

**WEAPONS**

VOLUME 8

**ROCKET, HIGH EXPLOSIVE,  
66 MM, NM 72 E5**

(BILINGUAL)

(Supersedes B-GL-317-008/PT-001 dated 1976-12-16 and Ch 4 dated 1990-10-18)

Issued on Authority of the Chief of the Defence Staff

OPI: LFC HQ/G3 INFANTRY

1996-07-02

## **WEAPONS SECURITY**

The security of small arms and small arms ammunition is your responsibility. Ensure your weapons and ammunition are secured/protected in accordance with current orders and instructions.

## **WARNING**

### **PURPOSE**

1. This order outlines Canadian Force policy governing the use and misuse of weapons, ammunition and explosives.

### **WEAPONS**

2. Firing or attempting to fire locally manufactured weapons, obsolete service or foreign weapons used for display, ceremonial or trophy purpose in parade grounds, armouries or such like areas is prohibited except when specifically authorized by NDHQ.

3. Attention is also drawn to the following references which concern offenses connected with the use or misuse of weapons:

- a. National Defence Act, section 117;
- b. Criminal Code of Canada, sections 82 to 106; and
- c. QR& O 103.59.

### **AMMUNITION AND EXPLOSIVES**

4. Tampering with or use of service and commercial ammunition or explosives for other than their designed purpose is prohibited.

5. Except as prescribed in paragraph 6, the modification, breakdown or sectioning of live ammunition for experimental, instructional or any other purpose, or manufacture of explosives is forbidden; this prohibition includes:

- a. unauthorized interchange of fuses or primers or both;
- b. experiments with blank ammunition to alter powder charge or to introduce any other substance into the cartridge case or into the weapon with the approved cartridge;
- c. experiments involving the use of altered propelling charges or bursting charges with ammunition for any type;
- d. the use of any non-service or obsolete ammunition;
- e. the use of foreign ammunition other than that received through normal supply channels or supplied in accordance with NATO Standardization Agreements;

- f. the manufacture and use of locally fabricated explosive training devices, battle simulators, saluting charges, etc.;
  - g. any alteration to the design of ammunition or explosive devices;
  - h. deviations from authorized drills for use of ammunition or explosive devices; and
  - i. rendering live ammunition inert for use as museum or instructional items.
6. The prohibition in paragraph 5 does not apply to:
- a. authorized experiments, modifications, etc., carried out by experimental, research or inspection establishments;
  - b. authorized breakdown, modification, repairs, proof testing, etc., carried out as normal functions of a Canadian Forces ammunition depot or base ammunition facility;
  - c. the use for its designed role of commercial pattern ammunition which is obtained by purchase as specified in CFAO 36-19;
  - d. the use for its designed role of commercial pattern ammunition which is taken into service and catalogued;
  - e. hand-loading small arms ammunition in accordance with CFAO 50-18; or
  - f. other cases, when specifically authorized by NDHQ.

## **FOREWORD**

1. B-GL-317-008/PT-001, Weapons, volume 8, Rocket High Explosive Anti-tank 66 mm, NM 72 is issued on authority of the Chief of Defence Staff.
2. This publication is effective on receipt and supersede CFP 317(8) dated December 16, 1976.
3. This publication is the basic reference for the employment of the NM 72 E5.
4. Comments and suggestions for changes are to be forwarded through the chain of command to LFC HQ Attention: G3 Infantry.



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## **CHAPTER 1**

### **AIM AND SCOPE**

#### **AIM**

1. This publication contains the information necessary to train soldiers to handle and fire the M 72 series light antiarmour weapon.

#### **BACKGROUND**

2. The Rocket Launcher 66 mm M 72 series was originally developed in the United States of America. It provides the section with a light-weight antiarmour weapon that has a high degree of safety, ruggedness, and reliability.

#### **FORMAT**

3. The information in chapters 2 and 3 is presented in the form of lesson plans. The manual is laid out as follows:

- a. chapter 1 contains general information about the NM 72 E5 series of antiarmour weapons, and the methods for teaching their use;
- b. chapter 2 contains the skills and the specific information required by soldiers to operate the weapon;
- c. chapter 3 consists of practice periods designed to further develop the skills and techniques taught in chapter 2;
- d. chapter 4 contains information for the instructor;
- e. chapter 5 contains all range practices; and
- f. chapter 6 contains all handling tests.

#### **TECHNICAL DATA NM 72 E5**

4. Calibre - 66 mm.
5. Weight (complete system) - 3.45 kg.
6. Length:
  - a. closed - .780 m, and

- b. extended - .980 m.
- 7. Muzzle velocity - 200 m/s.
- 8. Time of flight 250 m - 1.4 s.
- 9. Maximum range allowing penetration of RHA - 300 m.
- 10. Firing mechanism - Percussion.
- 11. Sight NM 72 E5:
  - a. front - temperature self adjusting, luminous sight which can be used as a range finder; and
  - b. rear:
    - (1) can be adjusted to large aperture for light conditions; and
    - (2) range comes set at 200 m, can be set to 350 m.

## **PRACTICE PERIODS**

12. **General.** All training must be progressive, unnecessary repetition is bad instructional practice. A soldier learns skills and facts in the basic lessons which should be taught only once during his service. He then requires a suitable amount of practice in order to speed up his actions and to get facts firmly in his mind.
13. The sequence for each stage of a practice period is:
- a. remind - by explanation;
  - b. assess weakness - by practice or tests;
  - c. improve on weaknesses - by practice; and
  - d. progressive practice - by competitions.
14. The practice periods are intended as a guide to exercising soldiers during their training. The instructor should plan the period on an assessment of the soldiers weak points.
15. Faults should be immediately brought to the attention of the soldier and corrected, otherwise he will go on making the same mistakes.

16. If it becomes obvious during a practice period that the soldier has failed to grasp a particular skill or fact, the instructor will have to teach that part of the basic lesson again.

17. Practice periods can be repeated according to the progress. The instructor should remember that constant instruction and practice without firing make the subject boring and every effort should be made to introduce live firing in the sequence as soon as it is feasible.

18. **Competition.** The incentive of competition will always help to make practice more interesting. The whole of a practice period can be based on competitions if the instructor so wishes. Some points on forming competitions are:

- a. they can be on an individual or team basis;
- b. if run on a team bases the instructor must ensure that the teams are all fairly equal in ability. The more advanced member of the team will help the weaker members;
- c. marks can be awarded up to a given total started with and marks deducted for mistakes as the competition progresses;
- d. a chart drawn on a chalk board or a sheet of paper on which to mark up results should always be used;
- e. further interest can always be attained by making one team or individual watch another, criticising, awarding and deducting marks; and
- f. above all the instructor must make certain that competitions are simple and realistic, i.e. that they must exercise the soldiers in the facts and skills concerning their training.

19. **Master and Pupil.** The master and pupil method of practice in its simplest form is for one person (the pupil) to work under the supervision of another (the master), the instructor keeps an eye on both.

20. During training it stimulates keenness and attention to detail. It is particularly useful with large squads and in competitions. Used regularly, it also develops initiative and leadership and potential leaders may well be discovered by watching the master work.

## LEFT HANDED FIRERS

21. Left handed firers can operate this weapon by simply using right for left and left for right in their drills.

## CLASSROOM DRILLS

22. Prior to the start of all lessons, number the class as individuals or as groups of two as necessary. Ideally there should be no more than ten students per instructor. Each student and instructor should have a weapon.

## SAFETY PRECAUTIONS

23. Before and after every lesson all weapons, belts, ammunition, boxes, dummy cartridges and soldier's pouches must be inspected to ensure that no live ammunition is present.

## SHIPPING AND PACKAGING

24. NM 72 E5. The NM 72 E5 is packaged in a wooden case which measures 83.5 x 85.5 x 31.5 cm (see Figure 1-1). Inside are three cardboard containers each containing five launchers. The centre box is wrapped with web straps to facilitate removal. The wooden case containing the fifteen launchers weighs 74.9 kg. The carton of five launchers weighs 17.5 kg. To remove each round, the end flap is opened using a pocket knife, the styrofoam support is removed, and the exposed round is pulled from the box. The launchers are painted with an olive drab green, non-reflecting paint.

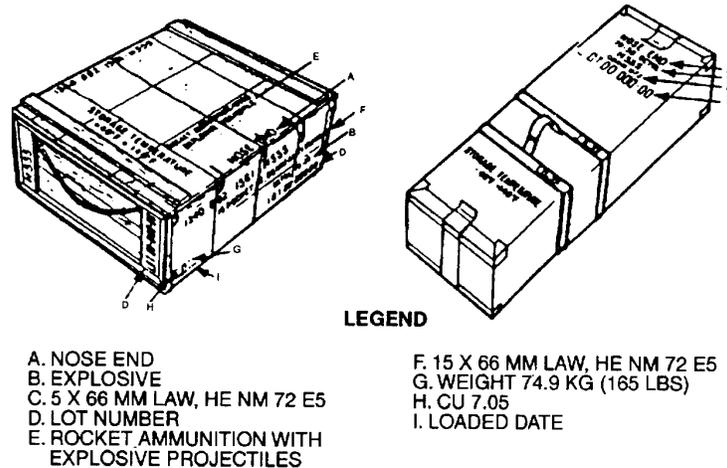


Figure 1-1 Packaging and shipping containers

**CHAPTER 2**  
**LESSON PLANS**  
**LESSON 1**

**DESCRIPTION, CHARACTERISTICS, SAFETY PRECAUTIONS, PREPARING  
LAUNCHER FOR FIRING AND MAKING AN UNFIRED LAUNCHER SAFE**

**INSTRUCTOR'S NOTES**

1. **Aim.** To teach:
  - a. description,
  - b. characteristics,
  - c. safety precautions,
  - d. preparing the launcher for firing,
  - e. making an unfired launcher safe, and
  - f. safety features.
2. **Time.** Two x 40 minute periods.
3. **Methods.** A basic instructional period.
4. **Stores:**
  - a. weapon stands: two per instructor;
  - b. table: one per instructor;
  - c. pointer: one per instructor;
  - d. NM 72 dummy: two per instructor and one per student;
  - e. NM 72 dummy rocket: one per instructor; and
  - f. AFV targets: one per fire location.

5. **Preparation:**
  - a. set up table with stands;
  - b. place one NM 72 closed into stand, the other NM 72 extended into the other stand; and
  - c. place the dummy rocket on the table between the two NM 72s.
6. **Miscellaneous.** When handling the NM 72, name the parts and their purpose. At this stage, the student is not expected to memorize all of the names.

#### **CONDUCT OF THE LESSON**

7. **Preliminaries:**
  - a. number the students;
  - b. inspect all NM 72 and dummy rocket;
  - c. explain positions to be used during lesson;
  - d. show training aids that are to be used; and
  - e. show target area.
8. Review.
9. **Introduction.** The NM 72 E5 is the newest in a family of SHORT RANGE ANTI-ARMOUR WEAPONS, (LIGHT) (SRAAW (L)) in use with the Canadian Forces. It was originally designed by the United States of America. The NM 72 E5 is designed by Norway.
10. **Characteristics.** Explain:
  - a. the weapons system is compact and light in weight at 3.45 kg. It combines a high destructive capability with maximum portability being .780 m closed and .980 m extended;
  - b. it is a one man weapon, water tight, fires a single shot, and requires a minimum of training;
  - c. it is capable of penetrating 300 mm of armour. Due to the rockets flat trajectory, there is high probability of a first round hit;
  - d. the maximum range is 350 m, with an effective range of 220 m; and

- e. when the weapon is fired, a back blast area exists behind the weapon that must be clear of personnel, equipment and loose objects.
11. Confirm by questions.
12. **Description:**
- a. **Launcher NM 72 E5.** The launcher consists of two telescopic tubes. The inner tube is oriented with respect to the outer tube by a channel assembly which rides in a alignment slot in the trigger housing assembly (Figures 2-1-1 and 2-1-2).
  - b. The outer tube is made of reinforced plastic, with outer parts affixed: the trigger housing assembly, trigger assembly, trigger safety handle, rear sight assembly, front sight assembly and rear cover.
  - c. The inner tube is made of aluminium. It will extend telescopically along the channel assembly which houses the firing pin rod assembly. The barrel detent will lock the launcher in the extended position. The firing pin rod assembly locks under the trigger assembly and cocks the weapon on extension.

