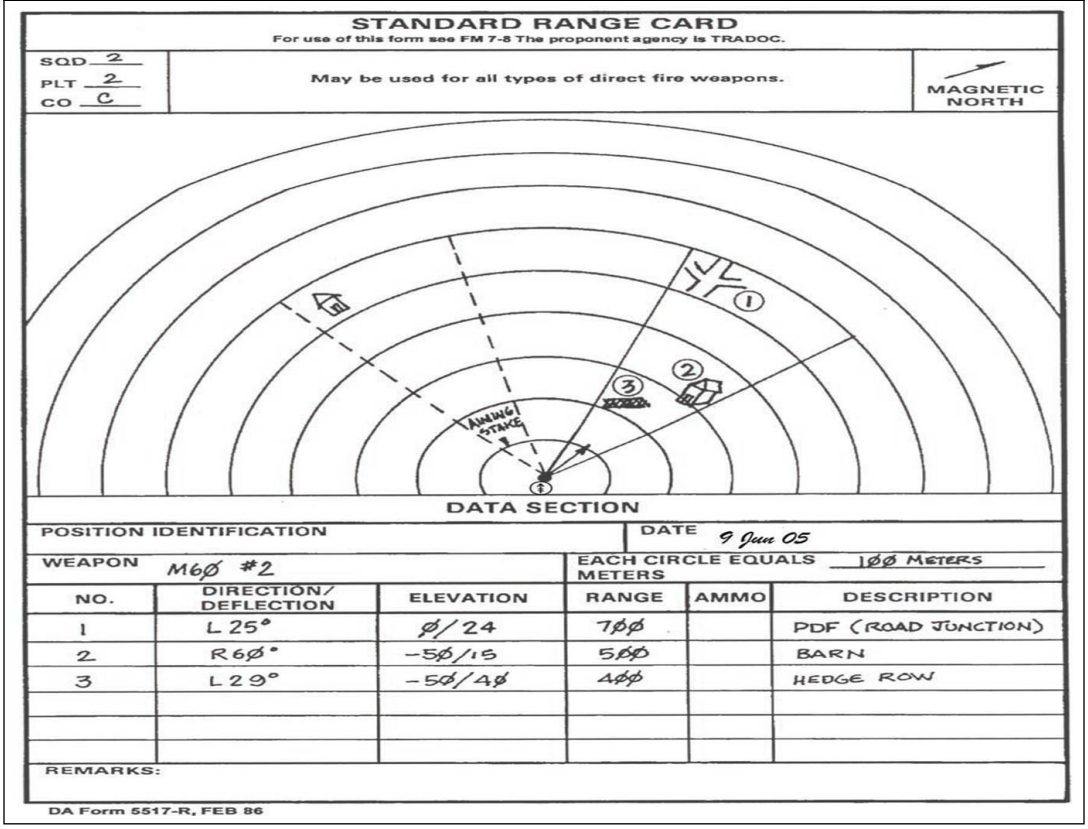
Tactical Employment of the M240B MG and M249 SAW weapon systems.
071-SAWE14 / Version 1.0

Sequence	Media Name	Media Type
0	Range Card with PDF.	JPEG
0	Range Card with FPL	JPEG
0	Range Card Marginal Information.	JPEG
0	Sector of Fire with PDF (left) and FPL (right).	JPEG
0	Marginal Information and Sector Skethch using a PDF.	JPEG
0	Data Section, Gun Firing Data	JPEG
0	Data Section with Remarks Added.	JPEG
0	Picture of Elevation Handwheel.	JPEG

For ELO E(0): Image "Range Card with PDF."

Subtitle: Not Entered

Description: Not Entered



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 9 Jun 05

WEAPON M60 #2 | EACH CIRCLE EQUALS 100 METERS

NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1	L 25°	0/24	700		PDF (ROAD JUNCTION)
2	R 60°	-50/15	500		BARN
3	L 29°	-50/40	400		HEDGE ROW

