SHOULDER-LAUNCHED MUNITIONS

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SHOULDER-LAUNCHED MUNITIONS

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Preface

This manual provides technical information and training and combat techniques for shoulder-launched munitions. Intended users include leaders and designated Soldiers who will use this information to successfully integrate shoulder-launched munitions into combat operations. This manual discusses gunnery training and the train-the-trainer program.

The tactical positions shown in this manual were drawn to enhance the reader's understanding of related subject systems and do not necessarily represent the best employment option for that system.

This publication applies to the Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Army Reserve (USAR).

The proponent of this publication is the U.S. Army Training and Doctrine Command. The preparing agency is the U.S. Army Infantry School. Send comments and recommendations to doctrine@benning.army.mil, or on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commandant, U.S. Army Infantry School, ATTN: ATSH-IN-S3, Fort Benning, GA 31905-5593.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

Blank DA Form 7323-R (M72-Series Law Scorecard) and DA Form 7324-R (M136 AT4 Scorecard) are available in the back of this manual for local reproduction.

Chapter 1
INTRODUCTION

Shoulder-launched munitions are used against light armored vehicles, field fortifications, or other similar targets. These weapons are issued as rounds of ammunition to individual Soldiers in addition to their assigned weapons and the unit's organic antiarmor weapons. Shoulder-launched munitions can withstand extreme weather and environmental conditions including arctic, tropical, and desert. This chapter provides information common to the weapons discussed in this manual to include care and handling, destruction and decontamination procedures, and operating temperatures.

TYPES OF SHOULDER-LAUNCHED MUNITIONS

1-1. Shoulder-launched munitions include the M136 AT4 light antiarmor weapon, the M72-series light antiarmor weapon (LAW), improved M72-series LAW, and the M141 bunker defeat munition (BDM) (a shoulder-launched, multipurpose assault weapon-disposable [SMAW-D]). The M72-series LAW (M72A2 and M72A3) was introduced in the early 1960s for use against light tanks of that era (Figure 1-1). More recent and improved versions of the M72-series LAWs were produced in the 1990s and include the M72A4, M72A5, M72A6, and M72A7 (Chapter 5). The M136 AT4 was designed in the late 1980s for use against the improved armor of light armored vehicles (Figure 1-2, page 1-2), and the M141 BDM was developed in the early 1990s primarily to use against bunkers (Figure 1-3, page 1-2).

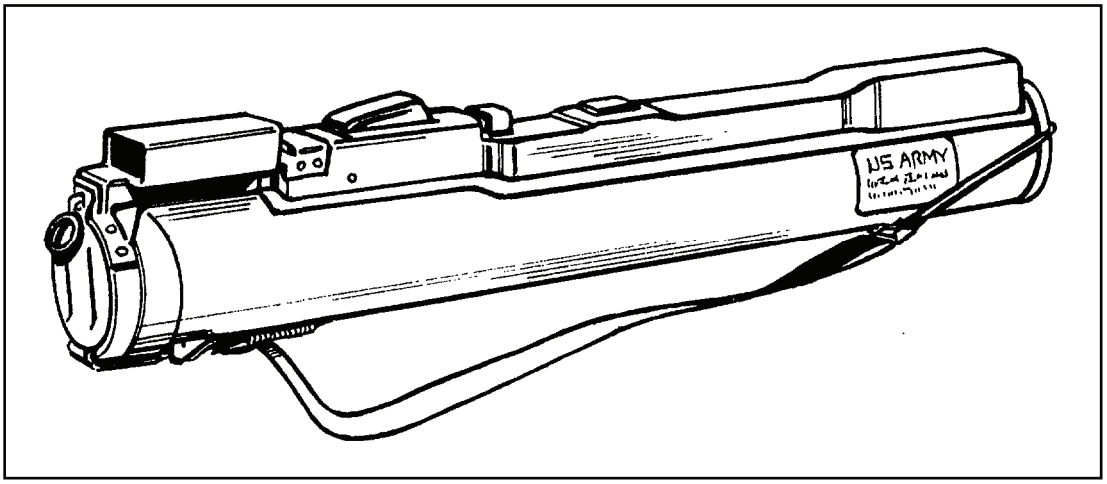

Figure 1-1. M72A2/A3 light antiarmor weapon.

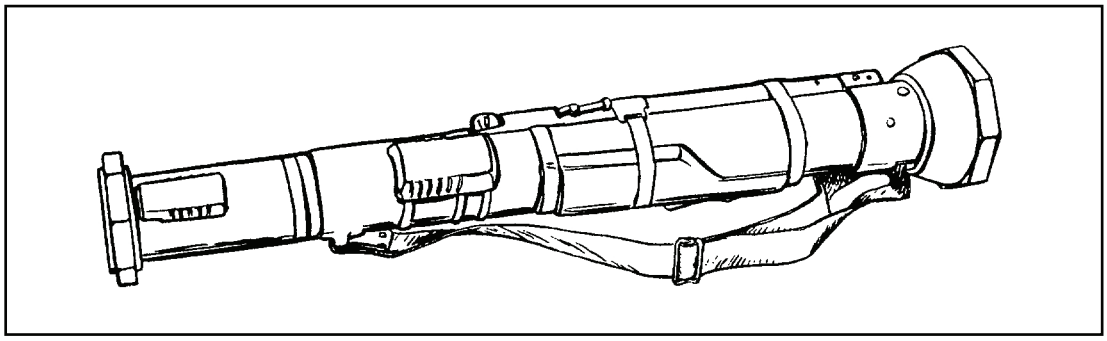

Figure 1-2. M136 AT4 light antiarmor weapon.

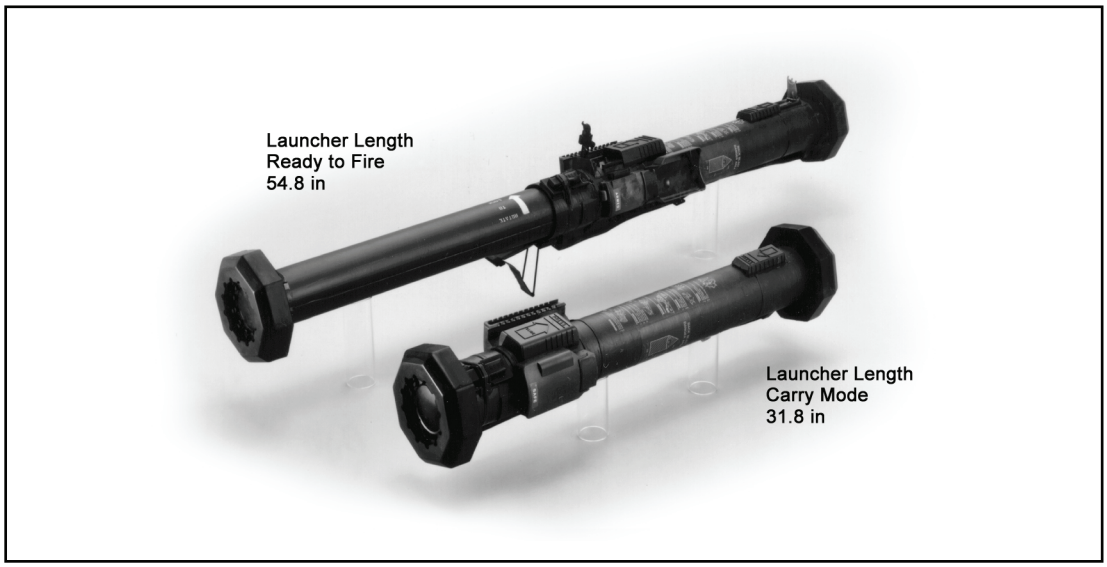

Figure 1-3. M141 BDM.

