



National Défense
Defence nationale

B-GL-393-010/FP-001

THEORY OF ARMOURED GUNNERY

PART IV

COYOTE/LAV III APPLICATION OF FIRE

(ENGLISH)

WARNING

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FOREWORD

1. B-GL-393-010/FP-001, *Armour, Theory of Armoured Gunnery, Part 4, Coyote/LAV III Application of Fire*, is issued on the authority of the Chief of the Land Staff.
2. B-GL-393-010/FP-001 is effective on receipt and supersedes all previous editions.
3. Suggestions for changes to this publication shall be forwarded through normal channels to the Armour School, Attention IG Stds Cell.
4. Unless otherwise noted, masculine pronouns apply to both men and women.

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CHAPTER 1 GENERAL PRINCIPLES

SECTION 1 GENERAL

INTRODUCTION

1. Techniques of shooting provide drills to assist crews in the application of fire from their armoured fighting vehicle (AFV). The techniques also take into account the various factors affecting the weapon system under specific engagement conditions. Whenever possible, techniques are standardized and follow a set pattern.
2. Continuous development and improvement tends to introduce further techniques for crews to learn. However, if the basic principles are understood, crews should have little difficulty in operating the weapons efficiently. Frequent review and practice on the Light Armoured Vehicle Crew Gunnery Trainer (LAV CGT) and open range will help in maintaining a high standard of proficiency.

AIM

3. The aim of this publication to describe the application of fire and the techniques of shooting from COYOTE/LAV III.

SCOPE

4. Section 2 of this chapter deals with the general principles which apply to all techniques used with COYOTE/LAV III. Subsequent chapters describe the individual techniques for each type of weapon and ammunition and conclude with example fire orders.

ASSOCIATED PUBLICATIONS

5. The following publications are related to and should be read in conjunction with this manual:

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- a. B-GL-304-003/TS-001, *Operational Training, Volume 3, Ranges and Training Safety*;
- b. C-71-339-000/MB-001, *Operating Instruction Turret, Combat Vehicle, Light Armoured Vehicle*
- c. B-GL-305-009/PT-001, *Armour, Volume 9, Theory of Armoured Gunnery, Part 1, General*;
- d. C-71-339-000/MD-001, *Turret Equipment Description, Turret, Combat Vehicle (LAV) Reconnaissance (RECCE)*,
- e. B-GL-305-013/PT-001, *Armour, Volume 13, Armour Open Range Practices*.

SECTION 2 GENERAL PRINCIPLES

BASIC TECHNIQUES AND VARIATIONS

6. There are three basic techniques of shooting which can be applied from COYOTE/LAV III and with each basic technique there are a number of variations. The basic techniques are:

- a. Main Armament direct shooting (static targets);
- b. coaxial machine-gun and pintle-mounted (MG) shooting; and
- c. shooting at moving targets and while on the move.

7. Variations to these techniques depend on the range to the target and whether or not the gunner can see the target. The reason for not seeing it could be:

- a. inconspicuous target;
- b. conditions of poor visibility; or
- c. damaged gunner's sight.

ENGAGEMENT PROCEDURE

8. The basic principles of shooting are described in B-GL-305-009/PT-001, Theory of Armoured Gunnery, Part 1, General. An engagement follows a pattern described below:

- a. **Manoeuvre the AFV into its Observation/Fire Position.** Although the Commander directs the AFV, a skilled driver can be of great assistance when taking up a position;
- b. **Spotting and Identifying the Target.** This is mainly the responsibility of the commander, although the other members of the crew must assist him whenever possible. High standards of visual and AFV recognition training are needed;
- c. **Determining the Range to the Target.** This may be done either using an aid such as a laser range finder or map, or it may be estimated by the commander.
- d. **Choice of Weapon/Ammunition and Technique.** The type of target, the range to it and type of result required will determine the choice of weapon/ammunition and technique;
- e. **Fire Orders.** A glossary of terms used in Crew Drills is included in B-GL-305-009/PT-001. All fire orders for direct fire engagements contain the following information and are given in the following order:
 - (1) **Weapon/Ammunition Designator.** “SABOT”, “COAX”, “FRANG”;
 - (2) **Range.** Initial range is given in metres, e.g., “ONE TWO HUNDRED”;
 - (3) **Target Description:**

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- (a) Targets are described as briefly as possible using the standard target descriptions used in B-GL-305-009/PT-001, *Theory of Armoured Gunnery, Part I, General*, e.g., “ANT”, “BMP”, etc. Inconspicuous targets will require a more precise target description and a more accurate lay.
 - (b) Once the gunner has identified the target, he informs the commander by reporting “ON”.
 - (c) If the target is moving or the vehicle is firing on the move, the direction of aim-off is ordered after gun alignment.
- (4) **Alignment of the Gun.** The commander has the capability to align the gun using his controller and sight. He may also direct the gunner on for line by ordering him to traverse left or right, using the following commands:
- (a) “TRAVERSE LEFT/RIGHT”—gunner traverses quickly;
 - (b) “TRAVERSE STEADY LEFT/RIGHT”—gunner traverses slowly;
 - (c) “STEADY”—gunner slows down from fast to slow traverse; and
 - (d) “ON”—gunner stops traversing;
- (5) **The Order to Fire.** The commander gives this by ordering “FIRE”;

f. **Gun Laying**

- (1) In all cases during direct fire, the correct point of aim is taken by placing the appropriate aiming mark on the centre of the visible mass of the target. Care must be taken not to include shadow as part of the mass.
 - (2) When engaging a moving target, the gunner, having applied his point of aim, must continue to track the target maintaining this correct point of aim at all times. This must be continued while pressing the firing switch.
- g. **Firing.** Once the order to fire has been given and the sight has been laid on the target, the gunner will report “FIRING NOW” and will fire the weapon immediately. The only exception to this rule is when firing on the move or the target disappears behind an obstacle. Here it is permissible to pause after saying “FIRING NOW” if the point of aim is not on the target. The pause for this reason is reported as “WAIT” by the gunner. The gunner will then fire as soon as the correct point of aim is laid on the target. (See Chap 3).
- h. **Observing and Correcting Fire.** Observation and correction of fire is primarily the task of the commander and the gunner, although other crew members may help; and
- i. **Re-laying After Firing.** When the gun has been fired, the commander and gunner must observe the effects of the round. The sight must be re-laid onto the target using the previous point of aim. Corrections required are then applied from this point of aim.

TECHNIQUES OF ENGAGEMENT

9. Techniques of engagement differ according to the type of ammunition and the circumstances of the engagement. Chapters 2 to 4 describe the individual techniques.

CHAPTER 2
SABOT AND FRANG DIRECT SHOOTING

SECTION 1
GENERAL

INTRODUCTION

1. This chapter covers all aspects of Main Armament direct shooting up to 2000 m for FRANG and 2200 for SABOT, under daylight conditions and when using the Thermal sight.
2. The general sequence of events is as follows. The commander determines the range to the target. The gunner, using the ballistic graticule, applies the initial range ordered by the commander and fires. If the target is hit and destroyed, the engagement is stopped. If the target is hit but not destroyed, further rounds may be fired until the target is destroyed. If the first or subsequent rounds miss the target, the gunner applies BOT corrections and reports them to the commander.

CORRECTIONS AVAILABLE TO THE GUNNER

3. All Main Armament direct shooting employs the principle of observation and correction of fire. The gunner observes and corrects his own fire, using the following corrections and limitations:
 - a. Burst on Target (BOT) Correction:
 - (1) line is reported first followed by elevation; and
 - (2) used at all ranges.
4. Should a target be grazed, or when engaging an area target, the gunner may correct to achieve a more-central hit or to distribute his fire. He would report "TARGET LEFT", "TARGET ADD", etc.

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5. The gunner reports all corrections to the commander. Examples are:

- a. "RIGHT";
- b. "LEFT AND DROP";
- c. "RIGHT AND ADD"; or
- d. "TARGET LEFT AND ADD".