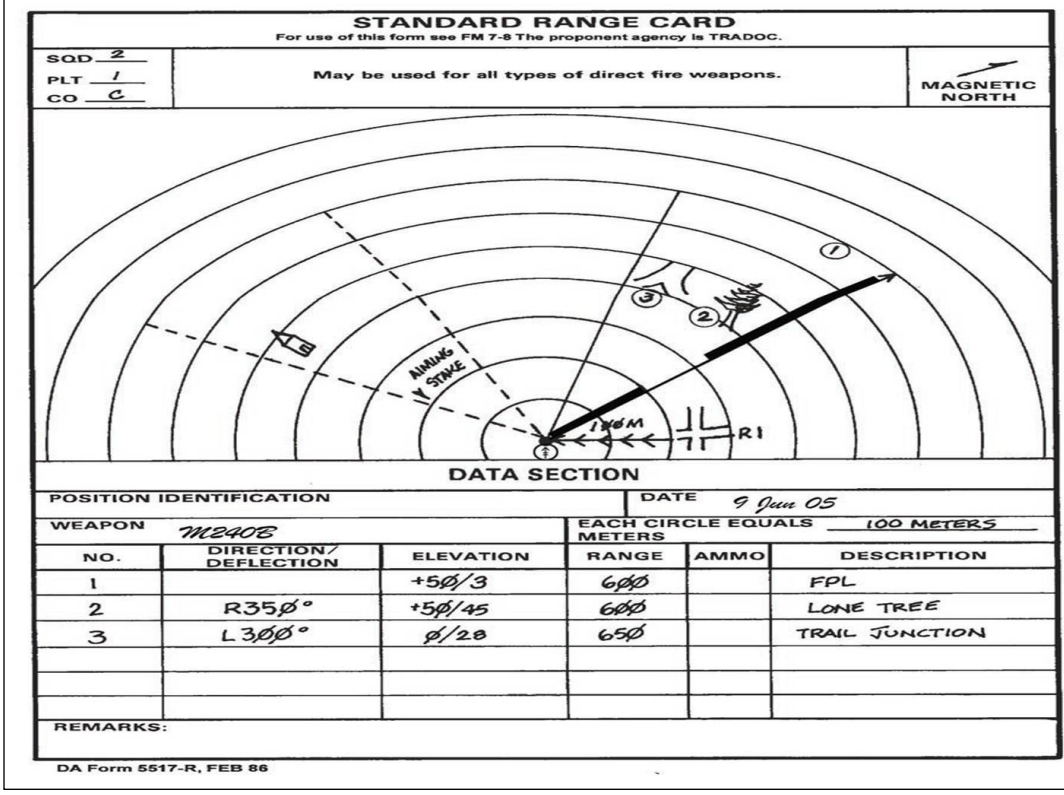
REMARKS:

DA Form 5517-R, FEB 86

For ELO E(0): Image "Range Card with FPL"

Subtitle: Not Entered

Description: Not Entered



STANDARD RANGE CARD

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

SQD 2 PLT 1 CO C

May be used for all types of direct fire weapons.

MAGNETIC NORTH

AIMING STAKE

1 KM

R1

DATA SECTION

POSITION IDENTIFICATION | DATE 9 Jun 05

WEAPON M240B | EACH CIRCLE EQUALS METERS 100 METERS

NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1		+5Ø/3	6ØØ		FPL
2	R35Ø°	+5Ø/45	6ØØ		LONE TREE
3	L3ØØ°	Ø/28	65Ø		TRAIL JUNCTION

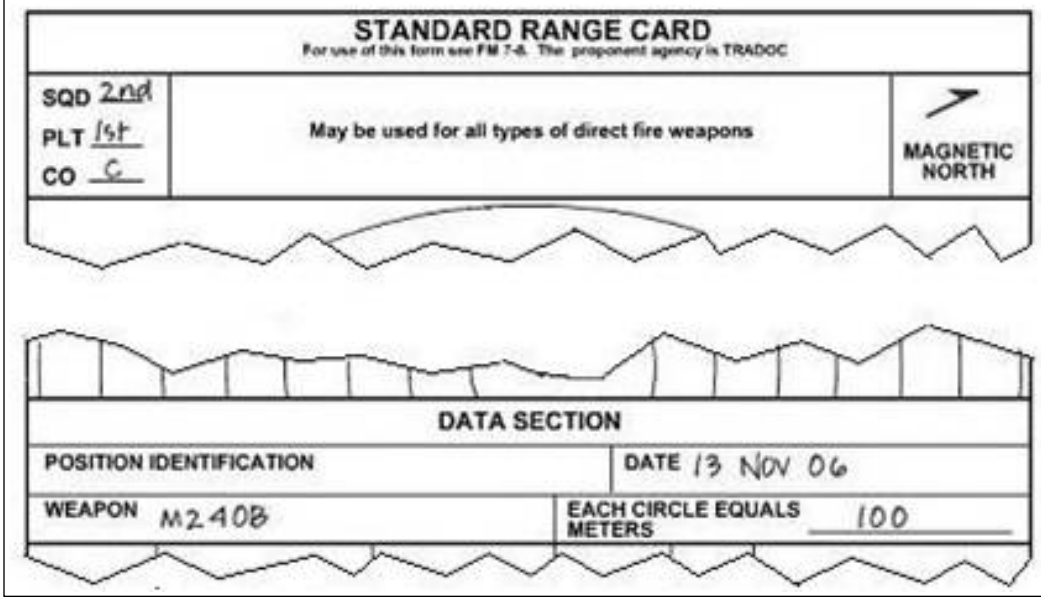
REMARKS:

DA Form 5517-R, FEB 86

For ELO E - LSA 1(0): Image "Range Card Marginal Information."