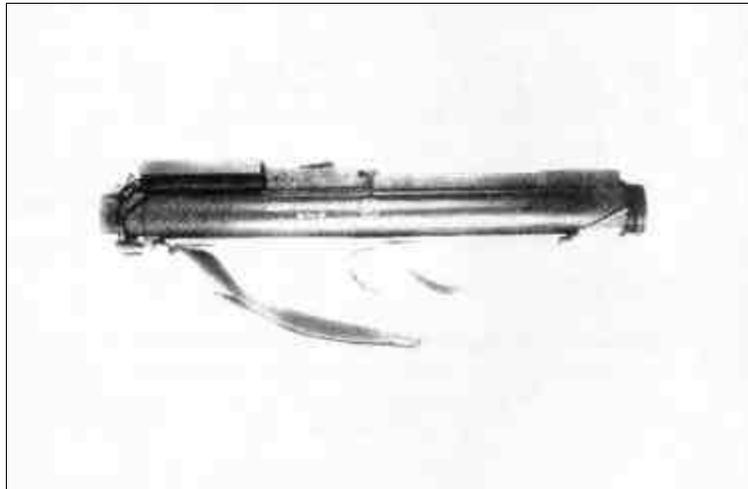


Figure 2-1-1 Rocket Launcher - closed position



Figure 2-1-2 Rocket Launcher - open position



Figure 2-1-3 Firing instructions and identification label

- d. The rocket consists of three major assemblies:
  - (1) 66 mm High Explosive Anti-Armour War Head,
  - (2) point-initiating base-detonating fuse, and

(3) propulsion unit (rocket motor).

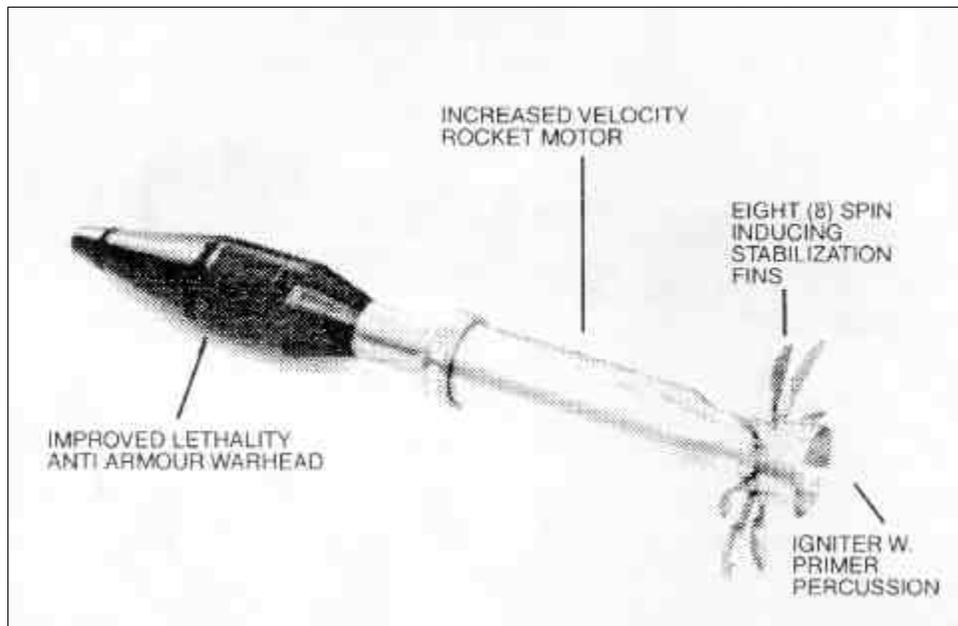


Figure 2-1-4 HEAT rocket

- e. Attached to the rear of the rocket motor are eight spring loaded fins which are folded forward along the motor when the rocket is installed in the launcher. When ignited, the propellant in the rocket motor burns and builds up gas pressure. The gas pressure then propels the rocket down the launch tube and on to the point of impact (Figure 2-1-4).
- f. **Firing Mechanism.** The launcher houses a percussion-type firing mechanism to activate the rocket. The trigger mechanism is located on the top rear of the outer tube. The trigger is in the configuration of a bar that must be compressed to fire. When the trigger bar is depressed it releases the firing pin, which strikes the centre of the primer. The firing pin housing is affixed to the top rearmost portion of the rear or inner tube. Closely associated with the housing is the firing pin rod assembly, firing pin rod spring, primer block, primer, and rear sight cover. The primer is located in line with the firing pin.
- g. **Trigger Safety Handle and Recocking.** The trigger safety handle must be pushed forward to the release (or ARM) position before the trigger can be depressed. This safety handle should not be released until the launcher is in the correct fire position on the firer's shoulder. The trigger safety handle has a

positive safety. When it is placed in the safe position, the firing pin rod assembly cannot move to the rear and strike the primer. Cocking is accomplished in the last 2.5 cm of travel upon extension. The weapon must therefore be closed at least this far when recocking it.

- h. **Front Sight.** It is made of plastic, has three posts which have luminous marks on each. It has a self adapting temperature system to adjust for hot or cold climates. Care should be exercised to ensure that the front sight is completely depressed when closing the launcher as the front sight protector could strike and fracture the plastic sight (Figure 2-1-5).
- i. **Rear Sight.** Sight comes pre set at 200 meters, has a peep aperture, and has a aperture lid which can be rotated counterclockwise to expose a larger strike for conditions of poor light. On the right side of the sight is a drum which can be used to adjust for ranges in units of 50 meters. Care is to be used when grasping the launcher as to not damage the plastic rear sight (Figure 2-1-6).

13. Confirm by questions.

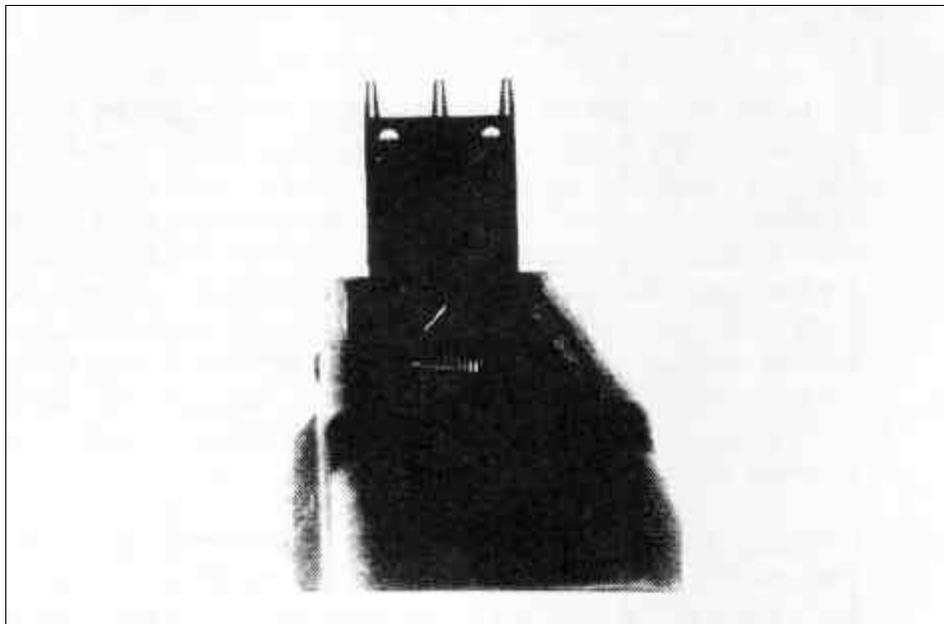


Figure 2-1-5 Front sight NM 72 E5

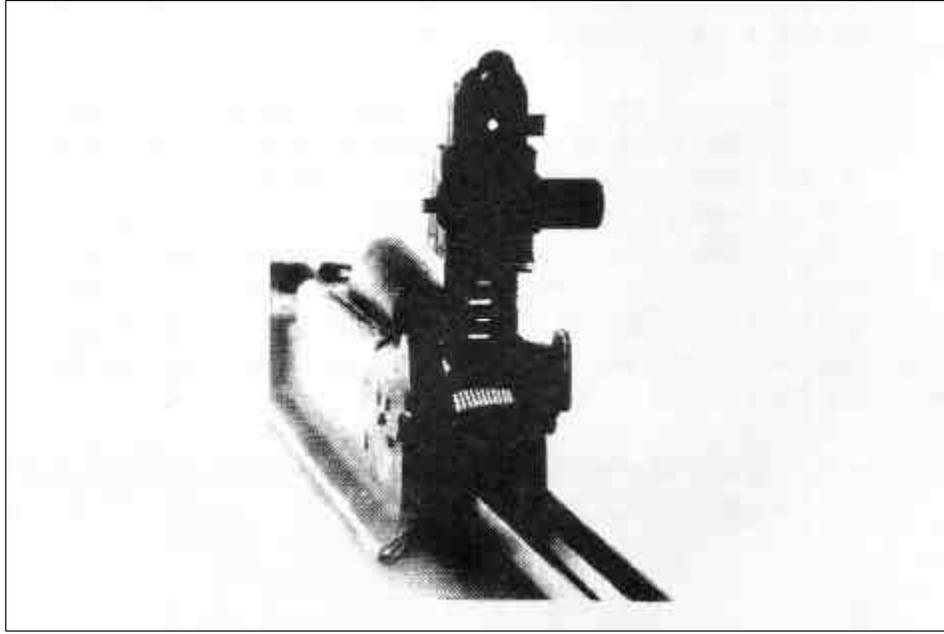


Figure 2-1-6 Rear sight NM 72 E5

14. **Safety Precautions.** Explain and demonstrate:

**CAUTION**

Since this weapon is pre-loaded and is dangerous from the front and rear, great emphasis must be placed on careful and safe handling. ALL LAUNCHERS MUST BE TREATED AS CONTAINING LIVE ROCKETS UNTIL PROVEN OTHERWISE.

- a. ensure that front and rear covers are securely in place;
- b. check that trigger safety handle is in the SAFE position;
- c. check that the pull pin is correctly positioned;
- d. dummy launchers used in training will be painted with a gold band and marked DUMMY FACTICE in black letters. Dummy launchers will be treated as live ammunition until the instructor has inspected them and ensured that they have been expended; and
- e. sub-calibers will be treated as live till proved clear by the instructor looking into

the rear of the sub-calibre to see that the barrel is clear.

15. Confirm by questions and practice.
16. **Preparing the Launcher for Firing.** Explain and demonstrate:
  - a. ensure that the trigger safety handle is in the SAFE position;
  - b. remove pull pin from rear of launcher;
  - c. with open palm grasp top of rear sight housing and pull firmly to rear till front and rear sights are up right;
  - d. check or adjust sights if required;
  - e. again grasp launcher as before and fully extend the launcher (Figure 2-1-7);
  - f. check behind launcher to ensure no persons or equipment are in the back blast area; and
  - g. place launcher on shoulder and aim (Figure 2-1-8).
17. Confirm by questions and practice.

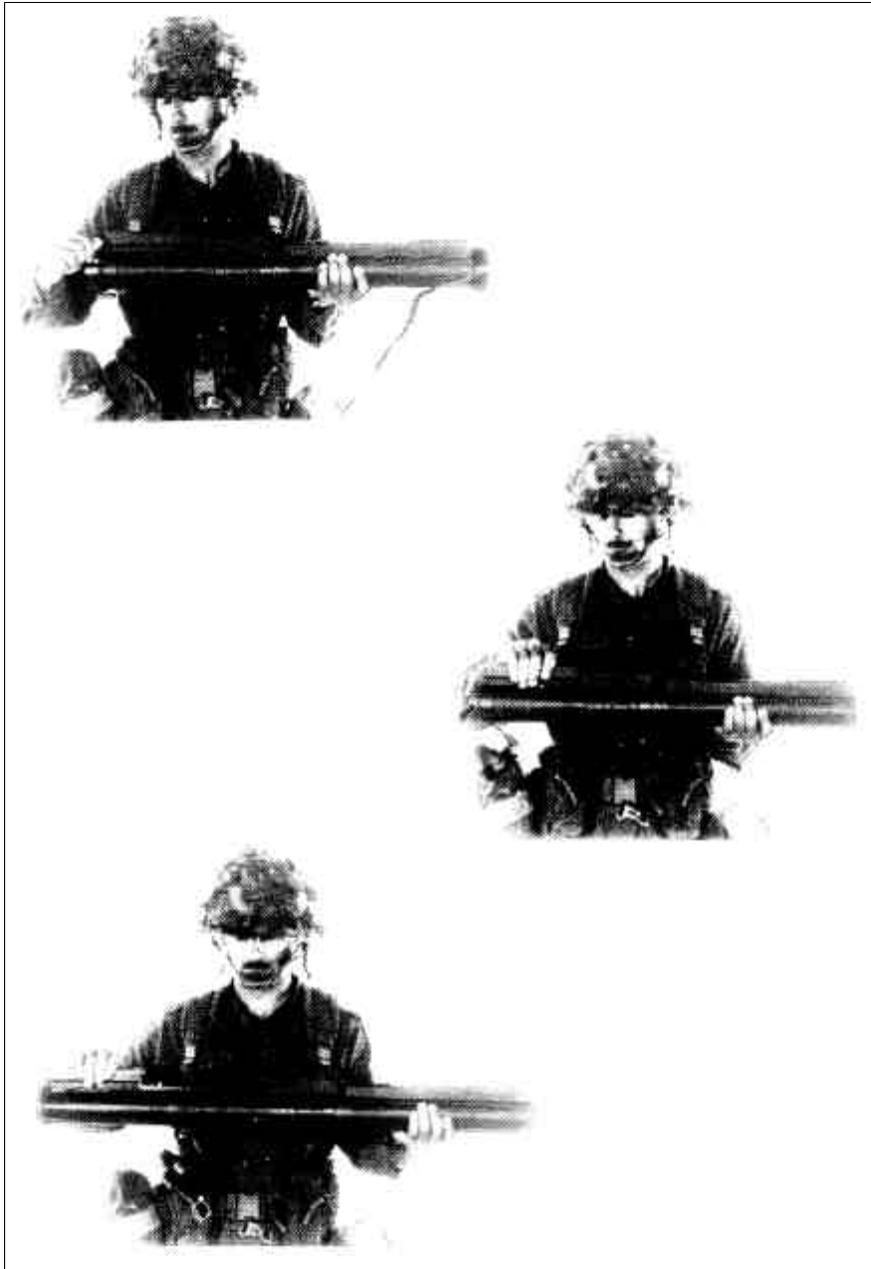


Figure 2-1-7 Extending the rocket launcher

### NOTE

The new rocket motor produces a slight recoil (less than the current in-service rifle). The firer must be instructed to hold the weapon firmly when firing, and he must ensure his eye is at least 10 cm away from the sight to avoid being struck by the weapon while it recoils (Figure 2-1-8).