CORRECTIONS AVAILABLE TO THE COMMANDER

6. Although the gunner normally corrects for direct fire it may be necessary for the commander to step in and take over the shoot if:

- a. the gunner fails to observe the fall of shot and reports, "NOT OBSERVED"; or
- b. the commander disagrees with the gunner's intended correction.

7. In the cases above, the commander takes over the shoot by ordering "STOP". The commander at this point has different options as to what direction he wants to take. The options the commander has are the following:

- a. The commander can order the corrections he wants carried out by the gunner. At this point the gunner repeats and applies the corrections ordered by the commander.
- b. The commander now has the option of retaining control of the shoot by ordering "FIRE". The commander would continue to report the corrections while the gunner would continue to repeat and apply them but the gunner would not fire until the commander gives the executive to fire;
- c. The commander's other option at this point is to return control of the shoot back to the gunner. He

SABOT and FRANG Direct Shooting

does this by ordering the correction he wants applied and once he is confident the gunner has applied it correctly he orders "GO ON" at this point the gunner would report and apply the corrections himself under the supervision of the commander; and

- d. The commander's last option is to remove the gunner's involvement in the shoot entirely. The commander does this by ordering "MY SIDE" and completes the engagement.

8. The corrections that are available to the commander and their limitations are listed below:

- a. **Commander's Line Correction.** This is measured with the sight or binoculars and is applied to the gunner's sight using the mil scale in his sight. The maximum allowed correction is 30 mils.
- b. **Commander's Elevation Correction.** This is the initial correction which may be of add or drop 1 or 2 dots.
- c. **Target Size Corrections.** The following limitations apply:
 - (1) maximum of three target widths for line;
 - (2) maximum of one target height for elevation; and
 - (3) one-half target corrections may be used only if the target has been struck.
- d. **Commander's Combined Correction.** The commander may use any combination of the above with the same limitations.

9. Examples of commander's corrections are:

- a. "STOP, LEFT ONE TARGET, GO ON/FIRE";

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- b. “STOP, RIGHT TWO TARGETS, ADD ONE TARGET, GO ON/FIRE”;
 - c. “STOP, DROP ONE DOT, GO ON/FIRE”; and
 - d. “STOP, DROP ONE TARGET, GO ON/FIRE”.
10. In the interest of speed, the commander should use target size corrections for line.
11. It is particularly important that commanders be alert to the need to step in and take over the shoot, particularly when the initial range is estimated. Ammunition may be wasted by "creeping" onto the target unless the commander steps in and orders a bold correction.
12. Commanders are cautioned however, not to over control their gunners as direct fire is usually best corrected by the gunner.

GUNNER’S RESPONSES

13. The gunner having fired a round, has four possible responses:
- a. “TARGET”, if the target has been struck;
 - b. “WRONG LAY”, if at the time of firing the gunner realized the lay was incorrect, due to inadvertent turret or target movement;
 - c. “NOT OBSERVED”, if the gunner cannot observe the fall of shot; and
 - d. The intended correction, followed by “FIRING NOW”.

COMMANDER’S RESPONSES

14. The commander’s possible responses are:
- a. “STOP”;

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- b. “GO ON”;
- c. “FIRE”;
- d. “REPEAT”;
- e. “MY SIDE”; and
- f. “TARGET STOP”.

MAXIMUM EFFECTIVE RANGES

15. The ballistic graticule is graduated to 2000 m for Frang and 2400 m for Sabot. The maximum engagement range with Frang is 2000 m and the maximum engagement range with Sabot is 2200 m.

SECTION 2 TECHNIQUES OF FIRE—DAY SIGHTS LASING TECHNIQUES

SITUATION

16. The commander wishes to engage a stationary target with the Main Armament with the LRF.

LASER RETURNS

17. The following range limitations are employed when using the LRF:

- a. APFSDS – Min R – 2400 m; and
- b. FAPDS – Min R – 2000 m.

TECHNIQUE

18. The commander gives a fire order "SABOT LASE" designating weapon/ammunition, target description, aligns the gun and reports "ON".

19. The gunner, puts the GUN ARMED switch to ARMED, identifies the target and reports "ON", selects proper ammo (if any ammo changes reports "SECOND ROUND". The gunner lays the laser aiming mark on the centre of the visible mass of the target, fires the laser, reports the nearest hundreds of metres or "Double" and the range to the commander and lays the corresponding aiming mark on the centre of the visible mass of the target.

20. The commander supervises the gunner and checks the range display. If there is a double-range return and the commander disagrees disagrees with the indicated range, his options are:

- a. switch to long range;
- b. switch back to short range if he disagrees with the long range readout;
- c. release;
- d. disregard lased ranges and employ the estimated technique.

21. Upon deciding on his option the commander will issue the executive to fire.

22. The gunner reports "FIRING NOW" and fires a three round burst.

23. The gunner re-lays and observes the fall of shot. If the target is hit, he reports "TARGET". If the commander considers that target is killed he orders "TARGET, STOP". Should the commander consider that, although struck, the target is not killed, the gunner fires additional three-round bursts at the same lay or a corrected point of aim until the commander orders "TARGET STOP".

24. If the target is not struck the gunner will apply an appropriate correction and fire an additional three-round burst at the new point of aim. If the target is still not struck, the gunner will continue this process until the target is struck or the commander orders him to stop. Once the target is struck, the gunner will continue to fire three-round bursts at the same point of aim until ordered to stop by the commander.

SECTION 3 ESTIMATED TECHNIQUE

SITUATION

25. The commander wishes to engage a stationary target with the Main Armament while estimating the range.

- a. 800- 2200 m APFSDS-T; and
- b. 700-2000 m FAPDS-T.

TECHNIQUE

26. The commander gives a fire order designating weapon/ammunition, range, target description, aligns the gun and reports "ON".

27. The gunner, puts the GUN ARMED switch to ARMED, repeats the range, identifies the target and reports "ON", selects proper ammo (if any ammo changes reports "SECOND ROUND". The gunner lays the appropriate aiming mark on the centre of the visible mass of the target and awaits the executive to fire.

28. Commander supervises the gunner and issues the executive to fire.

29. The gunner relays and observes the fall of shot. If the target is struck, the gunner will fire three-round bursts at the same point of aim until ordered to stop by the commander. If the target is not struck the gunner will apply an appropriate correction and fire another single round at the target. If the target is still not struck, the gunner will

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apply an appropriate correction and fire a single round at the target until the target is struck or ordered to stop by the commander. Once the target has been struck, the gunner will continue to fire subsequent three-round bursts at the same point of aim until ordered to stop by the commander.

30. The gunner reports “FIRING NOW” and fires a single round at the target (the gunner does not select single shot on his power controller).

SECTION 4 BATTLE ENGAGEMENT

SITUATION

31. The commander is confronted with a target at close range and wishes to engage with the main armament. The range limitations when employing the Battle Technique are:

- a. APFSDS – 0 – 800 m;
- b. FAPDS – 0 – 700 m; and
- c. HE – 0 – 500 m.

TECHNIQUE

32. The commander gives a fire order, “SABOT BATTLE”, designating weapon/ammunition, target description, aligns the gun and reports “ON”.

33. The gunner puts GUN ARMED switch to ARMED, repeats “BATTLE”, identifies the target and reports “ON”, selects proper ammo (if ammo changes report “SECOND ROUND”, the gunner lays on to the target with the battle aiming mark, awaits the order to fire.

34. The commander supervises the gunner and gives the executive to fire.

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35. The gunner reports “FIRING NOW” and fires a three-round burst.
36. The gunner re-lays and observes the fall of shot. If the target is hit, he reports “TARGET”. If the commander considers that target killed he orders “TARGET, STOP”. Should the commander consider that, although hit, the target is not killed, the gunner fires additional three-round bursts at the same lay or a corrected point of aim until the commander orders “TARGET STOP”.
37. If the target is not hit the gunner reports his intended correction and continues to apply corrections until the target is hit or the commander orders “TARGET STOP”.
38. Observation of the fall of shot at short ranges may be difficult due to obscuration and the short time of flight. Subsequent rounds may be fired at the commander's discretion. Gunner's determination is essential in order to observe fall of shot at the shorter ranges.