Subtitle: Not Entered

Description: Not Entered



STANDARD RANGE CARD

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

SQD 2nd PLT 1st CO C

May be used for all types of direct fire weapons

MAGNETIC NORTH

DATA SECTION

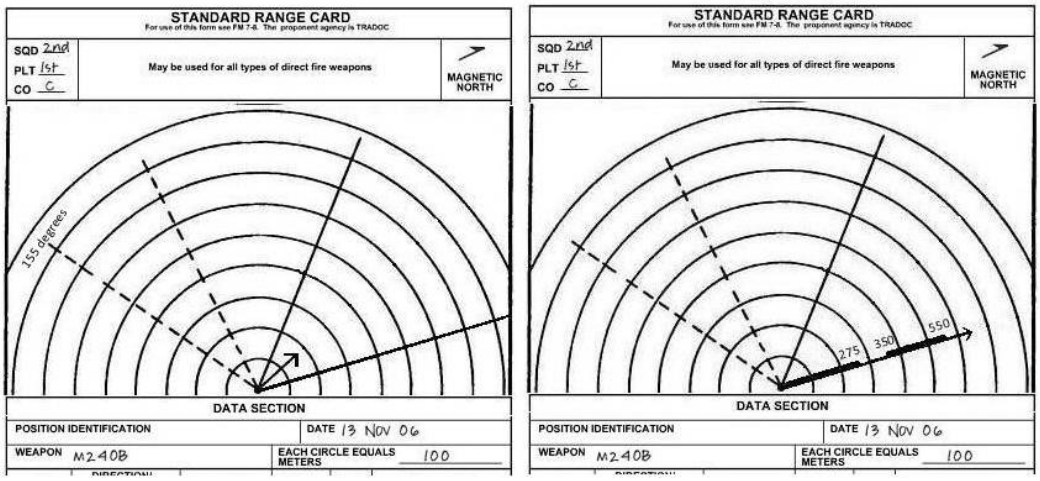
POSITION IDENTIFICATION | DATE 13 NOV 06

WEAPON M240B | EACH CIRCLE EQUALS METERS 100

For ELO E - LSA 2(0): Image "Sector of Fire with PDF (left) and FPL (right)."