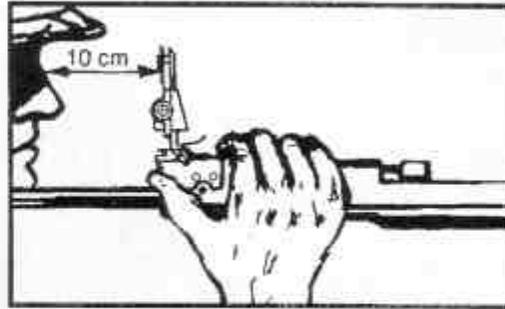


Figure 2-1-8 Eye sight distance

18. **Making an Unfired Launcher Safe:**
  - a. ensure that the trigger safety handle is in the SAFE position;
  - b. depress the barrel detent and collapse the launch tube part way;
  - c. ensure that the sights are set to 200 m and large aperture is closed;
  - d. guide front and rear sights into position and completely collapse the launcher;
  - e. replace sling assembly; and
  - f. mark rear cover of launcher to show it is no longer water tight and should be fired first.
19. Confirm by questions and practice.
20. **Safety Features.** Safety design features built into the NM 72 E5 Series LMAW systems to counteract hazards inherent to a shoulder fired ballistic rocket are:
  - a. tube extension cocking;
  - b. drop safe feature;
  - c. launch environment sensing capability in the fuze. Until launch acceleration loads are sensed, explosive train misalignment is maintained; and
  - d. arming distance. The rocket becomes armed after it has travelled 12-20 meters from the launcher. Any obstacles in the flight path of the rocket encountered beyond 12 meters are liable to explode the rocket.
21. Confirm by questions and practice.
22. **Conclusion.**
  - a. Take questions from class on entire lesson;
  - b. Confirm by questions and practice;
  - c. Carry out safety precautions;
  - d. Pack up kit as required; and

23. **Summary.** To include the following:
  - a. stress the necessity for safety precautions; and
  - b. reiterate all points covered as each soldier is required to recognize and use the NM 72.
24. Forecast of next lesson on the NM 72 E5.

## LESSON 2

### USE OF SIGHTS, FIRING POSITIONS, FIRING DRILLS AND MISFIRE

#### INSTRUCTOR'S NOTES

1. **Aim.** To teach:
  - a. use of the sights,
  - b. firing position,
  - c. firing drill, and
  - d. misfire drill.
2. **Time.** Two x 40 minute periods.
3. **Methods.** A basic instructional period.
4. **Stores:**
  - a. dummy NM 72 E5: one per instructor and one per student;
  - b. aiming aids w/targets: one per instructor and one per student;
  - c. chalkboard: one per instructor;
  - d. pointer: one per instructor; and
  - e. aiming rests: one per fire position.
5. **Preparation:**
  - a. set up chalkboard;
  - b. set out AFV targets in classroom side, front, rear;
  - c. check that NM 72 E5 are all in working order;
  - d. extend instructor's NM 72 E5;
  - e. put out student NM 72 E5 and aiming aids;
  - f. select outside area for positions if possible.

6. **Miscellaneous.** Instructor to be familiar with the rifle marksmanship principles. The sights on this launcher are as for those on a common rifle:

- a. AFV cut outs are to be scale so the sights can show how they are used to judge distance;
- b. the aiming rests can be used to confirm that the correct POA is being employed by the student;
- c. aiming discs can be used to check firing drills and to ensure that the marksmanship principles are being followed;
- d. outside area should be used for fire positions if weather permits and area is suitable; and
- e. confirm use of the 4 point relationship.

### **CONDUCT OF THE LESSON**

7. **Preliminaries:**

- a. number the students and in teams if required;
- b. inspect all NM 72 E5 in the classroom;
- c. explain positions to be used during lesson;
- d. show training aids to be used and how to use them; and
- e. point out target area.

8. **Review.** Lesson 1

9. **Introduction.** Explain the importance of understanding the use of the sight, how to correctly aim the launcher at different ranges, the firing positions, firing drill, misfire drill and other fire positions. These skills are required to get first round hits on targets.

10. **Aiming.** Explain and demonstrate. The sights are used the same as for the rifle, while employing the marksmanship principles.

11. **Stationary Targets.** At ranges out to 200 metres, no sight adjustment is required, due to the flat trajectory of the rocket. Correct POA for a side on target is centre at turret ring; for a front or rear target POA is turret ring or centre of mass. At ranges over 200 metres rear sight must be set to correct range, one click is 50 metres (Figure 2-2-1).

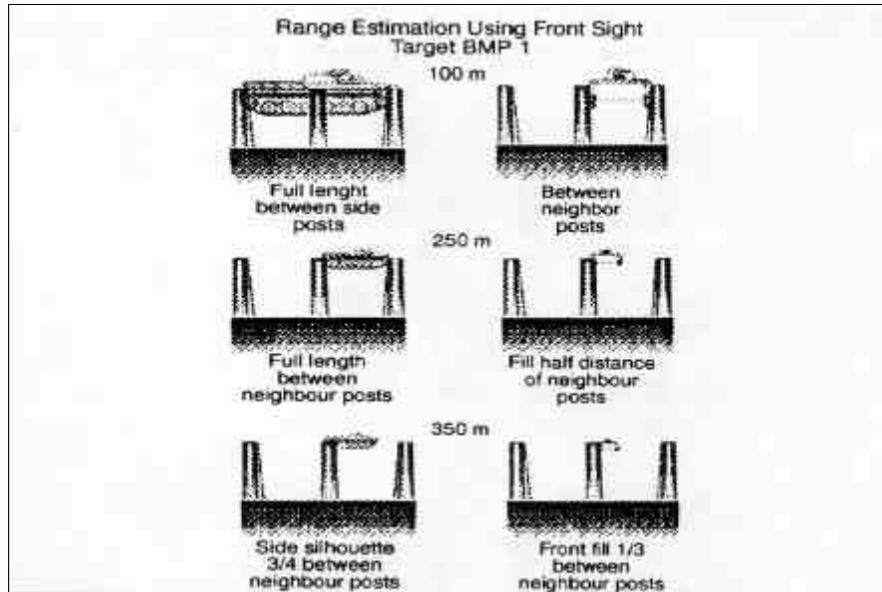


Figure 2-2-1 Sight Picture - Stationary Target

12. **Moving Targets.** Range and speed are critical factors that must be considered to achieve a first round hit. Speed must be estimated by the firer and set between the aiming posts on front sight. A vehicle moving from left to right at 24 km/h with a range of 200 metres, the front aiming post left side will be placed on the correct POA, allowing for the target to move into the rocket as it travels along its flight path (Figures 2-2-2 and 2-2-3):

- a. **Target moving towards firer.** Correct POA will be at bottom centre of the vehicle, so as it advances it will move into the rocket; and
- b. **Target moving away from firer.** Correct POA will be the top centre of the vehicle so as it moves away, the rocket will hit centre of the target.

13. Confirm by practice.

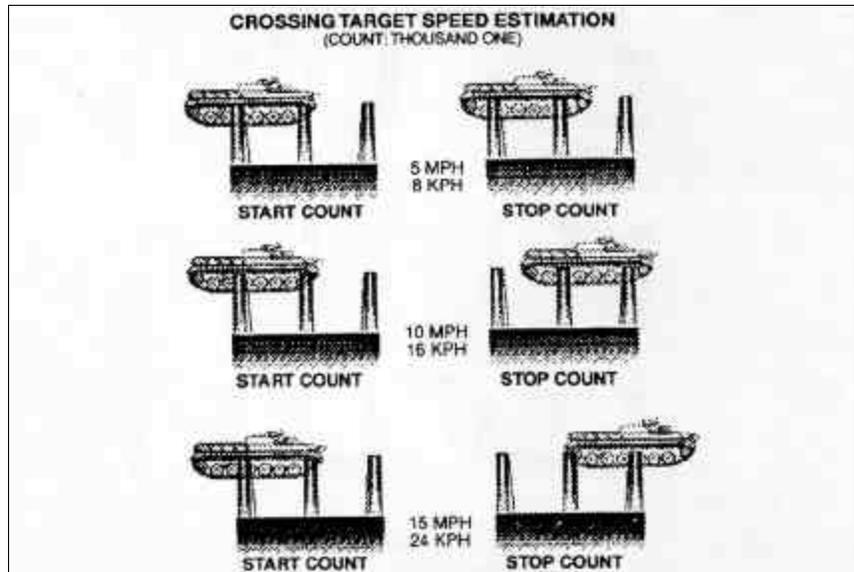


Figure 2-2-2 Crossing target speed estimation

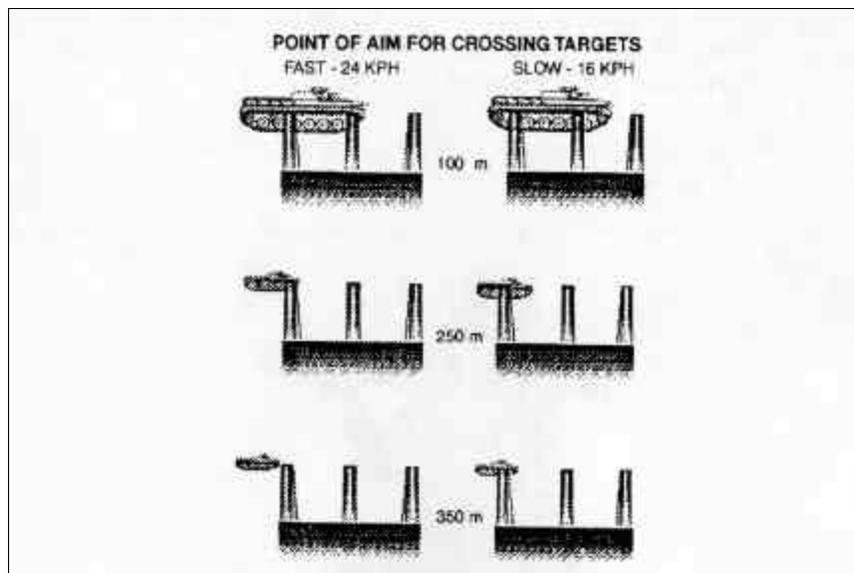


Figure 2-2-3 Point of aim for crossing targets

14. **Kneeling Position and Firing Drill.** Explain and demonstrate. The firing position selected will depend upon ground, whether target can be seen and if arc of fire can be covered:

- a. **Kneeling Position.** Two types, one is kneeling up on the rear leg:
- (1) kneel in position;
  - (2) check back blast area (BBA);
  - (3) place launcher on shoulder, with rear cover into front of shoulder;
  - (4) the supporting hand is placed under the launcher, forward of the trigger mechanism housing, not near the muzzle;
  - (5) the firing hand is placed on top of the rubber boot covering the trigger mechanism, with the thumb or heel under the launcher for support; and
  - (6) if possible, support can be gained by use of the knee (Figure 2-2-4).



Figure 2-2-4 Upright kneeling position

- b. **Alternate Kneeling.** Is sitting back on the rear leg to get more support and steadiness to the aim (Figure 2-2-5).



Figure 2-2-5 Alternate kneeling position

15. **Firing.** Explain and demonstrate. This launcher can be fired by left or right handed firers as follows:

- a. carry out safety precautions;
- b. prepare the launcher for firing;
- c. check that sights are set for 200 meters, check BBA;
- d. place launcher on shoulder and support as taught;
- e. with firing hand pull out trigger safety handle to ARM position (Figure 2-2-6);
- f. select your POA through the sights, using your fingers depress the trigger bar slowly but firmly;
- g. after firing, maintain the sight picture through the sights and maintain follow through. Note any corrections that may be required for any further rockets to be fired;
- h. during the preceding operation keep the launcher pointed at the target and ensure that all parts of the body are out of the BBA; and

- i. once the launcher has been fired, the tube can be disposed of or retained for training.
16. Confirm by practice.