SECTION 5 TECHNIQUES OF FIRE—THERMAL SIGHTS

GENERAL

39. The methods used by the commander and gunner to engage targets with the Main Armament using the thermal sights are identical to those employed using the day sights.

DAY MODE

40. When employing the thermal sight during the day all techniques of engagement used by the commander and gunner are the same as when the day sights are used.

NIGHT MODE

41. When employing the thermal sight at night the application of fire is the same as for daylight techniques.

SECTION 6
EXAMPLE FIRE ORDERS

LASING TECHNIQUE

COMMANDER

GUNNER

“FRANG LASE, BMP IN
OPEN... ON”

“ON”, “1400”

“FIRE”

“FIRING NOW”

“TARGET LEFT AND ADD”

“FIRING NOW”

“TARGET DROP”

“FIRING NOW”

“TARGET”

“FIRING NOW”

“TARGET”

“TARGET, STOP”

“GUN SAFE, FIRST,

WIDE, MAIN, 200,

START MODE”

ESTIMATED TECHNIQUE

COMMANDER

GUNNER

“SABOT 2000 BMP IN OPEN
...ON”

“2000 ON”

SABOT and FRANG Direct Shooting

COMMANDER

“FIRE”

“TARGET, STOP”

GUNNER

“FIRING NOW”

“LEFT AND ADD”

“FIRING NOW”

“TGT DROP”

“FIRING NOW”

“TARGET”

“GUN SAFE, FIRST,

WIDE, MAIN 200,

START MODE”

BATTLE TECHNIQUE

COMMANDER

“FRANG BATTLE BTR 60 IN
HEDGE ROW...ON”

“FIRE”

“TARGET, STOP”

GUNNER

“BATTLE...ON”

“FIRING NOW”

“TARGET”

“FIRING NOW”

“TARGET”

“FIRING NOW”

“TARGET”

“GUN SAFE, FIRST,

COMMANDER

GUNNER

WIDE, MAIN, 200,

START MODE”

SECTION 7 MULTIPLE TARGETS

GENERAL

42. Multiple target engagements can be employed when the next target is within the commander’s field of view and easily identifiable. Multiple targets fall into the following two categories:

- a. targets that are at similar ranges; and
- b. targets that are at different ranges.

TARGETS AT SIMILAR RANGES

43. When there are multiple targets at similar ranges, the commander will order the gunner to engage other targets by describing the targets as “NEXT TARGET LEFT/RIGHT, BMP”. This target description signals to the gunner that there is no change in the nature of ammunition being used.

44. During lasing engagements, the laser will be used to confirm the range to the second target.

45. The sequence for the lasing engagement is as follows:

- a. The commander will indicate the technique by ordering “RELEASE”.
- b. After the gunner has identified the target he will report “ON” and will immediately lay onto the target using the laser aiming mark, relase, report the range, and do one of the following:

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- (1) fire, if the commander ordered “GO ON”;
or
 - (2) wait for the commander’s order to fire.
- c. The commander then orders “GO ON” or “FIRE” after the gunner has reported “ON”, and the “RANGE”.
46. During estimated engagements the same point of aim that was used to hit the previous target will be used on the second target. The sequence for all estimated engagements is as follows:
- a. The commander will indicate the technique by issuing a new range in hundreds of metres.
 - b. After the gunner has identified the target he will report “ON” and immediately lay onto the target with the same point of aim that was used to hit the previous target and do one of the following:
 - (1) fire, if the commander ordered “GO ON”;
or
 - (2) wait for the commander’s order to fire.
 - c. The commander then orders “GO ON” or “FIRE” after the gunner has reported “ON”.
 - d. The engagement will continue IAW the estimated technique.

TARGETS AT DIFFERENT RANGES

47. When multiple targets are at different ranges the commander will order the gunner to engage other targets by describing the target as “NEXT TARGET LEFT/RIGHT, BMP” followed by one of the following orders:
- a. “RELEASE”, for a lasing engagement; or

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- b. "THE RANGE IN HUNDREDS OF METRES", for estimated techniques.

48. The sequence for a lasing engagement is as follows:

- a. After the gunner has identified the target he will report "ON", and will immediately lay onto the target using the laser aiming rules, relase, report the range, and do one of the following:
 - (1) fire, if the commander ordered "GO ON";
or
 - (2) wait for the commander's order to fire.
- b. The commander then orders "GO ON" or "FIRE" after the gunner has reported "ON" and the new range.
- c. The engagement will continue IAW the lasing technique.

49. The sequence for an estimated engagement is as follows:

- a. After the gunner has identified the target he will report "ON" and repeat the range, and will immediately lay onto the target, apply the new range, and do one of the following:
 - (1) fire, if the commander ordered "GO ON";
or
 - (2) wait for the commander's order to fire.
- b. The commander then orders "GO ON" or "FIRE" after the gunner has reported "ON".
- c. The engagement will continue IAW the estimated technique.

CHAPTER 3
MACHINE GUN (MG) SHOOTING

SECTION 1
GENERAL

INTRODUCTION

1. The next 7 sections deal with shooting the coaxially mounted MG and the pintle-mounted MG at stationary targets under daylight conditions, in thermal or when using white light or indirect illumination.
2. Direct shooting using the coaxially mounted MG is similar in principle to the technique for firing Main Armament at static targets. This chapter deals with MG shooting against stationary and moving targets under daylight conditions and when using Thermal sights.
3. As with direct Main Armament shooting, the gunner is responsible for observation and correction of fire, with the commander being prepared to step in and order corrections if necessary. The same rules apply for the use of the orders "GO ON" and "FIRE" after a correction by the commander.

MAXIMUM EFFECTIVE RANGES

4. The normal maximum range of engagement is TBO. However, when an MG barrel becomes hot through sustained firing, the tracer will burn out earlier. Accurate observation of fire must be obtained from the fall of shot on the ground. In exceptional circumstances, such as very dry and dusty conditions, the strike of bullets on the ground may be observed at ranges in excess of trace burn-out.

CORRECTIONS AVAILABLE TO THE GUNNER

5. Once the gunner has identified and laid onto the target, he fires a ranging burst when ordered by the commander. If the ranging

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burst is on target, the gunner fires killing bursts as necessary. If the ranging burst misses the target, the gunner applies corrections to hit the target. Under no circumstances will he "hose-pipe" onto the target (by altering line and elevation while firing the MG).

6. Corrections available to the gunner and their limitations:
 - a. Burst on Target Correction;
 - b. line reported first followed by elevation and up to trace burn out is the usual correction.
7. The gunner reports each correction to the commander.
Examples are:
 - a. "RIGHT";
 - b. "ADD"; or
 - c. "LEFT AND DROP".
8. The gunner reports "FIRING NOW" for every burst.
9. Aiming marks are the normal marks equivalent to the range ordered.

CORRECTIONS AVAILABLE TO THE COMMANDER

10. As in Main Armament shooting the commander may step in and order corrections if:
 - a. the gunner reports "NOT OBSERVED"; or
 - b. the commander disagrees with the gunner's intended correction.
11. The corrections available to the commander are similar to Main Armament:
 - a. commander's line correction;

- b. target size corrections; and
- c. commander's combined correction.

12. Once the commander has ordered a correction, he may order "FIRE" if he wants to retain control of the shoot, or "GO ON" if he wants to hand control of the shoot back to the gunner.