CARE AND HANDLING

1-2. Shoulder-launched munitions are issued as rounds of ammunition. The only requirement for their care is a visual inspection; this information is outlined in the appropriate chapter for each weapon (Chapter 2 for the M136 AT4, Chapter 5 for the M72-series LAW and improved M72 light antiarmor weapon, and Chapter 6 for the M141 BDM).

DESTRUCTION PROCEDURES (COMBAT ONLY)

1-3. In combat, live and expended shoulder-launched munitions are destroyed only to prevent their capture or use by the enemy and, even then, only on order. For such an order to be given, the weapons must be so badly damaged that neither repairs nor cannibalization can restore them to usable condition (FM 5-25). Table 1-1 provides destruction procedures for live and expended shoulder-launched munitions; Appendix A discusses safety precautions to follow when destroying them.

DANGER

BEFORE USING ANY DESTRUCTION PROCEDURE, MOVE TO A SAFE POSITION AND TAKE COVER TO AVOID POSSIBLE INJURY OR DEATH. BEFORE USING DEMOLITIONS FOR ANY REASON, YOU MUST KNOW THE PROPER PROCEDURES IN FM 5-25.

LIVE SHOULDER-LAUNCHED MUNITIONS	DEMOLITION	Prepare a 113-gram (one-quarter pound) demolition charge. Tape or tie the charge over the propellant charge. Dual prime the charge to reduce the chance of a misfire.
	BURNING	Construct a pit or trench deep enough to allow 0.6 meters (2 feet) of space between the weapons and the top surface of the ground. Place combustible material, such as wood, paper, or rags, in the pit and then place the weapon inside, pointed into the side of the pit and directed away from all friendly Soldiers. Pour diesel fuel or oil over the weapons and the combustible material.
	FIRING	If time does not permit use of the previous methods, dispose of the weapons by firing them randomly in the direction of the enemy. Before using this method, observe all appropriate safety requirements.
EXPENDED SHOULDER-LAUNCHED MUNITIONS	MECHANICAL	Never use mechanical means to destroy any **live** shoulder-launched munition or expended M136 AT4 or M141 BDM rounds. You may do so to destroy the residue from an **expended** M72-series LAW. For example, you can drive over it with a tracked vehicle or strike it with a pick, ax, or other object, as long as you make it unusable.
	DEMOLITION	Same as a live round.
	BURNING	Same as a live round.

Table 1-1. Destruction procedures for shoulder-launched munitions.

DANGERS

1. **WHEN USING FIRE TO DESTROY A SHOULDER-LAUNCHED MUNITION, THE TIME REQUIRED TO EXPLODE THE WARHEAD IS UNPRE-DICTABLE. ALSO, IGNITING THE PROPELLANT CAN CAUSE IT TO FIRE THE WARHEAD IN ANY DIRECTION, WHICH COULD CAUSE INJURY OR DEATH.**
2. **OBSERVE THE APPROPRIATE SAFETY PRECAUTIONS WHEN HANDLING DIESEL FUEL. CARELESSNESS COULD CAUSE PAINFUL, EVEN FATAL, BURNS.**
3. **DO NOT TRY TO USE VEHICLES OR MECHANICAL MEANS TO DESTROY SHOULDER-LAUNCHED MUNITIONS. EITHER METHOD COULD DETONATE THE WARHEAD OR PROPELLANT CHARGE, WHICH COULD CAUSE INJURY OR DEATH.**

DECONTAMINATION PROCEDURES

1-4. The Soldier can use his M258A1 or decontamination kit, individual equipment (DKIE) (M280) to remove H-series, G-series, and V-series agents. FM 3-5 provides more information about decontamination procedures for equipment and weapons.

DANGER

NEVER USE DS2 TO DECONTAMINATE ANY SHOULDER-LAUNCHED MUNITION. THE DS2 WOULD DISSOLVE THE RUBBER AND PLASTIC SEALS, ALLOWING THE DS2 TO REACH THE PROPELLANT AND PRODUCE AN EXTREMELY HAZARDOUS MIXTURE.

OPERATING TEMPERATURES

1-5. Operating temperatures for the M136 AT4, M72-series LAW, and improved M72-series LAW, are -40 degrees to +60 degrees Centigrade (-40 degrees to +140 degrees Fahrenheit). Operating temperature for the M141 BDM is -32 degrees to +49 degrees Centigrade (-20 degrees to +120 degrees Fahrenheit). Firing shoulder-launched munitions in temperatures outside these limits could cause a misfire or produce some other hazard for the Soldier (Appendix A).

Chapter 2

M136 AT4 OPERATION AND FUNCTION

This chapter provides information and technical data for the M136 AT4 light antiarmor weapon, including its characteristics, nomenclature, and operation. Its function, firing mechanism, and safeties are also discussed.

DESCRIPTION

2-1. The M136 AT4 is a lightweight, self-contained, antiarmor weapon. It consists of a free-flight, fin-stabilized, rocket-type cartridge packed in an expendable, one-piece, fiberglass-wrapped tube (Figure 2-1). The M136 AT4 is man-portable and fired from the right shoulder only. The launcher is watertight for ease of transportation and storage. Though the M136 AT4 can be employed in limited visibility, the firer must be able to see and identify the target and estimate the range. Unlike the M72-series LAW and the M141 BDM, the M136 AT4 launcher need not be extended before firing.