Subtitle: Not Entered

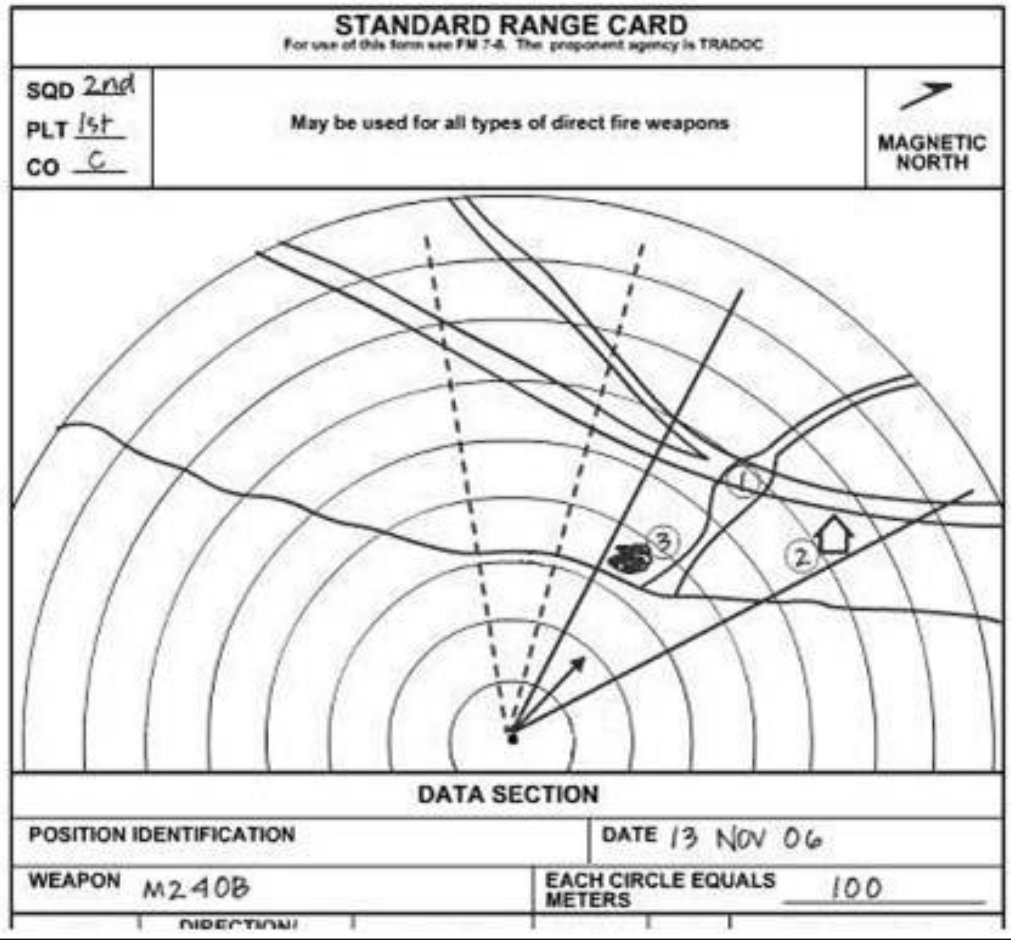
Description: Not Entered



For ELO E - LSA 3(0): Image "Marginal Information and Sector Skethch using a PDF."

Subtitle: Not Entered

Description: Not Entered



For ELO E - LSA 4(0): Image "Data Section, Gun Firing Data"

Subtitle: Not Entered

Description: Not Entered

DATA SECTION

POSITION IDENTIFICATION			DATE 13 NOV 06		
WEAPON M240B			EACH CIRCLE EQUALS METERS 100		
NO	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1	L035°	0/25	575	Ball	PDF (Bridge)
2	R375°	+50/5	625	Ball	Barn
3	L200°	-50/2	375	Ball	Tree line

REMARKS:

For ELO E - LSA 4(0): Image "Data Section with Remarks Added."

Subtitle: Not Entered

Description: Not Entered

DATA SECTION

POSITION IDENTIFICATION PRIMARY POSITION			DATE 20 APRIL		
WEAPON M240 B			EACH CIRCLE EQUALS METERS 100		
NO.	DIRECTION/ DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
1	L	+50/3	550		FPL
2	R275	+50/15	525		BARN
3	L102	0/28	425		ROAD JUNCTION
4	L370	0/12	375		BOULDER

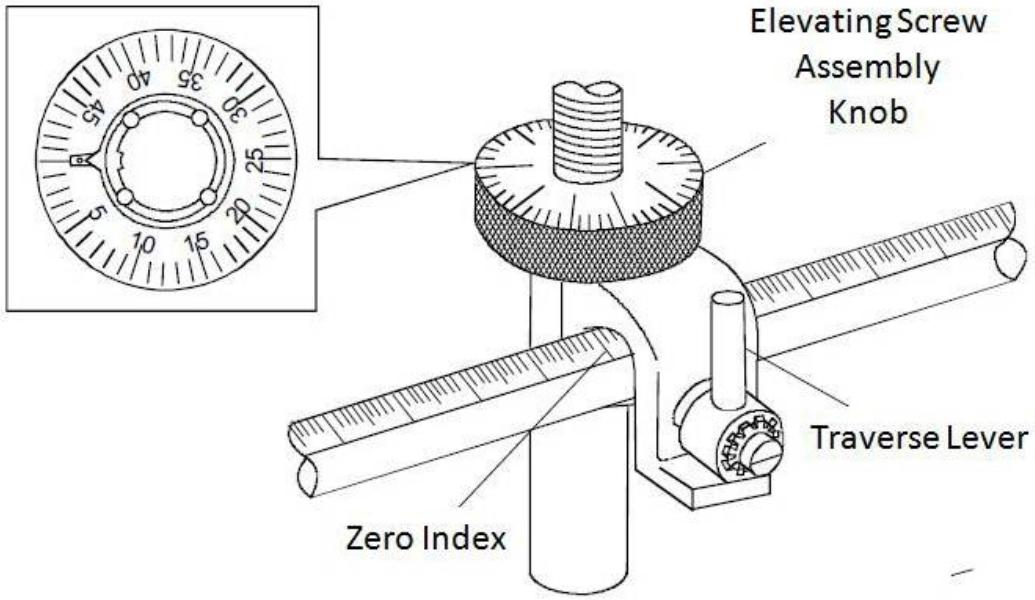
REMARKS: ① -4
③ TW 15 / L8

DA FORM 5517-R, FEB 1986

For ELO E - LSA 4(0): Image "Picture of Elevation Handwheel."