LENGTH OF BURST

13. The length of burst depends on the requirement to observe fire during ranging and the desired effect on the target once the range is established. The nature of the ground and visibility will influence the length of burst and, although no rigid rule can be given, the following are guidelines:

- a. **Ranging** (using the standard load of four ball/one tracer (4B/1T):
 - (1) up to trace burn-out - a short burst of two tracer; and
 - (2) beyond trace burn-out - a long burst of four tracer.
- b. **Killing:**
 - (1) Up to trace burn-out:
 - (a) small targets or men gone to ground-a short burst of two tracer; and
 - (b) large targets or men in open -a long burst of four tracer.
 - (2) Beyond trace burn-out killing bursts of 4 trace should be used.

COYOTE/LAV III Application of Fire

- c. **Speculative Fire.** If speculative fire is used on areas likely to conceal enemy positions, a short burst of two tracer should be fired at irregular intervals.

SECTION 2 TECHNIQUES OF FIRE—DAY SIGHTS STATIC TARGET TECHNIQUES

SITUATION

14. The commander wishes to engage a static target with the coaxial machine gun.

TECHNIQUE

15. The commander gives a fire order designating weapon/ammunition, range, target description, aligns the gun and reports “ON”.

16. The gunner puts the GUN ARMED switch to ARMED, repeats the range, selects “COAX”, and identifies the target, reporting “ON”. He lays onto the target with the appropriate aiming mark on his sight graticule and awaits the commander's order to fire.

17. The commander readies the coaxial machine-gun, and reports “READY”, FIRE”.

18. The gunner reports “FIRING NOW” and fires a ranging burst. He observes the trace or fall of shot and, if the target is hit, reports “TARGET”.

19. If the commander considers the target killed he orders “TARGET, STOP”. However, if the commander considers that although hit, the target is not killed, he will remain silent allowing the gunner to fire again at the same lay.

20. If the target is not hit the gunner reports his intended correction and continues to apply corrections until the target is hit or the commander orders “TARGET STOP”.

21. If the commander agrees with the corrections reported he remains silent. If he disagrees he orders "STOP" and then gives his own correction followed by either "FIRE" or "GO ON".
22. If the target is not hit the gunner reports his intended correction and continues to apply corrections until the target is hit or the commander orders "TARGET STOP".
23. The commander agrees with the gunner's corrections, he remains silent, but if he disagrees, he orders "STOP" and gives his own correction followed by either "FIRE" or "GO ON".
24. The gunner, on hearing the command "STOP", re-lays with his last point of aim, repeats the commander's correction, applies it, and, after receiving the order "FIRE" or "GO ON" reports "FIRING NOW" and fires. If the commander does not say "GO ON", the commander will maintain control of the shoot.
25. When engaging more than one target at the same range the commander orders "TARGET...NEXT TARGET RIGHT/LEFT... GO ON/FIRE". The gunner reports "ON" when he identifies the target. He lays on the new target with the same point of aim he used to hit the previous target. He reports "FIRING NOW" and fires.
26. If the new target is outside the gunner's field of view the commander aligns the gun with the new target (or orders the gunner to traverse left or right) and reports "ON". The gunner reports "ON" when he has identified the new target and the commander orders "FIRE/GO ON".
27. The commander ends the shoot by ordering "TARGET, STOP".
28. The gunner, on hearing the command "STOP", relays with his last point of aim. He repeats the commander's correction, applies it, and after receiving the order "FIRE" or "GO ON" reports "FIRING NOW" and fires.
29. If the target is large the gunner must traverse his fire through the target (reporting the direction before firing).

COYOTE/LAV III Application of Fire

30. The commander ends the shoot by ordering “TARGET STOP”.

SECTION 3 TECHNIQUES OF FIRE—THERMAL SIGHTS

GENERAL

31. The methods used by the commander and gunner to engage targets with the coaxially mounted MG using the Thermal Sights are similar to those employed using the day sights up to a maximum of 1000 m.

DAY MODE

32. When employing the Thermal sight during the day, all techniques of engagement used by the commander and gunner are the same as when the day sights are used.

NIGHT MODE

33. When employing the Thermal sights at night the application of fire is the same as for daylight techniques.

SECTION 4 EXAMPLE FIRE ORDERS

MACHINE GUN STATIC TARGET TECHNIQUE

COMMANDER

“COAX 800, MEN IN
OPEN..ON”

“FIRE”

GUNNER

“800...ON”

“FIRING NOW”

“LEFT AND ADD”

COMMANDER

GUNNER

“FIRING NOW”

“TARGET”

“FIRING NOW”

“TARGET”

“TARGET, STOP”

“GUN SAFE, FIRST,

WIDE, MAIN, 200,

START MODE”

**SECTION 5
PINTLE-MOUNTED MACHINE GUN SHOOTING**

GENERAL

34. The principles of firing the pintle-mounted machine gun against ground targets are the same as those with any machine gun. In addition, the pintle-mounted MG may be employed against aerial targets.

CORRECTIONS

35. Corrections will be BOT corrections at all ranges.

LENGTH OF BURSTS

36. **Ground Targets.** The length of ranging and killing bursts against ground targets are the same as listed in Section 1.

37. **Aerial Targets.** Fire against aerial targets does not usually follow the principle of ranging and killing bursts. Normally, continuous fire is directed at a fixed point or with a given lead. Orders

COYOTE/LAV III Application of Fire

to commence and stop firing will come from the commander or an observer.

ENGAGEMENT OF AERIAL TARGETS

38. The more fire which can be directed at aircraft, the better. There are two methods of engagement:

- a. aiming off; and
- b. reference point.

39. **Aiming Off.** The following leads are suggested:

- a. for head-on targets, slightly above the nose of the aircraft;
- b. for fast crossers, one football field length in front; and
- c. for slow crossers, half a football field in front.

40. **Reference Point.** As the aircraft passes a previously named reference point, all guns open fire at a previously selected aiming point. The aircraft therefore runs into a wall of fire.

41. Both of these methods are explained in detail in B-GL-305-009/PT-001, *Part 1, Theory of Armoured Gunnery*.

SECTION 6 PINTLE-MOUNTED MACHINE GUN TECHNIQUE

SITUATION

42. The commander wishes to engage a suitable target with the pintle-mounted MG.

TECHNIQUE

43. The commander wishes to engage a suitable target with the pintle-mounted MG. The gunner, will position himself so as to operate the pintle-mounted MG. He will then ready the MG, press the safety catch to the fire position.

NOTE

The cupola mounted MG may be fired by either the commander or the gunner depending in which direction the weapon is to be deployed.

44. The commander will estimate the range to the target in hundreds of metres.

45. The commander will then describe the target using conventional terms, eg, “ANT”, “MEN”, etc.

46. The commander will indicate direction of the target by one of the following methods:

- a. direction from a reference point in metres; or
- b. direction right or left of the present bearing of the main armament (given by using the clock-ray method).

47. At this time the commander will order an aim-off if the target is moving, eg, “AIM RIGHT”. The gunner will repeat the required aim-off.

48. Once the gunner has identified the target, he will report “ON”, and then lay the gun on to the target or take the ordered aim-off. The commander will then give the executive order to fire. Upon hearing this, the gunner will report “FIRING NOW” and range onto the target using a BOT correction. Once in the target area he will fire killing bursts, reporting “TARGET” each time the burst is on target.

COYOTE/LAV III Application of Fire

49. The commander may indicate fall of shot to the gunner by reporting “LEFT one target or RIGHT one target”, “ADD one target or DROP one target”, by repeating the aim off. Once the commander judges that the target has been neutralized, he will order “TARGET STOP”.