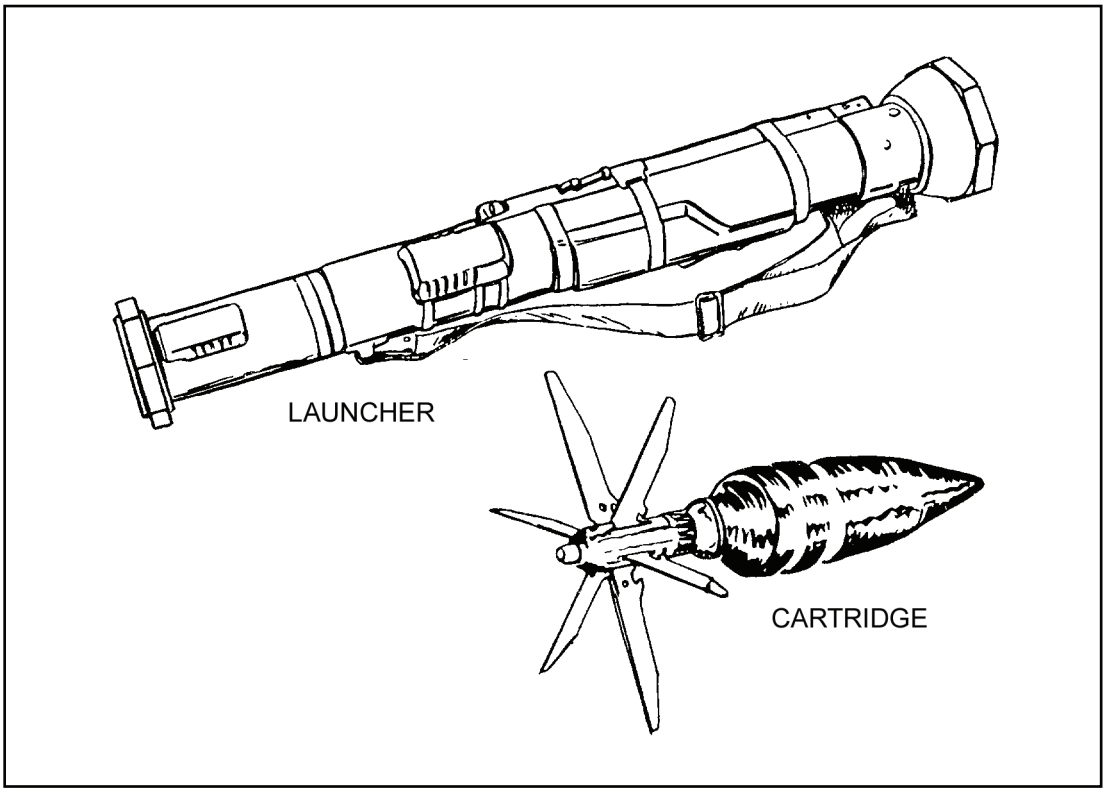

Figure 2-1. M136 AT4 launcher and HEAT cartridge.

TECHNICAL DATA

2-2. The following data apply to the M136 AT4:

- **Launcher.**
  - Length: 1,020 millimeters (40 inches).

- Weight (complete system): 6.7 kilograms (14.8 pounds).
- Rear sight: range indicator, graduated in 50-meter increments.

- **Rocket.**
  - Caliber: 84 millimeters.
  - Muzzle velocity: 290 meters per second (950 feet per second).
  - Length: 460 millimeters (18 inches).
  - Weight: 1.8 kilograms (4 pounds).
  - Minimum range:
    - Training: 30 meters (100 feet).
    - Combat: 15 meters (49 feet).
    - Arming: 15 meters (49 feet).
  - Maximum range: 2,100 meters (6,890 feet).
  - Maximum effective range: 300 meters (985 feet).

AMMUNITION

2-3. The M136 AT4 is a round of ammunition with an integral, rocket-type cartridge. The cartridge consists of a fin assembly with tracer element; a point-initiating, base-detonating, piezoelectric fuze; a warhead body with liner; and a precision-shaped explosive charge (Figure 2-2).

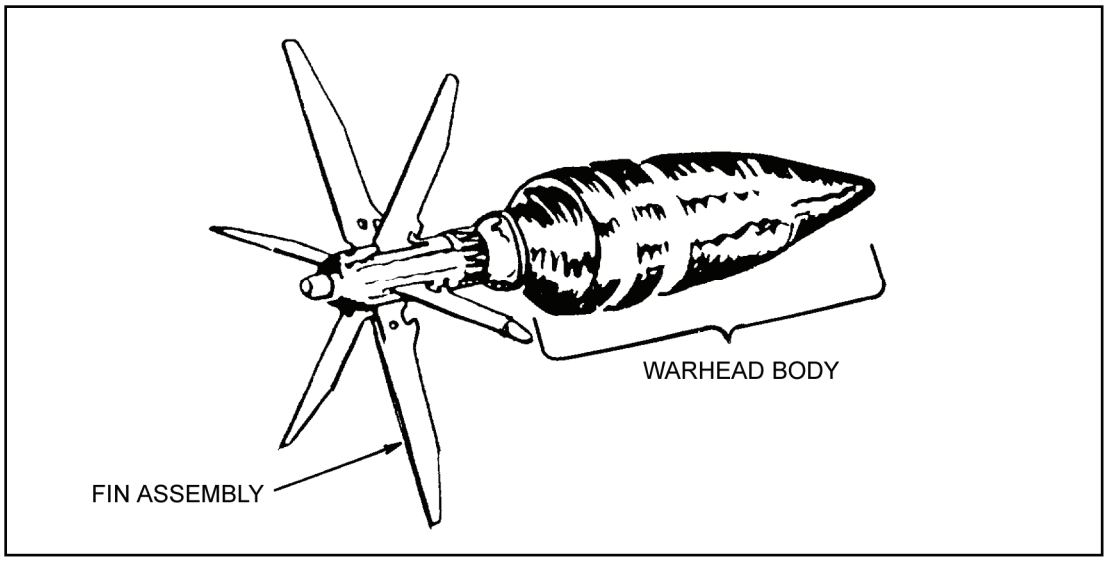

Figure 2-2. 84-millimeter HEAT cartridge.

DESCRIPTION

2-4. The M136 AT4's warhead has excellent penetration ability and lethal after-armor effects. The extremely destructive, 440-gram shaped-charge explosive penetrates more than 14 inches (35.6 centimeters) of armor. (Warhead effects are shown in Figure 2-3.)

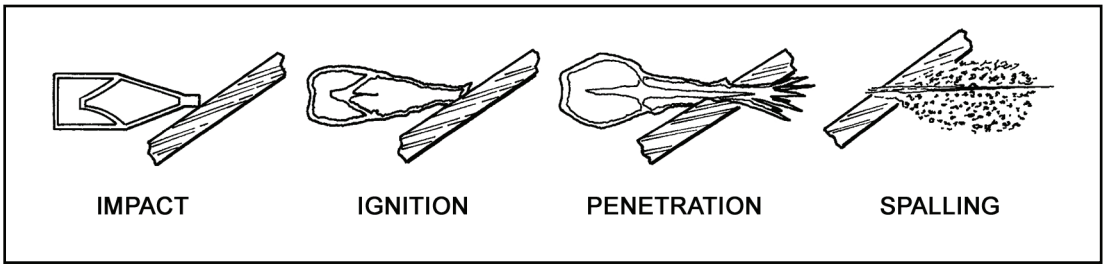

Figure 2-3. Effects of M136 AT4 warhead.

Impact

2-5. The nose cone crushes; the impact sensor activates the fuze.

Ignition

2-6. The piezoelectric fuze element activates the electric detonator. The booster detonates, initiating the main charge.

Penetration

2-7. The main charge fires and forces the warhead body liner into a directional gas jet that penetrates armor plate.

After-Armor Effects (Spalling)

2-8. The projectile fragments and incendiary effects produce blinding light and highly destructive results.

PACKAGING

2-9. Five M136 AT4s, each wrapped in a plastic barrier bag, are packed together in a wooden container. The containers are too heavy to stack more than four deep on the pallets (Figure 2-4).