Figure 2-2-6 Moving the safety handle to the ARM position and aiming the weapon

17. **Malfunction and Immediate Action.** Explain and demonstrate. The most common malfunctions that occur with the NM 72 are misfire and hang fire. If, when the trigger is operated the launcher fails to fire, the following action is to be carried out:
- a. **Misfire.** It is a complete failure to fire, which may be due to a faulty firing mechanism or a faulty element in the propelling charge explosive train. A misfire is not dangerous, but since it cannot be immediately distinguished from a delay in the functioning of the firing mechanism or from a hang fire, it shall be considered as a possible delayed firing, until such a possibility has been eliminated.
  - b. **Hang Fire.** A hang fire is a delay in the functioning of the propellant charge explosive train at the time of firing. The amount of delay is unpredictable, but in most cases, will fall within the range of a split second to several minutes. Therefore, a hang fire cannot be distinguished immediately from a misfire.

- c. **Immediate Action.** (Misfire drill) The immediate action needs to be applied only when a malfunction occurs. If when the trigger is operated, the launcher fails to fire, the firer will:
- (1) maintain the aim for 10 seconds;
  - (2) ensure that the trigger safety handle is in the arm position;
  - (3) squeeze the trigger again;
  - (4) if the weapon does not fire, maintain the aim for one minute;
  - (5) attempt to return the trigger safety handle to the safe position;
  - (6) remove the weapon from the shoulder, keeping the weapon pointed down range, and ensure that the BBA is clear;
  - (7) depress the detent, and collapse the weapon approximately 120 mm;
  - (8) grasp the rear sight cover and re-extend the launcher, ensure it is locked; the launcher is automatically cocked when re-extended;
  - (9) check BBA;
  - (10) place launcher on the shoulder;
  - (11) pull trigger safety handle to the arm position;
  - (12) aim and press the trigger to fire;
  - (13) if the launcher still does not fire, keep the launcher aimed at the target for at least one minute;
  - (14) after this, attempt to return the trigger safety handle to the safe position;
  - (15) remove the launcher from the shoulder **WITHOUT COLLAPSING IT** and carry it to a flank (at least 50 meters from personnel) for disposal. Ensure that the launcher is pointed down range and that the BBA is clear while carrying the launcher. The procedures for disposal are covered in CFTO C-74-050-005/MS-000; and
  - (16) call for an ammunition technical officer or ammunition technician to investigate the cause of the defect before the launcher is destroyed.

18. Confirm by practice.

19. **Conclusion:**
  - a. take question from class on entire lesson;
  - b. confirm by questions and practice;
  - c. carry out safety precautions;
  - d. pack up kit as required; and
20. **Summary.**
21. Forecast of next lesson on the NM 72 E5.

## LESSON 3

### OTHER POSITIONS

#### INSTRUCTOR'S NOTES

1. **Aim.** To teach:
  - a. the additional firing positions, and
  - b. employment of the SRAAW (L).
2. **Time.** Two x 40 minute periods.
3. **Methods.** A basic instructional period.
4. **Stores:**
  - a. NM 72 E5: one per instructor and one per student; and
  - b. stakes: six each.
5. **Preparation:**
  - a. set up board; and
  - b. prepare stakes and set out in area.
6. **Miscellaneous:**
  - a. select outside area and set out stakes to show how ranging is done;and
  - b. carry positions are slung over one shoulder or slung across the back.

#### CONDUCT OF THE LESSON

7. **Preliminaries:**
  - a. number squad;
  - b. normal safety precautions;
  - c. explain positions to be used during lesson;
  - d. show any new training aids; and

- e. point out target area.
8. **Review.** Aiming, firing drills and misfire drills.
  9. **Introduction.** Explain the importance of being able to use other positions when firing the launcher and why it is so important to use the launcher in the most effective way.
  10. **Other firing positions.** The NM 72 E5 can be fired from the kneeling, standing, sitting and prone positions. The exact positions may vary slightly to allow for the configuration of the individual body. The firer must ensure that his position is stable and comfortable and that it is the most suitable choice for engaging the target.
  11. In general, the most suitable positions for the engagement of moving targets are the standing and alternate kneeling. All other positions are suitable for stationary targets. Situation, terrain, arcs and firers preference should govern the firers selection of the best fire position. Whenever possible, the firer should use the preceding positions with support, as the inherent stability of a supported position aids the firer when aiming.
  12. If a firer is left handed the procedures should be reversed.
  13. **Standing Position.** Explain and demonstrate. The standing position is similar to the standing with the rifle. Face the target, make a right turn, spread the feet apart a comfortable distance and place the launcher on the shoulder. The body should be well balanced with the hips level. The left hand will be directly under the forward portion of the launcher. The elbow should be placed against the body for stability. To traverse in this position, move the body from the ankles up (Figure 2-3-1).

14. Confirm by practice.



Figure 2-3-1 Standing position

15. **Sitting Position.** Explain and demonstrate. There are two sitting positions. First position, firer faces the target and makes a half turn, sits down with legs crossed, lean slightly forward from the hips, and rest elbows forward of the knees to avoid bone on bone contact. Be sure no portion of the body is in the BBA. Place the right hand on the trigger and grasp the forward section of the launcher tube with the left hand (Figure 2-3-2).



Figure 2-3-2 Sitting position

16. **Alternate Sitting Position.** Face the target, make half right turn, and set with legs partially extended and well apart. Brace by digging the heels into the ground as with the conventional rifle position. Rest elbows forward of the knees to avoid bone to bone contact. The alternate sitting position is suitable for firing at stationary targets and is more stable than the kneeling position (Figure 2-3-3).

17. Confirm by questions.



Figure 2-3-3 Alternate sitting position

18. **Prone Position.** Explain and demonstrate. There are two types of prone positions. First position the firer lies down at an angle to the target of not less than 800 mils to the line of fire in order to keep clear of the BBA. The back should be straight and the right leg directly on a line running through the right hip and right shoulder. Move the left leg apart and up as far as possible without discomfort. Keep both knees on the ground and both elbows below the launcher. Hold the head as steady as possible with the eye lined up with the sights. If an occasion that requires tracking a moving target should arise, maintain a 800 mils angle so the BBA is not directed at the feet and legs (Figure 2-3-4).



Figure 2-3-4 Prone Position

19. **Alternate Prone Position.** Cross the right leg over the left to further ensure that no part of the body is in the BBA (Figure 2-3-5).



Figure 2-3-5 Alternate Prone Position

20. **Carrying Position.** Explain. The weapon should never be carried fully extended, except when its immediate use is foreseen. A sling that can be adjusted to fit the individual comfortably is provided for carrying. The weapon should be slung with the front end down. Several weapons may be carried at the same time (Figure 2-3-6).

21. Confirm by questions.

22. **Conclusion:**

- a. take question from class on entire lesson;
- b. confirm by questions and practice;
- c. carry out safety precautions;
- d. pack up kit as required.

23. **Summary.** To include the following:
- a. the need to employ the NM 72 in positions other than the primary position; and
  - b. forecast of next lesson on the NM 72 E5.



Figure 2-3-6 Carrying Position

## LESSON 4

### 21 MM SUB-CALIBRE TRAINING SYSTEM

#### INSTRUCTOR'S NOTES

1. **Aim.** To teach:
  - a. characteristics,
  - b. description,
  - c. safety precautions,
  - d. loading,
  - e. maintenance, and
  - f. I.A. and misfire drills.
2. **Time.** Two x 40 minute periods.
3. **Methods.** A basic instructional period.
4. **Stores:**
  - a. AFV targets: one per fire location;
  - b. tables: one per instructor;
  - c. NM 72 sub-calibre: one per instructor and one per student;
  - d. weapon stands: one per instructor; and
  - e. 21 mm dummy rockets: one per instructor and one per student.
5. **Preparation:**
  - a. set up table with NM 72 sub-calibre on stand with dummy rocket;
  - b. place one NM 72 sub-calibre and one dummy rocket under each chair;
  - c. set up chalkboard; and
  - d. place AFV targets in front of fire positions.

## CONDUCT OF THE LESSON

6. **Safety Precautions.** Normal.
7. **Review.** Preparing the launcher for firing.
8. **Introduction.** Explain that the 21 mm sub-calibre training system consists of a 21 mm practice rocket and an adaptor which enables the rocket to be fired from an expanded NM 72 to provide realistic and relatively inexpensive training.
9. **Characteristics.** Explain:
  - a. **Operation.** It is operated, aimed and fired in the same manner as the NM 72 E5.
  - b. **Range.** The maximum effective range is 200 metres and minimum range for engagement is 50 metres.
  - c. **Effect.** Blast, smoke and flash occur on firing, but to a lesser degree than the 66 mm. There is also a red tracer element which burns for approximately 40 metres. There is no terminal target effect.
  - d. **Ballistics.** The ballistics of the 21 mm sub-calibre rocket are almost identical to those of the 66 mm, enabling a trained soldier to obtain the following hit probability on a 2 metre by 2 metre target:
    - (1) at 100 metres 99 %;
    - (2) at 150 metres 92 %; and
    - (3) at 200 metres 67 %.
10. Confirm by questions.
11. **Description.** Explain the three components of the 21 mm sub-calibre: the modified NM 72, 21 mm sub-calibre rocket and the sub-calibre adaptor:
  - a. **Modified NM 72.** The modified launcher may be used for 50-80 firings. It is now repairable and must be returned to the issuing facility for replacement if components are missing or damaged.
  - b. **21 mm Sub-Calibre Rocket.** The 21 mm sub-calibre rocket consists of a solid shot projectile fitted to a rocket motor which contains a tracer element (see figure 2-4-1). An igniter, flash tube and primer are attached to the tracer element.

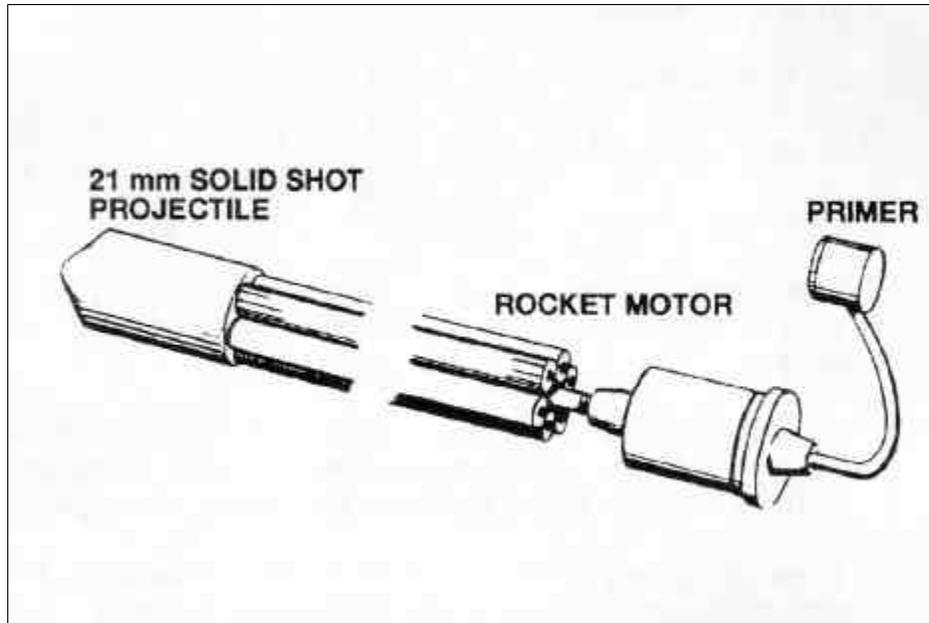


Figure 2-4-1 The 21 mm Sub-Calibre Rocket

- c. **Sub-Calibre Adaptor.** The adaptor is a steel barrel which is inserted into the modified launcher from the front and secured within the launcher by 2 locking screws, see figure 2-4-2. It may be fitted to, or removed from the launcher by the user.