SECTION 7
EXAMPLE PINTLE-MOUNTED MG FIRE ORDER

AERIAL TARGET

50. The Commander wishes to engage a helicopter:

COMMANDER

GUNNER

“MG”

“READY”

“ONE THOUSAND,
HELICOPTER AT THREE
O’CLOCK, AIM RIGHT”

“ONE THOUSAND, ON ...,
AIM RIGHT”

“FIRE”

“FIRING NOW”

“TARGET”

“TARGET STOP”

“MG SAFE”

CHAPTER 4
SHOOTING AT MOVING TARGETS AND WHILE ON THE MOVE

SECTION 1
GENERAL

INTRODUCTION

1. At times it may be necessary to engage targets which are moving or while on the move. In both cases there is the possibility that there may be lateral movement between the AFV and the target. The lateral movement must be dealt with to achieve a hit.
2. This chapter covers shooting at moving targets and shooting while on the move.
3. The 25mm cannon can be employed effectively against aerial threats. Targets such as helicopters and UAV's can be engaged with Frangible ammunition. The techniques of fire used against aerial targets are the same as those used against ground based moving targets.

SECTION 2
SHOOTING AT MOVING TARGETS

INTRODUCTION

4. To hit a target moving laterally it is necessary to aim in front of it or to aim off. The amount of aim-off will differ for each individual target, depending upon speed, time of flight of the projectile and angle of approach. However, a standard aim-off is used since it is not practical to treat each target individually. Corrections are then made, if required, after the initial round has been fired.

RULES FOR AIMING

5. It is the commander's responsibility to decide whether aim-off is to be applied, and if so, in which direction. Two simple rules govern this decision:

- a. To decide whether to aim off or aim on:
 - (1) if more side than front/rear of the target is visible—AIM OFF; or
 - (2) if more front/rear than side of the target is visible—AIM ON.
- b. To decide in which direction to aim off:
 - (1) if traversing RIGHT to keep on target—AIM RIGHT; or
 - (2) if traversing LEFT to keep on target—AIM LEFT.

6. Having made a decision, the commander includes in his fire order the command “AIM LEFT/RIGHT” or “AIM ON”.

7. **Point of Aim.** The correct point of aim is:

- a. **Aim-off Required.** The initial aim-off mark on the centre of the visible mass for coax and aiming leading edge for sabot and frang; and
- b. **Aim-off Not Required.** Central graticule range mark on the centre of the visible mass.

RANGE LIMITATIONS

8. The range limitations for firing at moving targets are:

Shooting at Moving Targets and While on the Move

a. MAIN ARMAMENT:

TECHNIQUE	RANGE	AMMO
Lasing	Min Range – 2200m	APFSDS-T
	Min Range – 2000m	FAPDS-T
	Min Range – 2400m	HEI-T
Estimated – Battle	0 – 800m	APFSDS-T
	0 – 700m	FAPDS-T
	0 – 500m	HEI-T
Estimated – Estimated	800 – 2200m	APFSDS-T
	700 – 2000m	FAPDS-T
	500 – 2400m	HEI-T

b. MG: all cases—tracer burn-out.

CORRECTION OF FIRE

9. To correct onto a moving target, it is especially important that the gunner remember his sight picture in relation to the target itself, and not the background. He must also take extra care in assessing the fall of shot since in most cases the target will have moved before he has completed the assessment, effectively removing his reference point.

10. When using the initial aim-off marks the target will only be hit if it is moving within the speed bracket covered by the aim-off mark (15 - 25 km/h, with a margin either side being given by the length of the target).

11. Corrections available to the commander and gunner are almost the same as those for static targets for both main armament and MG, the only exception being the commander's line correction.

SECTION 3 SHOOTING ON THE MOVE

INTRODUCTION

12. Fire from a moving vehicle can never be as consistently accurate as that from a stationary vehicle.
13. As with shooting at moving targets, when there is lateral movement between the target and the AFV, it is necessary to aim-off. A standard amount of aim-off is used as it is not practical to treat each target or situation individually.

RULES FOR AIMING

14. As with moving targets, it is the commander's responsibility to determine the need and direction of aim-off. Three simple rules are:
- a. To decide whether to aim off or aim on:
 - (1) if the gun is closer to 3 or 9 o'clock ... AIM OFF; and
 - (2) if the gun is closer to 6 or 12 o'clock ... AIM ON.
 - b. To decide in which direction to aim-off:
 - (1) if traversing RIGHT to stay on target ... AIM RIGHT; and
 - (2) if traversing LEFT to stay on target ... AIM LEFT.
15. Having made a decision, the commander includes in his fire order the command "AIM LEFT/RIGHT" or "AIM ON".
16. **Point of Aim.** The correct point of aim is:

Shooting at Moving Targets and While on the Move

- a. **Aim-off Required.** The initial aim-off mark on the centre of the visible mass for coax and leading edge for sabot and frang; or
- b. **Aim-off Not Required.** Central graticule range mark on the centre of the visible mass.

RANGE LIMITATION

17. The maximum range for engaging a target while on the move:

AMMO	BATTLE TECH	ESTIMATED TECH	LASING TECH
SABOT	0-800 m	800-2200 m	Min range – 2200 m
FRANG	0-700 m	700-2000 m	Min range – 2000 m
HEI-T	0-500 m	500-2400 m	Min range – 2400 m

CORRECTION OF FIRE

18. The gunner normally corrects fire. It is important that he notes the sight picture at the time of firing in order that he may evaluate any errors and apply the necessary corrections.

19. Corrections available to the commander and gunner are the same as those for static firing less commander's line correction. Generally speaking the gunner should remember:

- a. if you miss RIGHT ... AIM FURTHER LEFT; and
- b. if you miss LEFT ... AIM FURTHER RIGHT.

20. Should the gunner report "NOT OBSERVED", the commander should order a bold elevation correction (usually a DROP correction) followed by "FIRE/GO ON".

SECTION 4
MAIN ARMAMENT SHOOTING AT MOVING TARGETS

SITUATION

21. The commander wishes to engage a moving target with the Main Armament.

TECHNIQUE

22. The commander gives a fire order designating weapon/ammunition, range, target description and, having aligned the gun, reports "ON". At this time he indicates the direction of aim-off by ordering "AIM LEFT/RIGHT" or "AIM ON" as appropriate.

23. The gunner places the GUN ARMED switch to ARMED, repeats the range, selects proper ammo (if ammo changes reports "SECOND ROUND", identifies the target, reports "ON", and repeats the aim-off. The gunner lays the correct aim-off mark on the target and begins to track, waiting for the order to fire from the commander.

24. The commander supervises the gunner, orders "FIRE".

25. The gunner continues to track the target and, when his lay is correct, reports "FIRING NOW" and fires.

26. The gunner observes the fall of shot, re-lays (continuing to track) and, if the target is hit, reports "TARGET". If the commander considers the target killed he orders "TARGET, STOP". Should the commander consider that, although hit, the target is not killed, allows the gunner to fire again at the same lay or a corrected point of aim until he orders "TARGET STOP".

27. If the target is not hit, the gunner reports his intended correction and continues to apply corrections until the target is hit or the commander orders "TARGET STOP".

28. If the commander agrees with the corrections reported by the gunner, he remains silent. If he disagrees, he orders "STOP" and gives his own correction followed by either "FIRE" or "GO ON".

Shooting at Moving Targets and While on the Move

29. The gunner on hearing the command “STOP”, re-lays with his last point of aim and continues to track the target. He repeats the commander's correction, applies it, and awaits for either the order “FIRE” or “GO ON” and at this time reports “FIRING NOW” and fires.
30. If the target stops moving the commander will order “STOP, AIM ON, GO ON/FIRE”. The gunner, on hearing the order to “AIM ON”, will repeat it and adjust his lay so that all lead is eliminated and his point of aim is on the centre of the visible mass.
31. If the target changes direction, the commander will order “STOP, AIM LEFT/RIGHT, GO ON/FIRE”.
32. The commander ends the shoot by ordering “TARGET, STOP”.