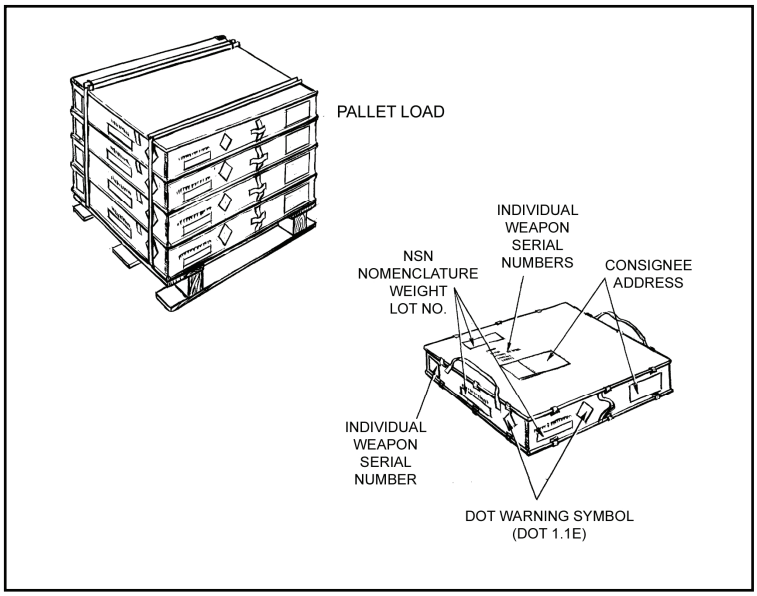

Figure 2-4. Ammunition packaging and markings.

COLOR-CODING

2-10. M136 AT4 launchers are marked with color-coded bands (Figure 2-5). A black with yellow band indicates an HE antiarmor round (early models had a solid black band). A gold or yellow band indicates a field handling trainer (FHT); no band indicates an M287 9-mm tracer bullet trainer (Appendix B).

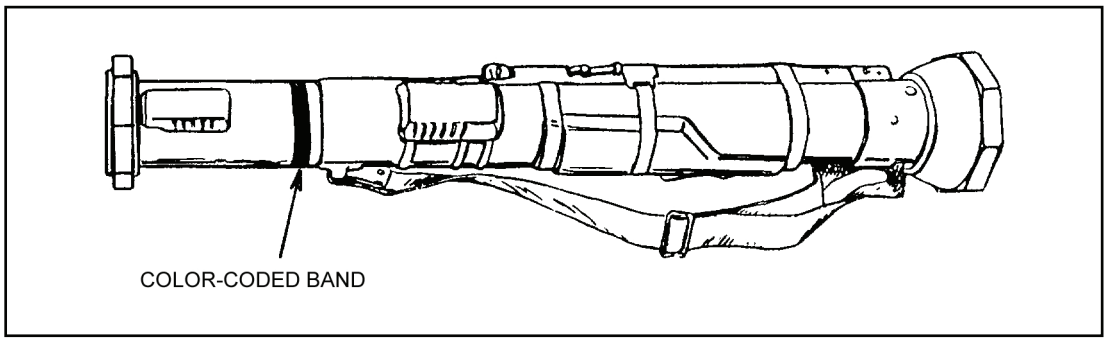

Figure 2-5. Location of color-coded band.

INSPECTION

2-11. The M136 AT4 is issued as a round of ammunition rather than as a weapon; the launcher is completely sealed. However, its overall condition should be inspected at the time of issue and again before use (Figure 2-6). The wooden container should be opened, the plastic bags removed, and the launcher visually inspected for obvious damage. If the M136 AT4 is not to be used immediately, it should be returned to its plastic bag and the bag resealed with tape. The Soldier issued the weapon must ensure—

- The *rear seal*, a brown acrylic plastic plate inside the *venturi*, is in place and undamaged.
- The *transport safety pin* is in place and fully inserted. The lanyard is attached to the transport safety pin and the launcher. The lanyard should already be wrapped around the launcher clockwise and the transport safety pin inserted in the retainer hole counterclockwise.
- The *cocking lever* is present and in the SAFE (uncocked) position.
- The plastic *fire-through muzzle cover* is in place and undamaged. If it is torn or broken, cut it out and check the launch tube to ensure it is clear of foreign objects. Remove any that you find by turning the tube muzzle downward and gently shaking the launcher.
- The launcher has the correct *color-coded band*.
- The *sights* function properly. Open the sight covers to ensure the sights pop up and are undamaged.
- The *forward safety* does not move when you depress it.
- The *red trigger button* is not missing.
- The *launcher body* has no cracks, dents, or bulges.
- The *carrying sling* is not frayed and is attached firmly to the launch tube.
- The *shoulder stop* is not broken or damaged, and it unsnaps and folds down.

Note: M136 AT4 launchers with missing muzzle covers and no obstruction are suitable for use. However, these launchers should have their muzzle covers replaced as soon as possible to prevent further damage and deterioration.

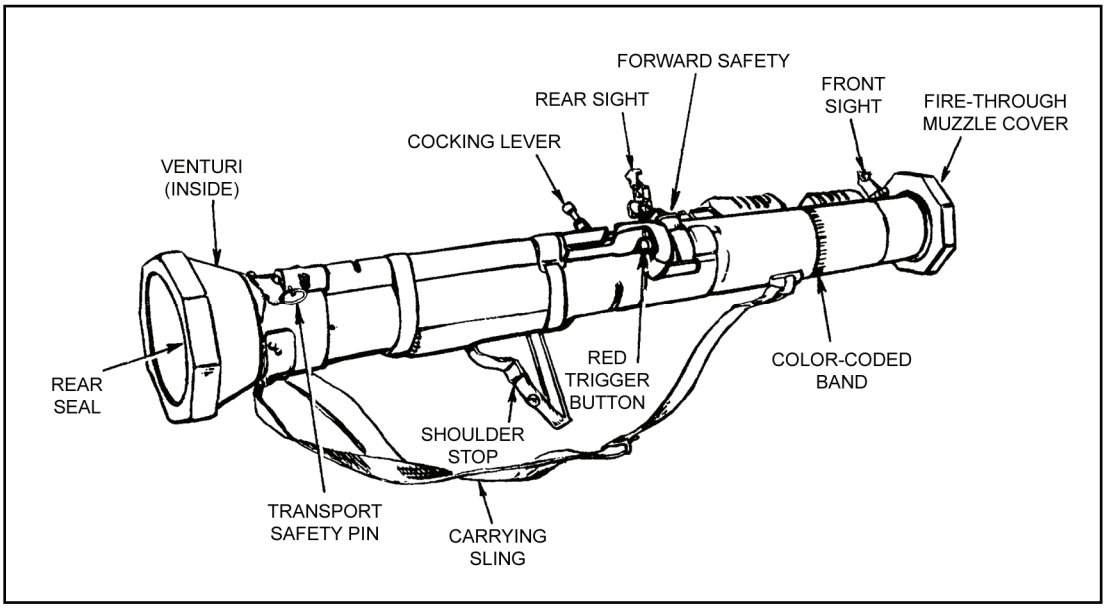

Figure 2-6. Inspection.

FIRING MECHANISM, SAFETIES, AND WEAPON FUNCTION

2-12. The function of the M136 AT4 must be discussed along with its firing mechanism and safety features. The firing mechanism is mechanical and consists of a red trigger button, an enclosed firing rod and spring, and three safety devices: *transport safety pin*, *cocking lever,* and the *forward safety* (Figure 2-7). The weapon cannot be fired until all three safeties have been disengaged.