12. Confirm by questions.

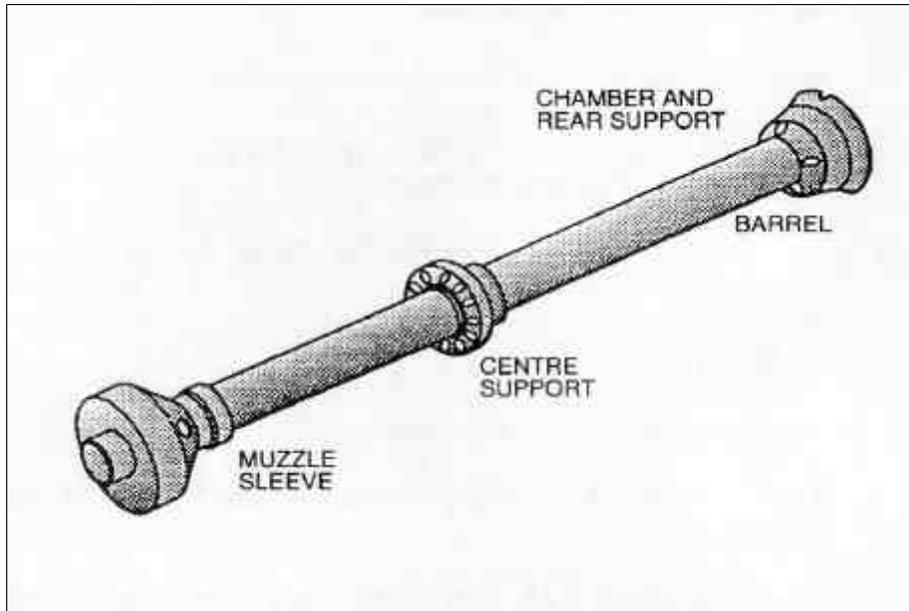


Figure 2-4-2 Sub-Calibre Adaptor

13. **Safety Precautions.** Explain:

**CAUTION**

The 21 mm sub-calibre training system launcher shall not be transported other than by hand when loaded.

- a. the back blast danger area for the 21 mm sub-calibre is the same as for 66 mm rocket; and
- b. the 21 mm sub-calibre training system shall not be unnecessarily exposed to the elements or left where it can accumulate dirt, as this increases the chance of it becoming inoperable.

14. **Additional Safety Precautions:**

- a. the rocket shall not be exposed to extreme heat or humidity;
- b. the sealed transit container containing the rockets should only be opened immediately prior to loading;
- c. care must be taken in handling the rocket due to exposed propellant sticks.

15. Confirm by questions.
16. **Loading.** Explain and demonstrate:
  - a. ensure launcher is in closed position to avoid an accidental discharge;
  - b. load rocket nose first into adaptor ensuring the primer fits into the primer housing;
  - c. close the retaining plate (Figure 2-4-3);
  - d. once loaded replace covers so that the firer can practise the complete firing drill;
  - e. immediately after the launcher has been extended, and prior to firing, a safety officer shall check that the rocket has remained fully inserted within the adaptor; and
  - f. before another rocket can be loaded the remains of the fired primer and igniter shall be removed from the primer housing.
17. Confirm by questions and practice.

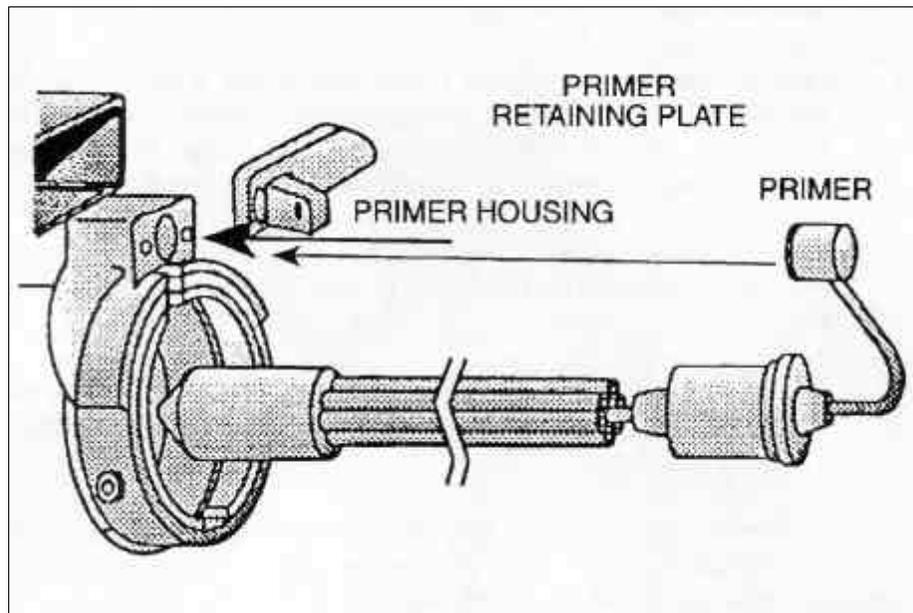


Figure 2-4-3 Loading the 21 mm sub-calibre rocket

18. **Immediate Action and Misfire Drills.** Explain that the IA and misfire drill to be carried out when firing the 21 mm sub-calibre training system are the same as those for the NM 72 as detailed in lesson 2, except that after a misfire the launcher shall not be destroyed but recovered using the following procedures:

- a. open the retaining plate and carefully pry out the igniter block from the launcher; and
- b. remove the misfired rocket from the launcher, place it in a suitably marked container and return it to the ammunition issuing facility for disposal. It is not hazardous to move. Recover the launcher for reuse.

19. Confirm by questions.

20. **Maintenance.** Explain:

- a. before initial firing, the bore of the sub-calibre adaptor shall be cleaned and dried using flannelette wrapped around the cleaning rod brush. After 6 rockets have been fired, the bore shall be pulled through to ensure all fouling has been removed;
- b. the following maintenance must be performed either on completion of the firing practice or after 35 rockets have been fired:
  - (1) the sub-calibre adaptor shall be removed from the launcher and cleaned inside and outside and all carbon deposits removed;
  - (2) if stiffness is experienced when extending the launcher, the contact surfaces of the inner and outer tubes should be cleaned and lightly oiled; and
  - (3) the sub-calibre adaptor should be inspected by a weapon technician to ensure serviceability.

21. Confirm by questions.

22. **Conclusion:**

- a. take question from class on entire lesson;
- b. confirm by questions and practice;
- c. carry out safety precautions;
- d. pack up kit as required;

23. **Summary.** To include the following:

- a. the 21 mm sub-calibre is training system and all the drills are the same as for the 66 mm; and
- b. forecast of next lesson in this subject.

**CHAPTER 3**  
**PRACTICE PERIODS**  
**SECTION 1**  
**PRACTICE 1**

**INSTRUCTOR'S NOTES**

1. **Aim.** To practise the soldiers in:
  - a. safety, preparing the launcher for firing; and
  - b. making an unfired launcher safe.
2. **Time.** Two x 40 minute periods.
3. **Methods.** An indoor practice period.
4. **Stores:**
  - a. weapon stands: one per instructor;
  - b. table: one per instructor;
  - c. pointer: one per instructor;
  - d. NM 72 E5: one per instructor and one per student;
  - e. AFV targets: one per fire location.
5. **Preparation:**
  - a. prepare a chalkboard for the final practice competition as shown in figure 6-1;
  - b. prepare a scoresheet containing training test as per annexes A and B;
  - c. set up table with stand;
  - d. place the NM 72 E5 extended into the stand;
  - e. set out AFV targets;

- f. check that all NM 72 E5 are in working order; and
- g. position all student NM 72 E5s.

6. **Miscellaneous:**

- a. the following sequence is to be used to practise the soldier in each stage:
  - (1) remind the more common errors related to the stage being practised;
  - (2) assess weaknesses by practice; and
  - (3) work on the weaknesses by further practice.
- b. the final practice is to confirm that the student has acquired all of the handling skills required to prepare the launcher for firing and to make safe an unfired launcher by:
  - (1) practicing the preparation of the launcher for firing and making safe an unfired launcher; and
  - (2) while being assessed, performing these skills according to standards, without error;
- c. to score, give one point to the soldier coming last in a test, two points to the second last, three points to the third last and so on;
- d. if it becomes obvious, during a practice period, that the soldiers have failed to grasp a particular skill or fact, the instructor will have to teach that part of the basic lesson again; and
- e. number the class prior to safety precautions.

**CONDUCT OF THE LESSON**

7. **Safety Precautions.** Normal.

8. **Introduction.** In battle, the soldier's own life and the lives of his comrades may depend a great deal on his ability to carry out instinctively the basic skills of safe handling, preparing the launcher to fire, and making an unfired launcher safe. This instinctive ability is acquired only after a great deal of practice.

9. **Description and Characteristics.** Question the class on the description and characteristics of the NM 72 E5.

10. **Safety Precautions:**

- a. explain that in the training test, the soldier is tested on his ability to carry out safety precautions correctly; and
- b. practise the class in normal safety precautions.

11. **Preparing the launcher for firing and making an unfired launcher safe:**

- a. explain that in the training test, the soldier is tested on his ability to carry out the drill of preparing a launcher for firing and making an unfired launcher safe; and
- b. practise the class on the drills.

12. **Final Practice.** A suggested method of conducting the final practice is by competitions as individuals and teams:

- a. practise each soldier in the safety precautions, preparing the launcher for firing and making an unfired launcher safe; and
- b. record individual and team scores on the chalkboard.

13. **Conclusion:**

- a. take questions from class on entire lesson; and
- b. pack up kit.

14. **Summary.** To include the following:

- a. the overall standard achieved and any weak points; and
- b. forecast of next lesson on this subject.

## SECTION 2

### PRACTICE 2

#### INSTRUCTOR'S NOTES

1. **Aim.** To practise the soldiers in:
  - a. use of the sights,
  - b. adopting fire positions,
  - c. firing drills, and
  - d. performing the misfire drills.
2. **Time.** Two x 40 minute periods.
3. **Methods.** An indoor practice period.
4. **Stores:**
  - a. dummy NM 72 E5: one per instructor and one per student;
  - b. aiming aids w/targets: one per instructor and one per student;
  - c. AFV targets to sale: one per firing position;
  - d. chalkboard: one per instructor;
  - e. pointer: one per instructor;
  - f. aiming rests: one per fire position; and
  - g. scoresheet: one per instructor.
5. **Preparation:**
  - a. prepare a chalkboard for the final practice competition as shown in figure 6-1;
  - b. prepare a scoresheet containing training tests as per annexes A and B;
  - c. set out AFV targets in classroom side, front and rear;

- d. check NM 72 E5 that all are in working order; and
- e. put out student NM 72 E5 and aiming aids.

6. **Miscellaneous:**

- a. the following sequence is to be used to practise the soldier in each stage:
  - (1) remind him of the more common errors related to the stage being practised;
  - (2) assess weakness by practice; and
  - (3) work on the weakness by further practice.
- b. the final practice is to confirm that the students acquired all the skills required to use the sights, to adopt all fire positions, to perform all the firing drills and the misfire drills by:
  - (1) practising these drills and adopting these positions; and
  - (2) while being assessed, performing these skills and demonstrating the fire positions according to standards, without error;
- c. to score, give one point to the soldier coming last in a test, two points to the second last and so on;
- d. if it becomes obvious, during a practice period, that the soldiers have failed to grasp a particular skill or fact, the instructor will have to teach that part of the basic lesson again; and
- e. number the class prior to safety precautions.

**CONDUCT OF THE LESSON**

- 7. **Safety Precautions.** Normal.
- 8. **Introduction.** Explain the importance of understanding the use of the sight, how to correctly aim the launcher at different ranges, the firing positions, firing drills and misfire drills. These skills are required to get first round hits on targets. This instinctive ability is acquired only after a great deal of practice.
- 9. **Aiming.** Practise the soldiers in adjusting to the target.

10. **Firing Drills:**

- a. explain that in the training test, the soldier is tested on his ability to correctly carry to the firing drill; and
- b. practise the class in the firing drills.

11. **Immediate Action Drill:**

- a. explain that in the training test, the soldier is tested on his ability to carry out immediate actions correctly.
- b. practise the class in immediate actions by using commands; and
- c. question class on what action to take if the immediate actions does not remedy the problem.

## SECTION 3

### PRACTICE 3

#### INSTRUCTOR'S NOTES

1. **Aim.** To practise the soldiers in adopting firing positions.
2. **Time.** Two x 40 minute periods.
3. **Methods.** An outdoor practice period.
4. **Stores:**
  - a. NM 72 E5: one per student; and
  - b. stakes: six each.
5. **Preparation:**
  - a. prepare a chalkboard for the final practice competition as shown in figure 6-1;
  - b. prepare stakes and set in area;
  - c. check NM 72 E5 that all are in working order; and
  - d. position all student NM 72 E5s.
6. **Miscellaneous:**
  - a. the following sequence is to be used to practise the soldier in each stage:
    - (1) remind him of the more common errors related to the stage being practised;
    - (2) assess weakness by practice; and
    - (3) work on the weakness by further practice.
  - b. the final practice is to confirm that the students can adopt the firing positions by:
    - (1) adopting the firing positions; and
    - (2) while being assessed, adopting the firing positions according to standards, without error;

- c. to score give one point to the soldier coming last in a test, two points to the second last, three points to the third last and so on;
- d. if it becomes obvious, during a practice period, that the soldiers have failed to grasp a particular skill or fact, the instructor will have to teach that part of the basic lesson again; and
- e. number the class prior to safety precautions.

#### **CONDUCT OF THE LESSON**

7. **Safety Precautions.** Normal.

8. **Introduction.** Explain the importance of being able to use other positions when firing the launcher. The ability to select rapidly the best firing position is acquired only after a great deal of practice.

9. **Other Positions:**

- a. explain that in the training test, the soldier is tested on his ability to adopt the other position depending on the ground; and
- b. practise the class on the other positions.