SECTION 5 COAX SHOOTING AT MOVING TARGETS

SITUATION

33. The commander wishes to engage a moving target with the coaxial MG. The range is less than trace burn-out.

TECHNIQUE

34. The commander gives a fire order designating weapon/ammunition, range, target description and, having aligned the gun, reports “ON”. At this time he orders the direction of aim-off.
35. The gunner repeats the range, selects “COAX”, identifies the target, reports “ON” and repeats the aim-off. The gunner lays the correct aim-off mark on to the target and begins to track, waiting for the order to fire.
36. The commander readies the coaxial MG and orders “READY FIRE”.

COYOTE/LAV III Application of Fire

37. The gunner continues to track the target and, when his lay is correct, reports "FIRING NOW" and fires a ranging burst.

38. The gunner observes the trace, re-lays (continuing to track) and, if the target is hit, reports "TARGET". If the commander considers the target killed he orders "TARGET, STOP". However, if the commander considers that, although hit, the target is not killed, he will remain silent, allowing the gunner to fire a killing burst at the same lay.

39. If the target is not hit, the gunner reports his intended correction and continues to apply corrections until the target is hit or the commander orders "TARGET STOP".

40. If the commander agrees with the corrections reported by the gunner, he remains silent. If he disagrees, he orders "STOP" and then gives his own correction followed by either "FIRE" or "GO ON".

41. The gunner, on hearing the command "STOP", re-lays with his last point of aim and continues to track the target. He repeats the commander's correction, applies it, reports "FIRING NOW" and fires.

42. If the target stops, the commander will order "STOP, AIM ON, GO ON/FIRE". The gunner, on hearing the order "AIM ON", will repeat it and adjust his lay so that all lead is eliminated and his point of aim is on the centre of the visible mass.

43. If the target changes direction, the commander will order "STOP, AIM LEFT/RIGHT, GO ON/FIRE".

44. When engaging more than one target at the same range, the commander orders "TARGET ... NEXT TARGET RIGHT/LEFT ... AIM LEFT/RIGHT, ON ... , FIRE/GO ON". The gunner reports "ON" when he identifies the target and repeats the aim-off. He lays onto the target with his previous point of aim, and applies the new aim-off ordered by the commander. He continues to track the target until his lay is correct, reports "FIRING NOW" and fires. The gunner continues to correct his fire until the target is hit or he is ordered to "TARGET STOP".

45. If the new target is outside the gunner's field of view the commander aligns the gun with the new target (or orders the gunner to

Shooting at Moving Targets and While on the Move

traverse left or right) and reports “ON” when he is on. At this time, he orders the direction of aim-off. The gunner reports “ON” when he has identified the target, repeats the aim-off, begins to track and fires when he is ordered to do so and his lay is correct.

46. The commander ends the shoot by ordering “TARGET, STOP”.

SECTION 6 SHOOTING ON THE MOVE

SITUATION

47. The commander wishes to engage a target with coaxial MG fire while on the move. The range is less than trace burn-out.

TECHNIQUE

48. The commander gives a fire order designating weapon/ammunition, range, target description and, aligning the gun, reports “ON”. He then orders the direction of aim-off.

49. The gunner repeats the range, selects “COAX” identifies the target, reports “ON” and repeats the aim-off. He lays onto the target with the correct aim-off mark and begins to track the target.

50. The commander readies the MG and orders “READY FIRE”.

51. The gunner, when his lay is correct, reports “FIRING NOW” and fires a ranging burst.

52. If the target is hit he reports “TARGET”. If the commander considers the target killed he ends the engagement by ordering “TARGET, STOP”. If he considers that, although hit, the target is not destroyed, he remains silent, allowing the gunner to fire successive killing bursts at the same lay.

53. If the target is not hit the gunner reports his intended correction, re-lays and fires ranging bursts until the beaten zone/cone of fire is on the target.

COYOTE/LAV III Application of Fire

54. If the commander agrees with the correction reported by the gunner, he remains silent. If he disagrees, he orders "STOP" and gives his own correction, followed by either "FIRE" or "GO ON".

55. The gunner on hearing the command "STOP" re-lays with his last point of aim and continues tracking. He repeats the commander's correction, applies it, reports "FIRING NOW" and fires.

56. When engaging more than one target at the same range, the commander orders "TARGET ... NEXT TARGET RIGHT/LEFT ... AIM LEFT/RIGHT, ON ... , FIRE/GO ON". The gunner reports "ON" when he identifies the target and repeats the aim-off. He lays onto the target with his previous point of aim, and applies the new aim-off ordered by the commander. He continues to track the target until his lay is correct, reports "FIRING NOW" and fires. The gunner continues to correct his fire until the target is hit or he is ordered to "TARGET STOP".

57. If the new target is outside the gunner's field of view the commander aligns the gun with the new target (or orders the gunner to traverse left or right) and reports "ON" when he is on. At this time, he orders the direction of aim-off. The gunner reports "ON" when he has identified the target, repeats the aim-off, begins to track and fires when he is ordered to do so and his lay is correct. The commander ends the shoot by ordering "TARGET, STOP".

SECTION 7 EXAMPLE FIRE ORDERS

MAIN ARMAMENT - MOVING TARGETS

COMMANDER	GUNNER
"FRANG, ONE THOUSAND, TRANSPORT ... ON".. "AIM RIGHT"	"ONE THOUSAND...ON" ... "AIM RIGHT"
"FIRE"	"FIRING NOW"
	"ADD"

Shooting at Moving Targets and While on the Move

COMMANDER

GUNNER

“FIRING NOW”

“ADD”

“FIRING NOW”

“TARGET”

“TARGET, STOP”

“GUN SAFE, FIRST, WIDE
MAIN, 200, START MODE”

COYOTE/LAV III Application of Fire

MACHINE GUN—MOVING TARGETS

COMMANDER

GUNNER

“COAX, NINE HUNDRED,
TRANSPORT...MOVING...“
RIGHT...ON...”

“NINE HUNDRED...ON”...
”

“AIM RIGHT”

“AIM RIGHT

“READY, FIRE”

“FIRING NOW”

“DROP”

“FIRING NOW”

"DROP"

“FIRING NOW”

“TARGET”

“FIRING NOW”

“TARGET”

“TARGET, STOP”

“GUN SAFE, FIRST, WIDE,
MAIN, 200, START MODE”

MACHINE GUN—SHOOTING ON THE MOVE

COMMANDER

GUNNER

“COAX, EIGHT HUNDRED,
MEN IN WOODS...ON...”

“EIGHT HUNDRED...ON”

Shooting at Moving Targets and While on the Move

COMMANDER

GUNNER

“AIM LEFT”

“AIM LEFT”

“READY, FIRE”

“FIRING NOW”

“RIGHT”

“FIRING NOW”

“TARGET”

“FIRING NOW”

“TARGET”

“TARGET, STOP”

“GUN SAFE, FIRST, WIDE,
MAIN, 200, START MODE”

CHAPTER 5 HEI-T AMMUNITION

SECTION 1 GENERAL

INTRODUCTION

1. HEI-T ammunition is designed for the suppression of dismounted enemy positions up to 2400 m. HEI-T ammunition may be employed against both point targets and area targets. The introduction of HEI-T ammunition into the Army's inventory will result in the following applications of fire to be employed by the COYOTE and LAV III.

PURPOSE

2. The purpose of HEI-T ammunition is to permit AFV crews the capability to suppress enemy targets and positions at ranges greater than COAX tracer burn-out, or from 0-2400 m if the coaxial MG is damaged.

STATIC TARGET TECHNIQUES

3. The following techniques and engagement ranges will be used for HEI-T ammunition:

NOTE

For battle engagements below 500 m, the 430 m aiming mark will be placed on the target.

- a. Battle Technique (0 – 500 m);
- b. Estimated Range Technique (500 – 2400 m); and

COYOTE/LAV III Application of Fire

- c. Lasing Technique (MinR – 2400 m).

4. The word of command used to identify the ammunition is “HE” (read ‘H’ ‘E’). The commander’s and gunner’s actions for the techniques of fire using HEI-T ammunition are the same as those for APFSDS and FAPDS ammunition.