TRANSPORT SAFETY PIN

2-13. The transport safety pin blocks the firing pin from striking the cartridge percussion cap. To disengage this pin, pull it outward and then release it.

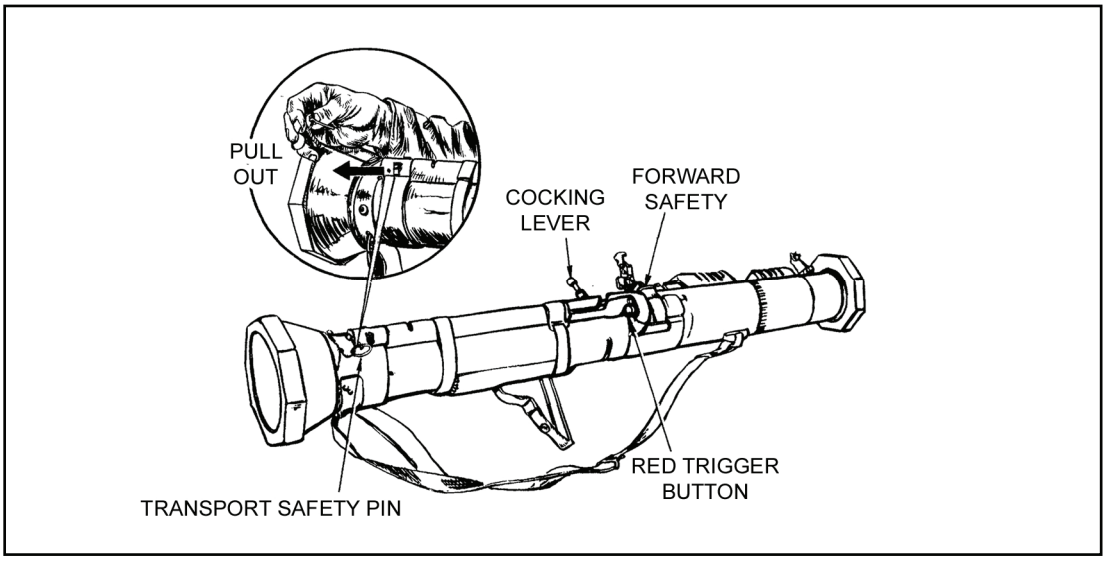

Figure 2-7. Firing mechanism and transport safety pin.

COCKING LEVER

2-14. When the cocking lever, which is attached to the firing rod (Figure 2-8), is in the SAFE position, the firing rod and the trigger cannot touch. To cock the M136 AT4, push the lever forward and rotate it downward and to the right with your right thumb. This causes the hooks on the front of the firing rod to catch and hold the red trigger button.

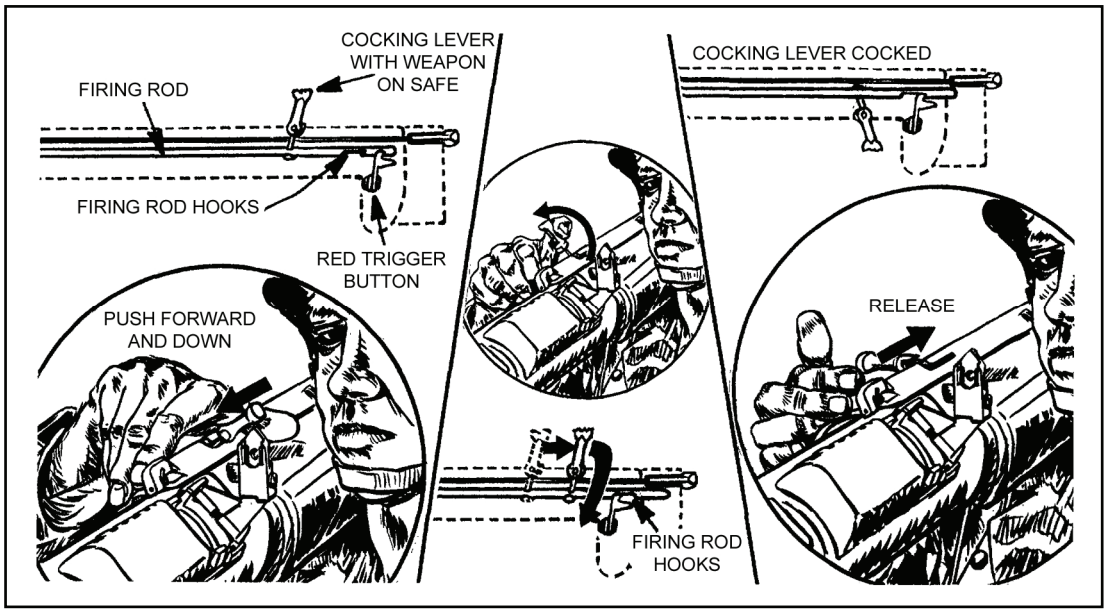

Figure 2-8. Cocking lever.

FORWARD SAFETY

2-15. The forward safety is on the front end of the firing mechanism (Figure 2-9) and is connected to a steel rod with a bent end that blocks the firing rod from striking the firing pin. To fire the M136 AT4, hold down the forward safety so the firing rod can strike the percussion cap and ignite the propellant when you push the trigger.

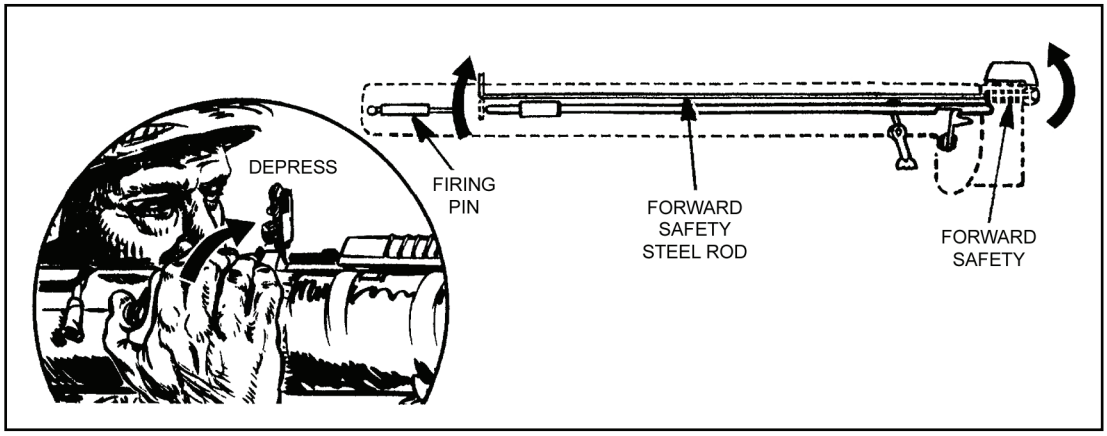

Figure 2-9. Forward safety.

SIGHTS

2-16. The fact that the M136 AT4's front and rear sights resemble those of the M16-series rifle makes using the M136 AT4 easier (Figure 2-10).