10. **Final Practice.** A suggested method of conducting the final practice is by competitions as individuals and teams:

- a. practise each soldier in adopting each of the other positions; and
- b. record individual and team scores on the chalkboard.

11. **Conclusion:**

- a. take questions from class on entire lesson;
- b. safety precautions;
- c. pack up kit; and

12. **Summary.** To include the following:

- a. the overall standard achieved and any weak points; and
- b. forecast of next lesson on this subject.

## SECTION 4

### PRACTICE 4

#### INSTRUCTOR'S NOTES

1. **Aim.** To practice the soldiers in:
  - a. safety precautions;
  - b. loading;
  - c. IA and misfire drill; and
  - d. maintenance.
2. **Time.** Two x 40 minutes periods.
3. **Methods.** An indoor practice period.
4. **Stores:**
  - a. AFV targets: one per fire location;
  - b. NM 72 E5 w/sub-calibre: one per student; and
  - c. 21 m dummy sub-calibre rocket: one per student.
5. **Preparation:**
  - a. prepare a chalkboard for the final practice competition as shown in figure 6-1;
  - b. prepare a scoresheet containing training tests as per annexes A and B;
  - c. set out AFV targets;
  - d. check NM 72 E5 that all are in working order;
  - e. put out student NM 72 E5 w/sub-calibre; and
  - f. put out dummy 21 mm rockets.
6. **Miscellaneous:**
  - a. the following sequence is to be used to practise the soldier in each stage:

- (1) remind him of the more common errors related to the stage being practised;
  - (2) assess weakness by practise; and
  - (3) work on the weakness by further practice.
- b. the final practice is to confirm that the students acquired all the skills required to apply the safety precautions, to load, to perform the IAs and misfire drills and to maintenance of the M-72 E5;
  - c. to score, give one point to the soldier coming last in a test, two points to the second last, three points to the third last and so on;
  - d. if it becomes obvious, during a practice period, that the soldiers have failed to grasp a particular skill or fact, the instructor will have to teach that part of the basic lesson again; and
  - e. number the class prior to safety precautions.

#### **CONDUCT OF THE LESSON**

7. **Safety Precautions.** Normal.
8. **Introduction.** You must know and perform all the drills with the 21 mm sub-calibre instinctively. This instinctive ability is acquired only after a great deal of practice.
9. **Description and Characteristics.** Question the class on the description and characteristics of the 21 mm sub-calibre.
10. **Safety Precautions:**
  - a. explain that in the training test, the soldier is tested on his ability to correctly carry out safety precautions correctly; and
  - b. practise the class in normal safety precautions.
11. **Loading the 21 mm Sub-Calibre:**
  - a. explain that in the training test, the soldier is tested on his ability to load the 21 mm sub-calibre; and
  - b. practise the class loading the 21 mm sub-calibre.

12. **Immediate Actions and Misfire Drills:**
  - a. explain that in the training test, the soldier is tested on his ability to do the IA and misfire drills; and
  - b. practise the IA and misfire drills.
13. **Maintenance of the 21 mm Sub-Calibre:**
  - a. explain that in the training test, the soldier is tested on his ability to maintain the 21 mm sub-calibre; and
  - b. practise maintaining the 21 mm sub-calibre.
14. **Final Practice.** A suggested method of conducting the final practice is by competitions as individuals and teams:
  - a. practise each soldier in the safety precautions, loading, IAs, misfire drills and maintenance of the 21 mm sub-calibre; and
  - b. record individual and team scores on the chalkboard.
15. **Conclusion:**
  - a. take questions from class on entire lesson;
  - b. safety precautions;
  - c. pack up kit; and
16. **Summary.** The overall standard achieved and any weak points.

## CHAPTER 4

### INFORMATION FOR INSTRUCTORS

#### SECTION 1

#### INSPECTION, DECONTAMINATION AND DESTRUCTION

##### GENERAL

1. **Introduction.** This section covers inspection, decontamination and destruction of the NM 72 E5. This weapon require neither preventive maintenance or repairs at unit level. However, it is important that the weapons remain packed until required and that they be kept clean.

##### INSPECTION

2. The NM 72 E5 is issued as a complete weapon system. Inspection is limited to a visual examination of the sealed unit, be examined for the following safety defects and the appropriate corrective action taken:

SERIAL	DEFECT	CORRECTIVE ACTION
(a)	(b)	(c)
1	Damaged, cracked, dented or bent tube, loose parts, firing pin or safety device missing	Return NM 72 E5 to ammunition technical officer (ATO) or issuing agency for disposal
2	Pull pin improperly placed or missing	Correctly replace pull pin. If not available, then return launcher to issuer
3	Safety catch not in the safe position.	Place safety catch to safe. If defective, the launcher is to be returned

<b>SERIAL</b>	<b>DEFECT</b>	<b>CORRECTIVE ACTION</b>
(a)	(b)	(c)
4	Cracks in the launcher tube.	Return to issuer
5	Damage to the flexible tube between the primer housing and the rocket may be noticed when launch is extended.	Damaged area will be taped to prevent loss of the igniter composition. Put weapon aside for disposal by the ATO.
6	Damaged or broken sights	The weapon will be returned to the issuer for repair.
7	Cuts or nicks over 3 mm wide in the rear of the extended launcher.	Set weapon aside for disposal by the ATO.

### **DECONTAMINATION**

3. To decontaminate the NM 72 E5, decontamination personnel must wear a complete set of protective clothing (permeable or impermeable) including impermeable protective gloves and a protective mask.
4. If contamination occurs with chemicals other than blister agents, G-series or V-agents, decontamination can be accomplished by airing or washing the contaminated areas.
5. If the source or contamination is a blister agent, G-series or V-agent, the affected area should be cleaned of all dirt, grease or oil, and scrubbed with soap and water, or cleaned with a non-corrosive decontaminating agent.

### **DESTRUCTION**

6. Destruction of weapon systems will be undertaken when they cannot be carried by the forces available and there is an imminent danger of their falling into enemy hands. Adequate destruction requires that all parts essential to operation of the system be destroyed beyond repair. Priority however, is first given to the destruction or firing of the rocket when practicable. This will prevent its re-use as part of a makeshift explosive system. As a minimum, the firing mechanism and the launch tube are to be destroyed. Bulk supplies of the weapon system can be disposed of by burning, demolition, gunfire and crushing. All documents, notes, instructions and other written material pertaining to function, operation, maintenance or employment, including drawings and parts list, must be rendered useless to an enemy.

7. **Destruction and Rendering Non-Serviceable.** There are three possible methods of destruction or rendering the weapon non-serviceable:

- a. fire the weapon and spike or distort the tubes with a rifle butt. The sights and firing mechanism should be destroyed;
- b. if firing is not possible, remove the covers and sling, and damage the tube with a rifle butt at point of the trigger and below the front sight. The launcher is not to be extended; and
- c. when feasible carry out sub-paragraph b and bury the weapon in a hole or throw it into water after having ensured that the covers are removed.

8. Any time that the weapon is fired in a tactical situation, the launcher should be destroyed to prevent its use by enemy irregulars as part of an improvised weapon system.

## SECTION 2

### TACTICAL EMPLOYMENT AND ENGAGEMENT OF TARGETS

#### GENERAL

1. This describes techniques for the tactical employment of the NM 72 series of anti-armour weapons.

#### ROLES

2. The NM 72 is self-defence anti-armour weapon. Its primary role is close anti-armour defence in the forward areas.

3. Secondary role includes:

- a. use as a principal weapon of tank hunting teams and ambushes, particularly in close country and built-up areas. Its portability makes it most useful for this role;
- b. the destruction of enemy bunkers, prepared positions, and enemy held buildings in built-up areas;
- c. emergency anti-armour defence in the rear areas; and
- d. the emergency engagement of dismounted troops in the open.

4. Except where specified, this chapter is limited to the discussion of the primary role of the NM 72 series weapons.

#### COMMAND, CONTROL AND DEPLOYMENT

5. The launcher is issued as a munition and is carried in addition to a personal weapon. In determining the scale of issue, the armour threat and the carrying capacity of a unit will be considered. In a general war setting, a scale of one NM 72 series weapon per man of a user unit is considered a minimum requirement. The actual distribution will be determined by the Commanding Officer according to his appreciation of the threat.

6. Infantry sections are sited principally to provide security for the major weapons which form the framework of defence. The need to cover the likely armour approaches is thus of paramount concern and in siting the individual weapon arcs of fire, platoon and section commanders must ensure that these are adequately covered. It is probable that most positions can be advantageously sited for the use of the launcher, but there will be exceptions. In preparing positions from which the weapons are intended to be used the problem of back blast and venting of gases must be recognized, particularly when the positions are to have full over head protection.

7. To simplify the difficulties of fire control under battle conditions, a minimum of two riflemen in the section will be designated to work as a weapon team. Depending upon the situation and the number of weapons available, further pairs may be designated. Thorough preparation including prior briefing will be used to ensure that team engagements are executed automatically and with effect.

8. It will not be usual to form teams from firers of crew-served or automatic weapons unless:

- a. the threat warrants it; and
- b. their use is foreseen should the primary weapon be rendered inoperable.

#### **ENGAGEMENT CRITERIA**

9. **Engagements should be undertaken in accordance with the following criteria:**

- a. multiple firing on a single target;
- b. the use of a known range;
- c. firing at halted targets;
- d. firing at vulnerable points; and
- e. firing from cover.

10. **Multiple Firings.** Multiple firings by one or more individuals increase the probability of a hit; targets must normally be hit with two or more rounds to ensure a kill, (a factor of accuracy, not of terminal effect). Therefore, designated firers should carry two or more weapons and all engagements should be planned for a minimum of two rounds against the same target.

11. **Use of a Known Range.** All teams should be sited to cover definite interlocking arcs with the distance to artificial (e.g. stakes) or natural reference points measured beforehand and recorded on range cards. A maximum effective range of 150 metres from the firer will be observed, with most engagements planned for 100 metres, the optimum range.

12. **Firing at Halted Targets.** Success is more certain against a halted target not only because the probability of a first round hit is increased, but also because more time is given to engage with succeeding shots. An artificial or natural obstacle should be used to force the target to halt or slow down.

13. **Firing at Vulnerable Points.** Because the terminal performance of the round is limited, it is important to attempt engagement of tank targets at their weaker points. In siting the weapon in relation to armour approaches, this factor must be given very careful consideration. The point of aim will normally be the centre of mass. However, for skilled firers, or when the firer can

engage at close range, more specific vulnerable points can be engaged. Engagement priorities with respect to the most vulnerable portions of a tank are:

- a. **Rear or Top Rear.** This portion has the least armour protection. Although this is the most vulnerable point, an engagement of this kind is usually only possible in ambushes or tank hunting operations. In a defensive position, engagements to the flanks and front are the norm. Troops who are being by-passed or overrun however, will often have opportunities to engage the rear of tanks and should take every reasonable occasion to do so;
- b. **Flanks.** Due to the location of crew, fuel, and ammunition, the preferred point of impact, is the forward half of the hull including the turret; and
- c. **Front.** The front of the tank has the most armour protection, however, when engaging, the left side of the hull (as you face it) is the preferred point of impact due to the fuel and ammunition stowed there.

14. **Firing from Cover.** Firing should be done from concealed positions and where possible, from a position outside the target's most evident arc of observation, e.g. in the case of a tank when its turret is traversed in the opposite direction to the firer. In a defensive position, cover and concealment are normal, however, protection from view may be improved by smoke and other obscuration, e.g. fog, dust, artillery bursts, etc. Target presentations will normally be from the front or flank. When this can be influenced as in the case of tank hunting, the firers must ensure that they are in the best possible concealed positions before engaging. Where possible, tanks being stalked should be engaged from the rear.

#### **METHODS OF ENGAGEMENT**

15. **General.** One individual firing a single weapon at a particularly close range can achieve a kill; however, when a second round is fired using the first as a reference, the probability of a hit/kill increases greatly. Further, the probability of a hit increases with a decrease in range. Therefore, engagement ranges are limited as follows:

- a. **Single Firing.** For success, single round engagements (one man, one weapon) require accurate range and speed determination, and a hit in a vulnerable area. Ranges can be the same as for multiple firings, but closer known range engagements greatly increase the chances of success; and
- b. **Multiple Firings.** Using the following techniques, the opening range for engagements will be 150 metres, with most engagements planned for 100 metres.

16. **Firing Techniques.** The use of measured stakes and range cards coupled to the use of the following technique will enhance the probability of a first round hit and shorten the time of engagement. The following techniques should be used in the priority in which they are listed:

- a. **Pair Firing.** This is the normal and preferred technique. The target is engaged by

one member of the team who announces the estimated range and lead he will use and then fires. A second member observes the impact of the first round, announces a revised estimate of range and lead, and fires. Members continue exchanging range and lead information, until a hit is achieved. Firing should continue until the target is destroyed.