MAXIMUM EFFECTIVE RANGES

5. The ballistic graticle for HEI-T ammunition is graduated to 2400m. The maximum engagement range with HEI-T is 2400 m.

CORRECTIONS AVAILABLE TO THE GUNNER

6. All gunner’s corrections used for APFSDS and FAPDS also apply to HEI-T ammunition.

CORRECTIONS AVAILABLE TO THE COMMANDER

7. All commander’s corrections used for APFSDS and FAPDS also apply to HEI-T ammunition, with the following exception:

- a. Commander’s Elevation correction:
 - (1) Under 1100 m—add/drop 1 or 2 dots.
 - (2) Over 1100 m—any multiple of 100 m.

AREA TARGET ENGAGEMENTS

8. Area targets are those targets that are too large for a point target engagement, or have considerable width and depth requiring extensive traversing of the turret. When engaging area targets, the gunner will apply a single round BOT correction, during the estimated engagement technique, until the fall of shot is within the target area. Once an accurate range has been determined, the gunner will lay the appropriate aiming mark on the edge of the target area and commence firing at a rate of 100 RPM while traversing through the area in a ‘Z’

pattern (see fig. 5.1). To accomplish this, the gunner will start from one edge of the target area in the near ground and fire a burst laterally across the target area to the opposite edge. A second burst will then be fired in a diagonal direction across the target area from the near ground to the far ground on the opposite side. Finally, a third burst is fired laterally across the far ground of the target area to the opposite edge. The number of rounds in a burst will depend on the size of the target and degree of success achieved while firing (one round for every 10 to 25 metres). Extensive practice is required to become proficient at engaging targets at extended ranges (1800 – 2400 m). See Figure. 5-1.



Figure 5-1: Area Target Engagement Technique

SECTION 2 SHOOTING AT MOVING TARGETS AND WHILE ON THE MOVE

INTRODUCTION

9. To hit a target while moving laterally, it is necessary to apply “aim off” (see rules for shooting while on the move in B-GL-305-009/PT-001 *Fundamentals of AFV Gunnery*). The amount of aim-off will differ for each individual target, depending upon speed, time of flight of the projectile, and angle of approach. After the initial round has been fired, the appropriate correction is determined and applied.

COYOTE/LAV III Application of Fire

Subsequent rounds are fired and corrected as required until the target is struck and the desired result is achieved.

AIM-OFF REQUIRED

10. For targets where an aim-off is required, the initial aim-off mark is:
 - a. up to 1000 m—place the appropriate range dot on the leading edge of the target; and
 - b. beyond 1000 m—place the appropriate range aim-off mark of the MG/HE scale on the centre of visible mass.

RANGE LIMITATIONS

11. The range limitations for firing at moving targets and while on the move are:
 - a. Battle Range Technique (0 – 500 m);
 - b. Estimated Range Technique (500 – 2400 m); and
 - c. Lasing Technique (Min R – 2400 m)

CORRECTIONS AVAILABLE TO THE COMMANDER AND GUNNER

12. All corrections and limitations available to the gunner when firing APFSDS and FAPDS ammunition at static targets are also available when firing HEI-T ammunition while on the move.

13. All corrections and limitations available to the commander when firing APFSDS and FAPDS ammunition at static targets are also available to the commander when firing HEI-T while on the move, with the following exception that the commander no longer has a line correction due to the constant movement of the turret in azimuth.

FIRE ORDERS

14. Some examples of fire orders using “HEI-T” ammunition are:

ESTIMATED TECHNIQUE—POINT TARGET

COMMANDER	GUNNER
“HE 1400 TRANSPORT, ON”	“1400 ON”
“FIRE”	“FIRING NOW TARGET” “FIRING NOW TARGET”
“TARGET STOP”	“GUN SAFE, FIRST, WIDE MAIN, 200, START MODE”

LASING TECHNIQUE—POINT TARGET

COMMANDER	GUNNER
“HE LASE BUNKER, ON”	“ON 1600”
“FIRE”	“FIRING NOW TARGET” “FIRING NOW TARGET”
“TARGET STOP”	“GUN SAFE, FIRST, WIDE, MAIN, 200, START MORE”

BATTLE TECHNIQUE—POINT TARGET

COMMANDER	GUNNER
“HE, BATTLE, INFANTRY, ON”	“BATTLE, ON”
“FIRE”	“FIRING NOW

COYOTE/LAV III Application of Fire

COMMANDER

GUNNER

TARGET”

“FIRING NOW
TARGET”

“TARGET, STOP”

“GUN SAFE, FIRST, WIDE,
MAIN, 200, START MODE

ESTIMATED TECHNIQUE—AREA TARGET

COMMANDER

GUNNER

“HE, 1600, TRENCHES,
ON”

“1600, ON”

“LEFT HAND EDGE, 100”

“LEFT HAND EDGE, 100”

“TRAVERSING FIRE,
FIRE”

“FIRING NOW, TARGET,
FIRING NOW, TARGET,
FIRING NOW, TARGET

“TARGET, STOP”

“GUN SAFE, FIRST, WIDE,
MAIN, 200, START
MODE”

ANNEX A
REFERENCES

1. The following publications are related to and should be read in conjunction with this manual:
 - a. B-GL-305-013/PT-001, *Armour, Volume 13, Armour Open Range Practices*;
 - b. C-71-339-000/MB-001, *Operating Instruction Turret, Combat Vehicle, Light Armoured Vehicle*;
 - c. C-30-600-A00/MB-001, *Operating Instructions, Light Armoured Vehicle (LAV), Reconnaissance (RECCE), Wheeled, 8 x 8, Diesel*;
 - d. B-GL-305-009/PT-001, *Theory of Armour Gunnery, Volume 9, Part 1, General*;
 - e. C-71-330-000/DF-002, *Firing Table, Gun, 25mm, Automatic, M242*;
 - f. B-GI-305-000/MS-004, *Commander Equipment Readiness Checklist*;
 - g. C-71-330-000/MN-001, *First/Second Line Maintenance Instructions, Gun Automatic, 25mm, M242*;
 - h. C-71-269-000/MB-000, *Leopard C1 Operator's Manual for Main Battle Tank Turret*;
 - i. C-71-330-000/MD-001, *Equipment Description, Gun Automatic, 25mm, M242, C1*; and
 - j. student drills and handouts.
2. There are no relevant NATO STANAGs or ABCA QSTAGs.

ANNEX B
ABBREVIATIONS

ABRÉVIATIONS		SIGNIFICATION
English	French	French/English
A/C	aé	aircraft/aéronef
APFSDS-T	AFSPDS-T	armour piercing fin stabilized discarding sabot – tracer/obus perforant à sabot détachable stabilisé par ailettes – traceur
BOT	---	burst-on-target/impact sur la cible
COAX	COAX	coaxially mounted machine-gun/mitrailleuse coaxiale
GPMG	MP	general purpose machine gun/mitrailleuse polyvalente
HEI-T	HEI-T	high explosive incendiary-tracer/obus incendiaire à explosif brisant-traceur
II	II	image intensification/intensification d'image
IMR	CTMI	indoor miniature range/champ de tir miniature intérieur
m	m	metres/mètres
MBS	MBS	muzzle boresight/lunette de simbleautage
MG	mit	machine gun/mitrailleuse
MPI	PMI	mean point of impact/point moyen des impacts
TBO	TBO	tracer burn-out/extinction du traceur

COYOTE/LAV III Application of Fire

ABRÉVIATIONS		SIGNIFICATION
English	French	French/English
TI	IT	thermal image/image thermique
TPDS-T	TPDS-T	target practice discarding sabot – tracer/obus d'exercice à sabot détachable – traceur
WP	PB	white phosphorus/phosphore blanc

ANNEX C
DEFINITIONS (SIMPLIFIED)

Angle of sight

The angle which the line of sight to the target makes with the horizontal plane. The angle is positive (one of elevation) when the line of sight is above, and negative (one of depression) when the line of sight is below the horizontal plane.