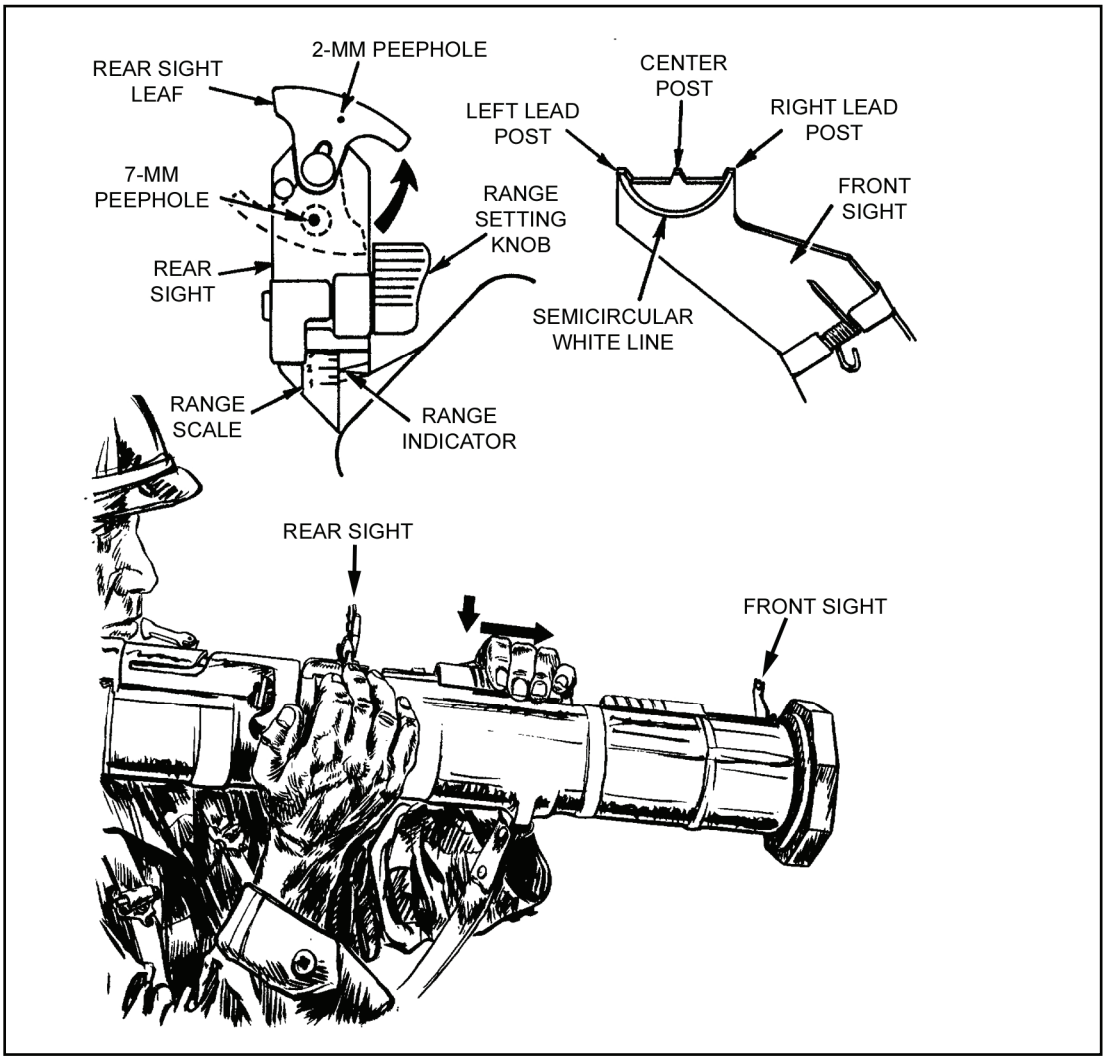

Figure 2-10. Sights.

FRONT SIGHT

2-17. The front sight has a sight blade with a center post and left and right lead posts. A semicircular white line helps you obtain the proper sight picture. To open the front sight cover, press down on it and slide it backward until the sight pops up.

REAR SIGHT

2-18. The rear sight has a sight blade, range adjustment knob, range scale, 2-mm peephole for normal daylight visibility conditions, and 7-mm peephole for limited visibility conditions. To open the rear sight cover, press down on it and slide it forward until the sight pops up.

NIGHTSIGHT

2-19. The M136 AT4 can be fitted with the AN/PAQ-4C, AN/PEQ-2, or the AN/PAS-13, when used with the nightsight mounting bracket (NSN 5340-01-391-3004).

- The leaf blade that covers the 7-mm peephole has its own tiny 2-mm peephole. To uncover the 7-mm peephole, pull the bottom of the leaf blade out slightly and rotate it right and up. To cover

the 7-mm peephole, rotate it back down and ensure the leaf blade is seated. The range indicator scale is indexed from 100 to 500 meters in 50-meter increments.

- To increase the range setting beyond 200 meters, turn the range adjustment knob clockwise, or vice versa (Figure 2-11). You must remember to reset the range to 200 meters when you close the rear sight. Otherwise, closing the sight cover will break off the rear sight.

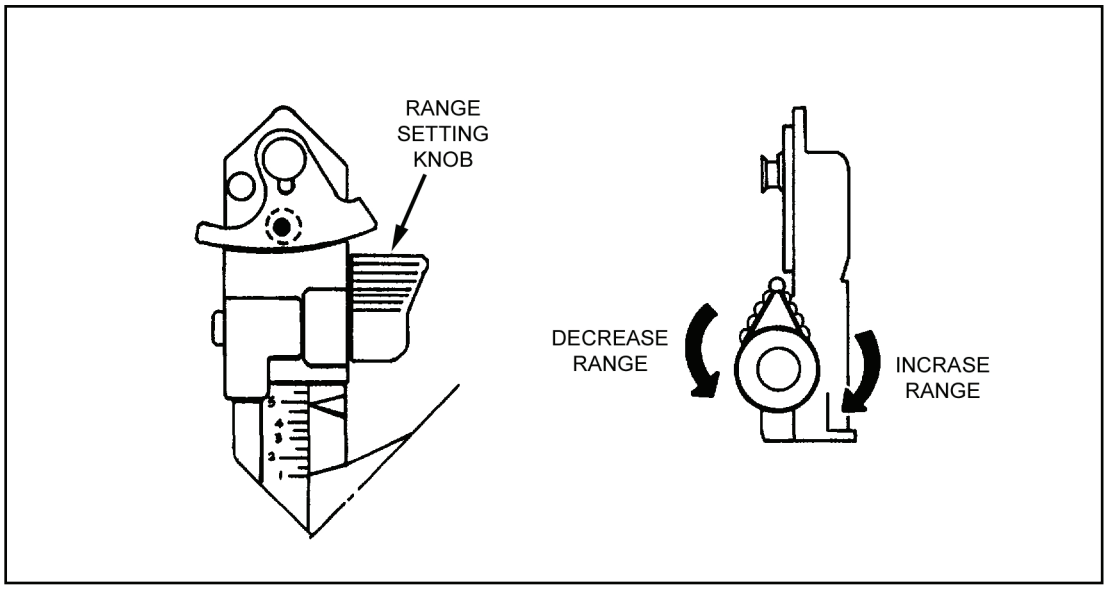

Figure 2-11. Adjusting the rear sight range setting.