- b. **Sequence Firing.** One individual with several rounds engages the target. The individual makes adjustments to the range and lead of succeeding rounds until a hit is achieved. He continues engaging until the target is destroyed.
- c. **Volley Firing.** In this technique, a target is engaged simultaneously by all teams within a section with succeeding shots fired by members making their own ranging adjustments until the target is destroyed.

17. **Target Destruction.** Firing should not cease until the target is destroyed. A tank should not be considered destroyed until:

- a. the crew leaves the vehicle; or
- b. the turret stops moving and weapons stop firing; and/or
- c. there is a secondary explosion after the impact of a round.

18. **Fire Control:**

- a. As part of the occupation process of a defensive position and to facilitate the control of fire, the platoon commander and section commanders will brief the weapon team(s) on:
  - (1) the site of the weapon team(s),
  - (2) the setting out of range stakes and preparation of range cards,
  - (3) the method of engagement foreseen,
  - (4) the arcs of fire and reference points, and
  - (5) opening engagement ranges and opening fire policy, e.g., automatic or by voice/hand signal.
- b. It will be normal to delegate authority to open fire to the senior member of the team(s). However, commanders must be prepared to influence the above by voice commands or hand signals, if necessary and practicable.

19. **Target Selection.** Selection of the target will be made by the senior team member, normally in the following priority:

- a. **Tanks.** those that are closest to the position, within the assigned arc and presenting the immediate menace.
- b. **Armoured Personnel Carriers (APCS)** with infantry on board or presenting an immediate threat.

## **SECONDARY ROLES - SPECIAL CONSIDERATIONS**

20. **Tank-hunting/Ambushes.** Fire control will generally be exercised more closely by the local commander. Ambushes may permit the use of range cards and stakes but tank-stalking will usually require accurate range and speed estimation without prior reference. Engagements will be planned for ranges as close as possible. All firing techniques have application.

21. **Against Prepared Positions/Bunkers/Built-up Areas.** Pair and sequence firing will be normal. The point of aim will usually be an embrasure, loophole or other opening in the target. The maximum opening range should remain 150 metres.

22. **Emergency Anti-Armour Defence of HQs, Echelons and Harbours.** NM 72s will be most effective in this role when they are issued to pairs of sentries tasked with guarding likely armour approaches. Remaining weapons may be distributed throughout the element bearing in mind that best results are achieved by:

- a. issuing two or more weapons to each prospective firer; and
- b. forming launcher teams from selected personnel, who would go into action as part of normal alert measurers.

23. **Against Troops in the Open.** When employed as an area fire weapon against massed enemy troops in the open, the area target may be engaged at the maximum range. However, it is stressed that this is an emergency measure only. Mortars, artillery and machine-guns are far better for this task, and NM 72s must be conserved to meet the armoured threat.

## SECTION 3

### EMPLOYMENT IN VARIOUS CLIMATIC CONDITIONS

#### GENERAL

1. The NM 72 E5 requires no field maintenance in the ordinary sense but precautionary measures must be taken under certain environmental conditions. These are discussed briefly in the articles that follow.

#### OPERATION IN COLD CLIMATES

2. In climates where the temperature is consistently below 0° C, it is necessary to prevent ice formation on the moving parts of the weapon. If the weapon is carried in the extended position, it must be ensured that snow or ice does not accumulate in the launcher tube.

3. The NM 72 E5 will not be fired if temperatures drop below -40° C.

#### OPERATION IN HOT CLIMATES

4. In climates where the temperature is consistently hot, care should be taken to protect the rocket from excessive heat, in particular the direct rays of the sun. Prolonged storage at a high temperature will increase the rate of deterioration of the propellant and must therefore be avoided.

5. The hot climate limitation for firing the NM 72 E5 is a temperature in excess of 60° C.

#### TERRAIN CONDITIONS

6. **Sand.** With the launcher sealed no special precautions are necessary when operating in sandy areas. If the launcher seal has been broken or if it is carried extended, sand must not be allowed to accumulate in the launcher tubes.

7. **Mud.** Placing the weapon on muddy or swampy ground must be avoided when possible. When unavoidable, it must be wiped clean before using. If water enters the weapon it must be drained before firing.

8. **Hand Carried Forging.** With the launcher sealed no special precautions are necessary when forging. If the launcher has been opened and then closed it is no longer water-proof and must be kept clear of water.

**CHAPTER 5**  
**RANGE PRACTICES**

**INTRODUCTION**

1. All range practices should be conducted as an extension of previously taught lessons. Prior to any live firing, commanders should examine the aim of the range practices to be conducted and review the appropriate lessons.
2. Range practices and standards are in figures 5-1 and 5-2.

**AIM**

3. Live five range practices are designed to confirm and assess the basic skills of the firer in target engagement.

**GENERAL**

4. Stores. A standard set of stores required for every range practice includes:
  - a. NM 72 E5 as required;
  - b. NM 72 E5 sub-calibre as required;
  - c. 21 mm ammunition as required; and
  - d. Phillips screw driver: 1 for each sub-calibre.
5. Additional stores as required by the range being run.
6. **Preparation.** Prior to the day of firing:
  - a. book the range and confirm the booking;
  - b. read range standing orders;

SERIAL	TARGET	RANGE	SYSTEM	HITS REQUIRED
(a)	(b)	(c)	(d)	(e)
1	Stationary	100 m	SCTD	2 out of 3
2	Stationary	150 m	SCTD	
3	Stationary	150 m	NM 72 E5	
4	Mover	75-150 m	SCTD	2 out of 3
5	Mover	75-150 m	SCTD	
6	Mover	75-150 m	SCTD	

Figure 5-1 Individual Test - NM 72 E5

SERIAL	TARGET	RANGE	SYSTEM	HITS REQUIRED
(a)	(b)	(c)	(d)	(e)
1	Stationary	150 m	5 SCTDs	3 out of 5
2	Stationary	75-150 m	5 SCTDs	3 out of 5

Figure 5-2 Team Test - NM 72 E5

- c. indent for ammunition;
  - d. identity review lessons; and
  - e. reconnaissance the range allotted.
7. **Miscellaneous.** All range staff are to be fully conversant with the details in chapter 4.
8. **Safety Precautions:**
- a. normal safety precautions as applicable to the range being used; and

- b. all range staff are to be fully conversant with the Range Standing Orders and B-GL-304-003/TS-001, Operational Training, volume 3, Ranges and Training Safety.

9. **Range Regulations.** The regulations given here apply to peacetime training. Ear defenders and steel helmets are to be worn during firing practices as stated in B-GL-304-003/TS-001.

10. High explosive anti-tank (HEAT) rockets are to be fired only from a correctly constructed emplacement, details of which are included in B-GL-304-003/TS-001. It is important that the rest of the launcher should be above ground level, and project beyond the rear wall of a trench.

11. If more than one firing position is required, the distance between them from centre to centre must be at least 12 metres and they must be laterally in line with each other. The ground behind the firing position must be free of any vertical face or obstruction (Figure 5-3) on any line of fire. Weapons, ammunition and stores must never be dumped in this area.

**CAUTION**

Any unchecked weapon must be treated as containing a live rocket until proven otherwise.

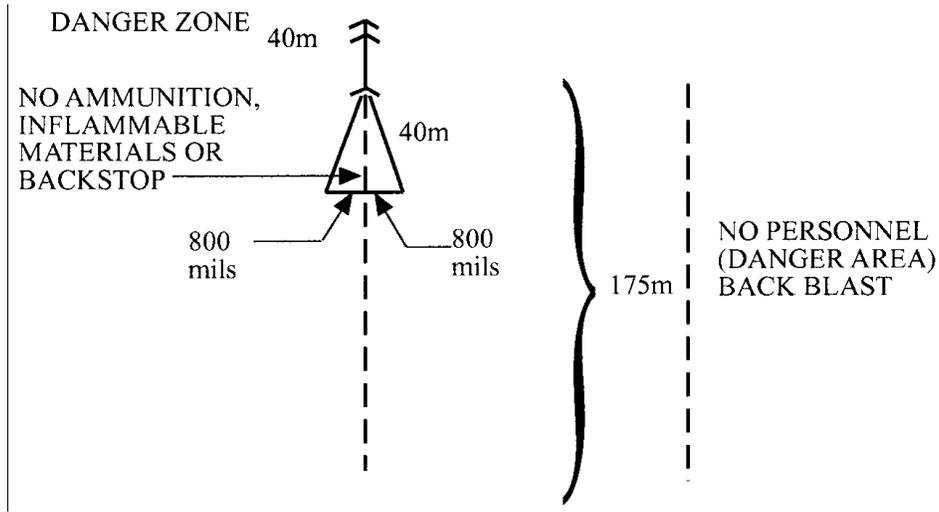


Figure 5-3 Backblast Danger Area

12. A control tower should be provided for the officer in charge (OIC) of the exercise and sited so that he can observe all firers, waiting details, and the entire area of ground around the target. He must be able to see the ground beyond the target for the purpose of plotting the position of any dud rockets. In the event that there is no control tower, OIC of the firing exercise

must occupy a trench on the firing line that gives him the best overall view. He must take the same precautions as the firers when the rocket hits the target.

13. A splinter-proof shelter should be provided for waiting relays. This is usually situated 12 metres to a flank. If no waiting relay shelter is available, waiting details must stay to the rear of the firing line, outside the backblast area, and at least 250 metres from any target being engaged.

14. **Targets.** These should be pieces of armour plate of sufficient size to present a worthwhile target. Old tank hulls are ideal. The incidence of duds can be reduced if rockets that miss the target are stopped by a back stop sufficiently dense to actuate the fuze. Rockets are therefore only to be fired on an approved range with such a back stop behind the target, or where the target area is a closed one. When firing at moving targets it should be remembered that a backblast area exists behind the weapon, the angle of which is determined by the angle of the arc of fire plus 800 mils on either side of the centre line (Figure 5-3).

15. **Minimum Range in Peace-time.** The minimum range at which targets may be engaged in peace-time training is 75 metres. Only personnel actually involved in firing, supervising, or coaching are allowed within the safe distance of 250 metres of a target, and they must be behind cover.

16. **Range Firing Procedures.** The following precautions apply when firing the M72E5 and C7:

- a. The OIC of the firing exercise will ensure that all weapons are inspected before firing. (See Section 1, Chapter 4.)
- b. Personnel will wear steel helmets. Parka hoods will not be worn because the hood might be caught in the backblast.
- c. Before firing, the entire backblast area must be clear of all men, equipment, and flammable material. Soldiers not firing must be in shelters or at least 250 metres away from targets being engaged.
- d. Range firing will not commence until the OIC of the firing exercise knows that the range is clear. He is the one who will order fire to commence.
- e. No person will move to, or leave, the firing line without the permission of the OIC of the firing exercise.
- f. All weapons should be covered to protect them from the rays of the sun. Weapons will not be fired when temperatures exceed the operating limits of the munition – 40°C to +60°C.
- g. Fired tubes will be kept segregated from launchers containing live rockets.
- h. To account for all duds, a non-commissioned officer should be designated to

count the number of rockets fired and the number of explosions.

### CAUTION

The piezo-electric crystals in the M18 series warhead of a fired rocket which fails to function and becomes a blind, may be hypersensitive to: a change in temperature, a slight wind blow, or other force which might cause stress in the crystal. Servicemen must be extremely careful not to disturb a blind containing a piezo-electric element, in any way. Blinds will be destroyed in situ in accordance with CFTO C-74-050-005/MS-000, Destruction of Dud and Misfired Ammunition.

17. An expended launcher can be a valuable item for future use as a training aid. It should, therefore, be handled carefully and returned to the issuing facility for modifications.
18. **Backblast Area.** The M72E5. The propellant gases escape to the rear of the launcher and can cause severe injury to personnel and damage to equipment located within close proximity to the breech of the launcher (Figure 5-3). The danger zone extends 40 metres to the rear of the launcher and has a base of 1600 mils. All personnel, equipment and flammable materials must be clear of this area. The total backblast danger area is 175 metres deep and includes a burst danger area in which no personnel are allowed. During training, the 40 metre danger area should be marked off and kept clear of all personnel and equipment. Forward danger area templates for both stationary and moving targets are shown in B-GL-304-003/TS-001, Operational Training, Volume 3, Ranges and Training Safety.
19. **Annual Qualification.** The annual qualification test shown in figures 5-1 and 5-2 represent the minimum standard for the infantryman and infantry section. The tests should also be used as the final confirmation of a course of instruction. However, the normal annual allotment of one 66 mm rocket per man will not be sufficient for the suggested qualification practice unless it is supplemented by the subcalibre training device (SCTD). The test ensures firers are effective at the ranges and for the conditions shown for each engagement. The team test described in figure 5-2 is desirable in annual training and course qualification and should be conducted when circumstances and training ammunition quotas permit.