Coaxial

A weapon mounted on the same trunnions as the main armament of an AFV. Both weapons are therefore moved the same amount by the same controls.

Direct Fire

Fire applied when the gunner and commander can both see that target and tangent elevation is applied by means of an aiming mark in the sight.

Dispersion

A measure of the spread of a number of strikes about the MPI from rounds fired under identical conditions. See standard deviation.

Fire for Effect

One or more rounds fired to have the desired effect on the target.

Hard target

Any target which requires an armour piercing or defeating round to destroy it.

High velocity

Muzzle velocities between 750 and 1,000 m per second.

HCE or HC

Hexachloroethane - a smoke producing compound.

Laying

The process of applying the necessary line and elevation to a gun (with the correct point of aim) before opening fire at a target.

Line of sight

A line (either real or imaginary) drawn between the sight and a target.

Long range

Ranges over 2,000 m.

Low velocity

Muzzle velocities under 500 m per second.

Mean point of impact

The centre of a pattern of shots. A point which represents the mean position of the points of impact of a number of projectiles fired at a constant line and elevation.

Medium range

Ranges between 1,000 m and 2,000 m.

Medium velocity

Muzzle velocities between 500 and 750 m per second.

Minimum Correction

The smallest correction that can be made, at longer ranges, without incurring the risk of contradiction.

Muzzle Velocity

The velocity of the projectile two feet beyond the muzzle of gun.

Percentage zone (of dispersion)

An area within which the percentage of rounds may be expected to all.

Quadrant elevation

The angle between the axis of the bore and the horizontal plane when the gun is laid with the required elevation to hit a target (the sum of TE and A of S).

Sabot

1. The “shoe” of an APDS projectile.
2. The term referring to all discarding sabot rounds.

Short ranges

Ranges below 1,000 m.

Soft Target

A target which can be destroyed by HE or MG fire.

Tangent elevation

The angle between the line of sight (real or imaginary) and the axis of the bore.

ANNEX D
GLOSSARY OF TERMS USED DURING CREW DRILLS

“ACTION”

When used as a single word, is the order given by the AFV commander to the crew to prepare the AFV for contact with the enemy.

“ADD”

Used during correction of fire by the commander to order the gunner to increase the elevation by a specified amount, ie, 'Add two hundred', or by the gunner to report a BOT correction.

“AIM (LEFT/RIGHT/ON)”

The order by the commander and response by the gunner to indicate the point of aim when engaging a moving target or firing on the move.

“AIM-OFF”

The amount by which the gun is laid off laterally from the centre of the target, usually to allow for the movement of the target or of the vehicle from which the gun is fired.

“ANT”

Target description of an anti-tank gun.

“APC”

Used in a fire order to describe a tracked armoured vehicle, other than a tank.

“BATTLE”

The designation of weapon/ammunition in a fire order, if the commander wishes to engage a target using the Battle range sight setting, eg, "SABOT BATTLE, BMP, ON".

“CLEAR GUNS”

COYOTE/LAV III Application of Fire

The order given by the commander to indicate that all weapons are to be unloaded.

“COAX”

The pro-word of a fire order for using the coaxially mounted MG.

“DROP”

Used during correction of fire (see 'Add').

“FIRE”

The order to fire the gun. Also signifies that the AFV commander will retain control of the shoot and order any corrections necessary.

“FIRING NOW”

The report made by either the gunner or commander (for AFVs with commander's firing switches) as the firing switch is pressed.

“GO ON”

The order given by the commander to the gunner to continue firing at a target and to be responsible for observation and correction of fire, eg”, STOP, ADD ONE HUNDRED, GO ON”.

“FRANG”

The term used to specify Frangible Armour Piercing Discarding Sabot ammunition in a fire order.

“LEFT”

The order to make a correction for line to the left, or the report by the gunner that he is making a line correction to the left.

“LONG RANGE”

Ordered by the commander (and repeated by the gunner) during a shoot when a the gunner reports “Double” and the commander feels that the longer range displayed on the range display is the most accurate.

“MACHINE-GUN”

The pro-word of a fire order for using the pintle-mounted-mounted MG.

“MAGGIE”

Target description of a MG post.

“TURRET MAKE SAFE”

The order given when weapons are to be made safe but not unloaded.

“MEN”

Target description of dismounted troops in the open.

“MY SIDE”

Reported by the commander to indicate he is assuming physical control of the weapon and is about to fire at a target. It is only reported when the comd initially takes control and remains in effect until the comd relinquishes physical control of the weapons system back to the gunner. The comd need not report “MY SIDE” for each engagement he conducts subsequent to the initial assumption of control.

“NOT OBSERVED”

The report made when a gunner fails to observe the target or fails to observe the fall of shot when he is responsible for the observation and correction of fire. The commander must then step in and assist.

“ON”

COYOTE/LAV III Application of Fire

1. When used by the commander, signifies that the gun is laid for line on the target either by the commander himself, or by his ordering the gunner to traverse.
2. When used by the gunner signifies he has identified the target.

“OR”

Ordered by the commander: given as a word of command to ensure the vehicle is made ready to fire.

“READY”

The report made by the commander when he has fully loaded the weapon specified in a fire order.

“RELEASE”

Ordered by the commander: usually after the gunner reports “Double” (the first time) during a shoot. The gunner will repeat “RELEASE”, re-lay and fire the laser. At any time he wishes to confirm the range to a target. The gunner will repeat “RELEASE” to confirm the commander's intention.

“REPEAT”

Ordered by the commander when he wants the gunner to fire another round at the same lay using the same nature of ammunition.

“REPLENISH”

Ordered by the commander when he wishes the to restock the primary and/or secondary ammo bins as well as to restock the coax ammo bin.

“RIGHT”

As in “LEFT”.

“SABOT”

The term used to specify Armour Piercing Discarding Sabot ammunition in a fire order.

“SECOND ROUND”

Reported by the gunner after a change in ammo is ordered from the previous engagement.

“START MODE”

See handouts.

“STEADY”

The order given by the commander to the gunner during the traversing of the turret to traverse the turret slowly.

“STILL”

Ordered by any crew member only used in the case of an Emergency; and if a crew member observes a safety infraction which may injure or damage equipment they will yell the words “STILL”. All members of the crew will stop all activities and the person of the crew who seen the problem will notify the crew commander who will then rectify the fault and carry on with normal activities

“STOP”

The order given to the gunner to:

1. stop firing at a target and engage a new one at the same range, eg, “STOP, NEXT TARGET RIGHT, GO ON/FIRE”;
2. stop applying a correction that the gunner has reported and apply one given by the commander, eg, “STOP, RIGHT ONE TARGET, GO ON/FIRE”;
3. stop firing altogether; or
4. change of ammo.

“SUPPRESSIVE FIRE”

Suppressive fire is indirect fire used on known or likely target locations to degrade one or more of the enemy’s basic combat functions of moving, shooting, observing or communicating

“TANK”

The target description for a tank target.

“TARGET”

Reported by either the commander or the gunner when his rounds hit the target.

“TRANSPORT”

The target description for any unarmoured wheeled vehicle.

“TRAVERSE”

The order given to the gunner to traverse the turret in a specified direction, eg, “TRAVERSE LEFT”. If not given with the word “STEADY”, the gunner traverses in the appropriate direction as fast as possible.

“TRENCH”

The target description of any fieldwork with no overhead cover.

“TURRET DOWN”

The order given as part of a fire order, indicating that turret down fire will be applied. This indicates to the crew that crest clearance drills will be carried out before the gun is loaded.

“WAIT”

The order given by the commander to the gunner to hold the point of aim for a period before being given the order “Fire”. It is also used by the gunner when firing on the move when, having give “Firing now” the point of aim is no longer correct.

“WRONG LAY”

Reported by the gunner if he fires the gun when it is not correctly laid (usually when firing on the move).