OPERATION

2-20. If you are under fire, take cover before preparing the M136 AT4 for firing as follows:

- Remove the M136 AT4 from its carrying position and cradle it in your left arm (Figure 2-12).

WARNING

Insert the approved brand of earplugs before you fire. Keep the weapon pointed toward the target, and keep the backblast area clear.

Figure 2-12. Cradle position.

- With your right hand, pull and release the transport safety pin (Figure 2-13). This pin is important; you must reinsert it if you do not fire the launcher. Therefore, unless it is attached to the launcher with a lanyard, you must keep it in a safe place.

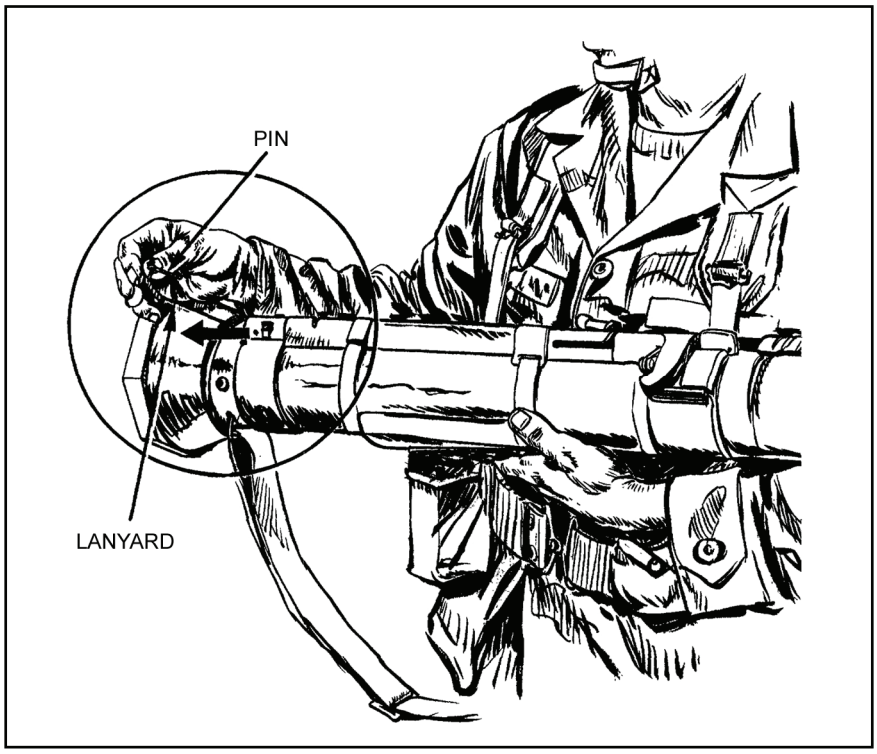

Figure 2-13. Removing the transport safety pin.

- Unsnap, unfold, and hold the shoulder stop with your right hand (Figure 2-14).
- Place the launcher on your right shoulder and stabilize it by grasping the sling near the launcher's muzzle with your left hand.

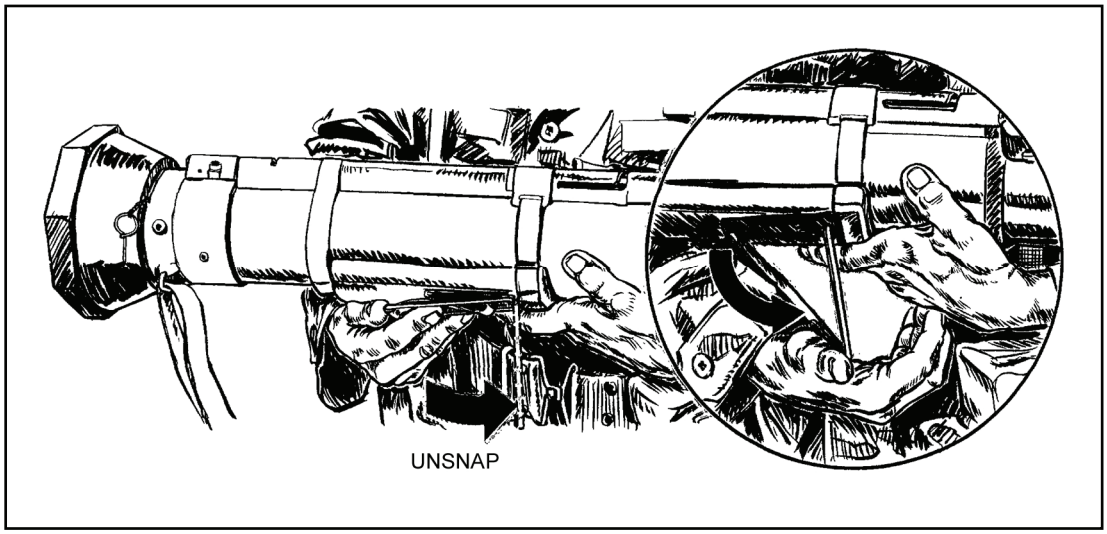

Figure 2-14. Unsnapping the shoulder stop.

- With the M136 AT4 on your right shoulder, stabilize it with your left hand and open the sights with your right hand. Press down and pull backward on the front sight cover until the front sight pops up (Figure 2-15), then press down and forward on the rear sight cover until the rear sight pops up. The rear sight should be no less than 2 1/2 inches and no more than 3 inches from your eyes.

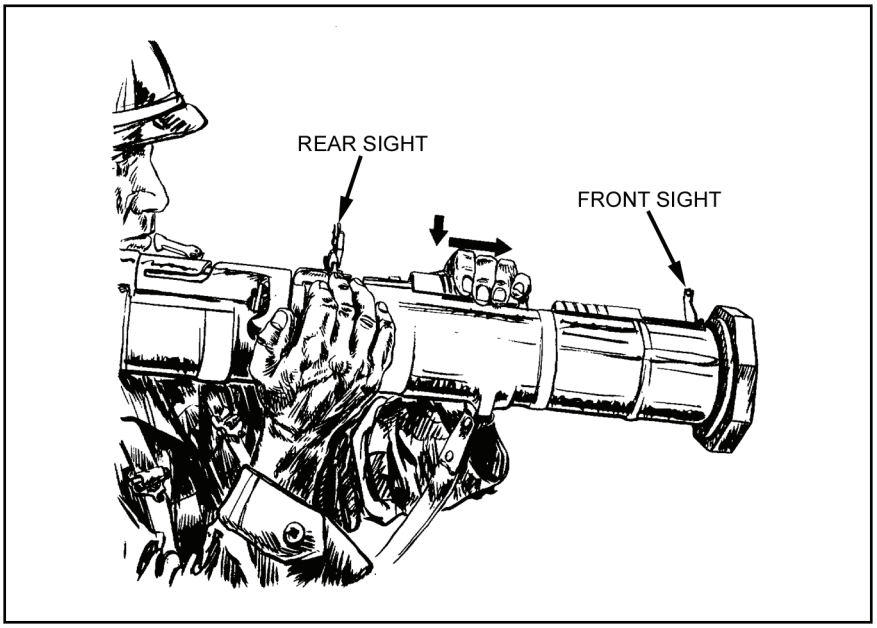

Figure 2-15. Opening and adjusting the sights.