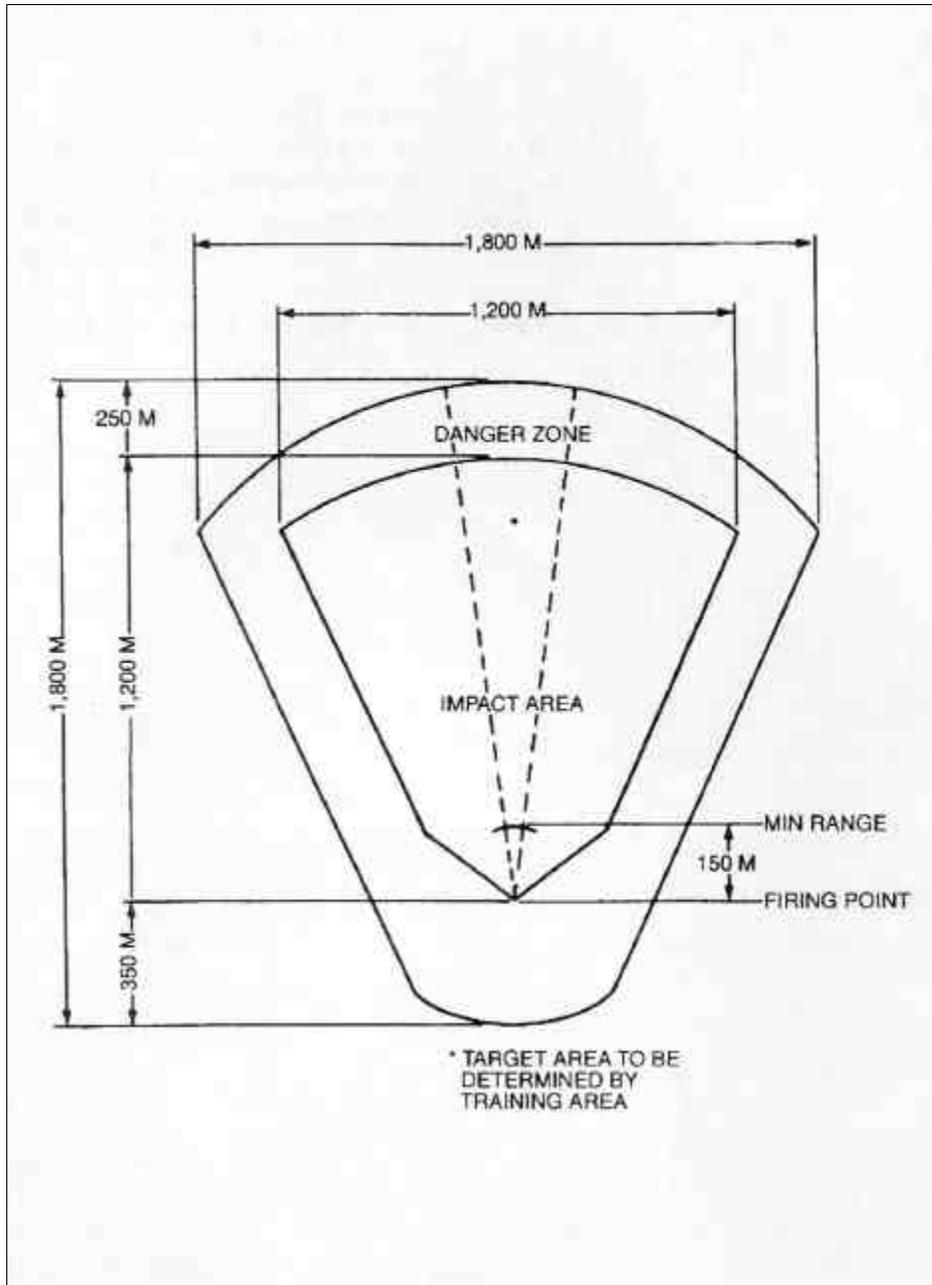
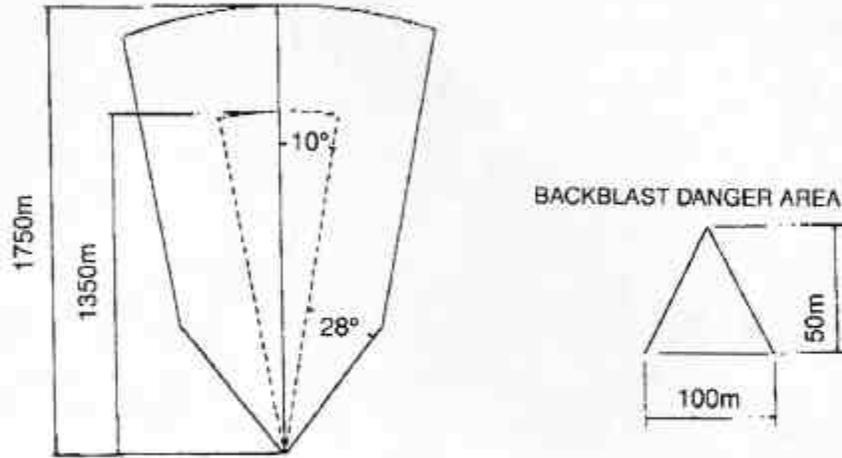


Figure 5-4 Danger Area Template - NM 72 E5, Moving Target

DANGER AREA TEMPLATE  
NM 72 E5

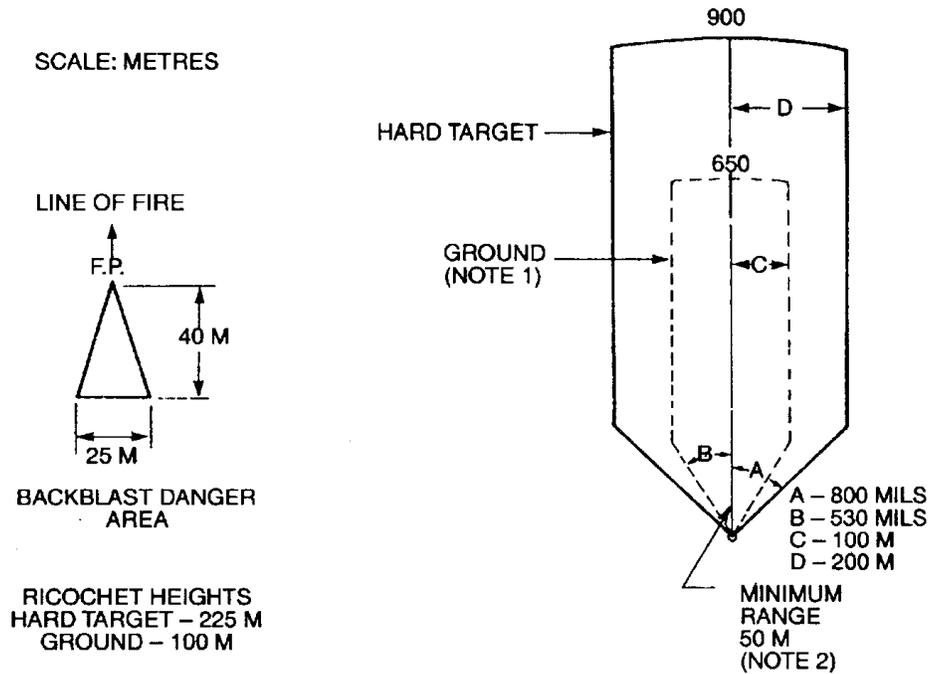


NOTE

1. DOTTED AREA REPRESENTS MOVING TGT AREA
2. FOR STATIONARY TGT REDUCE TGT AREA TO 5 DEGREES LEFT/RIGHT OF LINE GT

Figure 5-5 Danger Area Template NM 72 E5, Stationary Target

**DANGER AREA TEMPLATE  
SUB-CALIBRE TRAINING  
DEVICE 21 MM NM 72 E5**



**NOTES**

1. GROUND DANGER AREA MAY BE USED WHEN:
  - (a) MAXIMUM QE DOES NOT EXCEED 340 MILS.
  - (b) PENETRABLE TARGETS ARE ENGAGED OVER GROUND FREE FROM CONCRETE, ROCKS AND STEEL.
  - (c) APPROPRIATE GROUND CONTOURS OR BACK-STOPS ARE PRESENT TO LIMIT TRAVEL OF SHOT.
2. ALTHOUGH ROUND HAS NO "BURST SAFETY DISTANCE", PIECES OF PROJECTILE MAY BE DEFLECTED UP TO 50 M FROM THE SURFACE OF A HARD TARGET.

Figure 5-6 Danger area template sub-calibre training device 21 mm NM 72 E5

**CHAPTER 6**  
**HANDLING TESTS**

**PURPOSE**

1. The purpose of handling tests is to ensure that the student has reached an efficient standard of weapon handling before advancing to live firing.
2. Standards should be measured:
  - a. at appropriate stages during training; and
  - b. annually in all units.

**CONDUCT**

3. The tests are to be done consecutively. They may be conducted in barracks using a dummy launcher.

**DRESS**

4. Fighting order, less steel helmet, will be worn for all tests.

**STANDARDS**

5. The following standard will apply:
  - a. Skilled: Skilled standard in all tests;
  - b. Average: Minimum of average in one or more tests; and
  - c. Fail: Fail in one or more tests.

**NM 72 E5 FINAL PRACTICE COMPETITION**

SERIAL	NAME	PREPARE LAUNCHER FOR FIRING AND GIVE TGT	FIRE	MISFIRE	STILL FAILS TO FIRE	STILL FAILS TO FIRE	CEASE FIRE, MAKE SAFE	PASS	FAIL
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1									
2									
3									
4									
5									
<p><b>STANDARDS</b></p> <p>THE FOLLOWING STANDARDS WILL APPLY:</p> <p>A. SKILLED: SKILLED STANDARD IN ALL TESTS</p> <p>B. AVERAGE: MINIMUM OF AVERAGE IN ONE OR MORE TESTS; AND</p> <p>C. FAIL: FAIL IN ONE OR MORE TESTS.</p>									

Figure 6-1 NM 72 E5 Final Practice Competition

**PREPARING THE NM 72 E5 FOR FIRING**

SERIAL	SKILL TO BE PERFORMED	PASS/FAIL	REMARKS
(a)	(b)	(c)	(d)
1	COMMAND		
2	PREPARE TO NM 72 E5 FOR FIRING		
3	1. With the feet in the firing position, the student will turn the upper portion of his body so that the weapon is pointed down range. Ensure the back blast area is clear.		
4	2. Remove the pull pin		
5	3. Rotate the rear cover downward.		
6	4. Disengage cover and sling.		
7	5. Extend the launcher grasping the rear sight cover with the firing hand and the forward portion of the outer tube with the non-firing hand.		
8	6. Sharply pull the hands away from each other until the launcher locks into position.		
9	7. To ensure that the launcher is fully extended, the firer will try to collapse the launcher by reversing the motion of the hands.		
10	8. Check the back blast area.		

SERIAL	SKILL TO BE PERFORMED	PASS/FAIL	REMARKS
(a)	(b)	(c)	(d)
11	9. Place the launcher on the shoulder in the correct firing position.		
12	10. Move the trigger safety handle to the ARM position.		
13	11. Aim the launcher.		
14	COMMAND		
15	FIRE		
16	12. Depress the trigger bar.		

**ACTION ON MISFIRE NM 72 E5**

SERIAL	SKILL TO BE PERFORMED	PASS/FAIL	REMARKS
(a)	(b)	(c)	(d)
1	COMMAND		
2	MISFIRE		
3	1. Maintain the aim for 10 seconds.		
4	2. Ensure the trigger safety handle is in the ARM position.		
5	3. Squeeze the trigger again. If the weapon does not fire, carry out the following drill:		
6	a. maintain the aim for one minute.		
7	b. then attempt to return the trigger safety handle to the SAFE position.		
8	c. remove the launcher from the shoulder keeping the weapon aimed down range and ensure the back blast area is clear;		
9	d. depress the detent and collapse the launcher approximately 120 mm;		
10	e. re-extend the launcher ensuring it is locked;		
11	f. check the back blast area;		
12	g. place the launcher on the shoulder;		

SERIAL	SKILL TO BE PERFORMED	PASS/FAIL	REMARKS
(a)	(b)	(c)	(d)
13	h. pull the safety handle to the ARM position; and		
14	i. aim and squeeze the trigger		
15	4. If the weapon still does not fire, keep the weapon aimed on the target for one minute.		
16	5. Then attempt to return the trigger safety handle to the SAFE position.		
17	6. Do not collapse the launcher. Remove it from the shoulder and carry it to a flank (50 meters) for disposal. Ensure that the weapon is pointed downrange and that the back blast area is clear while carrying the weapon.		

**MAKING SAFE AN UNFIRED WEAPON NM 72 E5**

SERIAL	SKILL TO BE PERFORMED	PASS/FAIL	REMARKS
(a)	(b)	(c)	(d)
1	COMMAND		
2	CEASE FIRE, MAKE SAFE		
3	Return the trigger safety handle to SAFE.		
4	Remove the weapon from the shoulder.		
5	Depress barrel detent, collapse launcher.		
6	Guide front and rear sight into position.		
7	Replace sling assembly.		