Subtitle: Not Entered

Description: Not Entered



Tactical Employment of the M240B MG and M249 SAW weapon systems.

071-SAWE14 / Version 1.0

Effective Date: 08 March 2013

1. The importance of this lesson: (Why)

Employ Infantry Platoon Machine Guns.

2. What we want our Soldiers to Achieve: (Outcomes/Standard)

Develop the ability to control Platoon Weapon Systems in accordance with 3-21.8 and 3-22.68.

3. Tasks to be taught

Task Number	Task Title	Task Type
071-000-0005	Prepare a Range Card for a Machine Gun	Individual TAUGHT
071-025-0008	Construct a Fighting Position for an M240B Machine Gun	Individual SUPPORTED
071-025-0022	Engage Targets with an M240B Machine Gun Using an AN/PAS-13 Thermal Weapon Sight	Individual REINFORCED
071-025-0026	Engage Targets with an M240B Machine Gun Using an AN/PAQ-4 Series Aiming Light	Individual REINFORCED
071-025-0030	Engage Targets with an M240B Machine Gun Using an AN/PEQ-2A-Series Aiming Light	Individual REINFORCED
071-326-5770	Prepare a Platoon Sector Sketch	Individual SUPPORTED
071-025-0038	Engage Targets with an M240B Machine Gun using an AN/PEQ-15 Aiming Light	Individual REINFORCED
071-326-5771	Prepare a Squad/Section Sector Sketch	Individual SUPPORTED
071-COM-0608	Use Visual Signaling Techniques	Individual TAUGHT
071-025-0005	Correct Malfunctions of an M240B Machine Gun	Individual TAUGHT
07-3-9013	Conduct Action on Contact	Collective SUPPORTED
07-3-1333	Knock Out a Bunker	Collective SUPPORTED
07-3-9018	Enter and Clear a Building (Section-Platoon)	Collective SUPPORTED
07-3-9020	Establish a Patrol Base	Collective SUPPORTED
07-3-9021	Clear a Trench Line	Collective SUPPORTED
07-2-3000	Conduct Support by Fire (Platoon-Company)	Collective SUPPORTED
07-2-9003	Conduct a Defense (Platoon-Company)	Collective SUPPORTED
07-3-1072	Conduct a Disengagement (Section-Platoon)	Collective SUPPORTED

Additional Non-Standard Tasks

None

4. References:

Reference Number	Reference Title	Date
DA FORM 5517-R	STANDARD RANGE CARDS (LRA)	01 Feb 1986
FM 3-21.8	THE INFANTRY RIFLE PLATOON AND SQUAD	28 Mar 2007
FM 3-22.68	Crew-Served Machine Guns, 5.56-MM and 7.62-MM	21 Jul 2006

Additional Non-Standard References

Unit Marksmanship SOP

Unit Tactical SOP

5. Resources

TIME: Time of Instruction (Time not specified)

LAND: Classroom, Training Area, and Range Requirements

Id	Name
17120-1200-16	GEN INST BLDG, 1200 SF, 16 PN

AMMO: Ammunition Requirements

DODIC	Name
None	

MISC: Materiel Items and TADSS Requirements

Id	Name
0000-00-0.C63317	COMPASS LENSATIC
1005-00-557-4621	Elevation Mechanism
113-00-000-C110	Proxima C110 CDW Projector
5895-01-540-4543	Computer, Laptop
6730-00-933-4871	Screen, Projection
7520-00-079-2406	EASEL,DISPLAY AND TRAINING

(Note: Asterisk before ID indicates a TADSS.)

Additional Non-Standard Resources

None

6. A possible technique to achieve the outcome:

None

7. Conduct AAR with Soldier and Cadre.

AAR's are essential to ensure the quality of the instruction and the efficiency of the course.
Schedule AAR's with Instructors to solicit feedback on the techniques and procedures in use.
Schedule AAR's with the Student's to solicit feedback on Instructional techniques, information being presented, and efficiency of the course.

NOTE: Before presenting this lesson, Instructors must be thoroughly prepared by studying the appropriate lesson plan and identified reference material.