- Set the rear sight for the correct range to the target.
- Check the backblast area before you cock the launcher. Then, unfold the cocking lever with your right hand (Figure 2-16). Place your thumb under it and, with the support of your fingers in front of the firing mechanism, push it forward, rotate it downward and to the right, and let it slide backward.

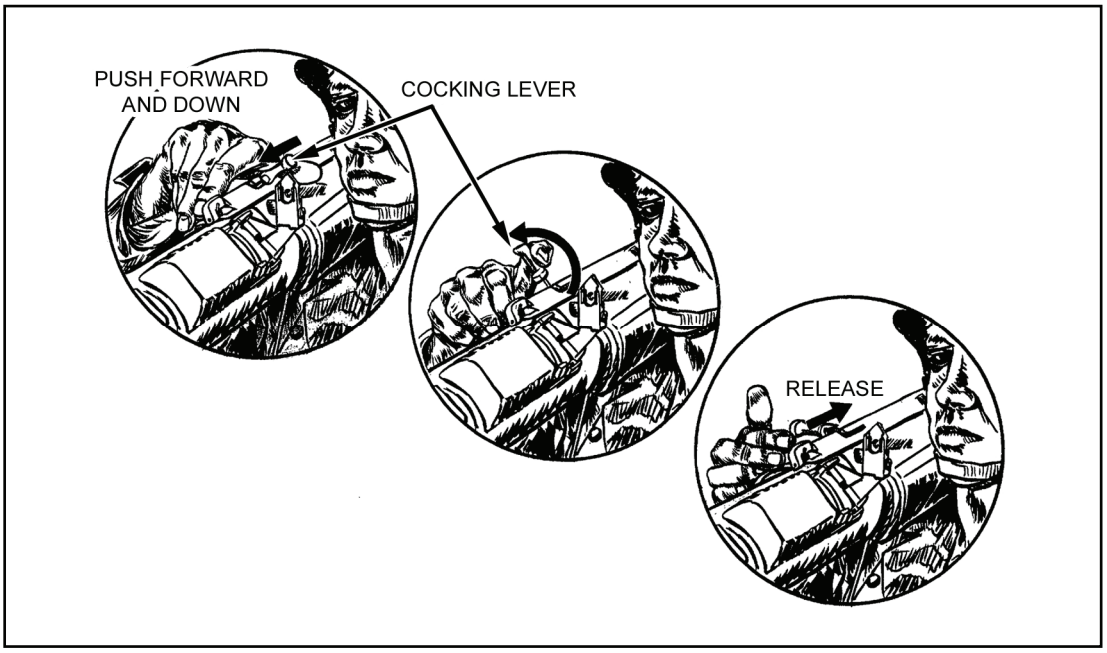

Figure 2-16. Cocking the launcher.

- Pull back on the sling with your left hand to seat the shoulder stop firmly against your shoulder. To avoid a misfire, use the index and middle fingers on your right hand to hold the forward safety down and to the left while you fire (Figure 2-17).

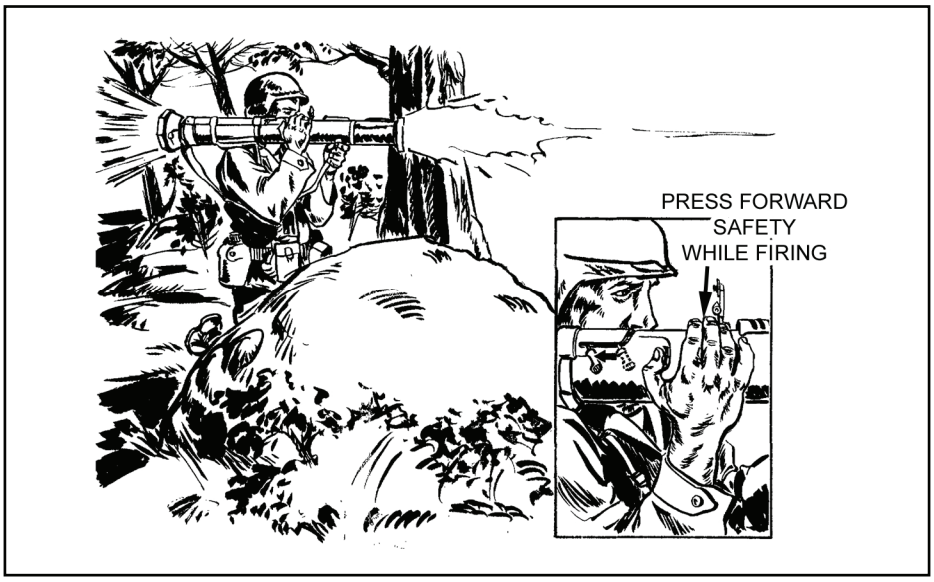

Figure 2-17. Firing the launcher.

MISFIRE PROCEDURES

2-21. A misfire is a complete failure to fire caused by a procedural or mechanical failure. Choosing the proper misfire procedure depends on whether the firer is in a combat or training environment. Point misfired M136 AT4 launchers away from personnel and equipment, and notify EOD. Do not return misfired M136 AT4 launchers to the ASP. Disarm (uncock) the M136 AT4 launcher and insert the transport safety pin. If the transport safety pin cannot be reinserted or if the pin is missing, notify EOD.

CAUSES

2-22. A misfire is usually caused by one of the following factors:

- The forward safety is not depressed far enough to disengage the safety.
- The firing mechanism is faulty.
- The propelling charge explosive train is faulty.

WARNING

Keep your weapon pointed toward the target.

COMBAT ENVIRONMENT

2-23. If a misfire occurs in combat, the firer responds as follows:

- If the M136 AT4 launcher is armed (cocked), keep it pointed away from personnel and equipment at all times.
- Release the forward safety.
- Remove your right hand from the firing mechanism and cock the weapon again.
- Try to fire again. If the launcher still does not fire, maintain the same firing position and return the cocking lever to the SAFE (uncocked) position.
- Move the launcher from your shoulder, keeping the launcher pointed toward the enemy. Reinsert the transport safety pin.
- Break off the sights to identify the misfired launcher.
- Place the launcher on the ground, pointed toward the enemy, and use another launcher. As soon as you can, dispose of the misfired launcher IAW unit SOP.

TRAINING ENVIRONMENT

2-24. If a misfire occurs on a live-fire training range, the firer responds as follows (the trainer later disposes of the launcher IAW local SOP):

- If the M136 AT4 launcher is armed (cocked), keep it pointed away from personnel and equipment at all times.
- Shout “Misfire” as soon as the launcher fails to fire, while maintaining the original sight picture.
- Release the forward safety.
- Recock the launcher. Immediately remove right hand from the firing mechanism and push the cocking lever forward with the heel of the right hand until the lever locks with a loud clicking noise.

Note. Because performing immediate action takes so little time, you need not recheck the backblast area.

- Press the forward safety all the way down and try to fire again. If the launcher still fails to fire, shout misfire, release the forward safety, and move the cocking lever to the SAFE (uncocked) position. Move the launcher from shoulder, keeping the weapon pointed toward the target and cradle the weapon in the left arm.
- Reinsert the transport safety pin, wait two minutes, then carefully lay the launcher on the ground with the muzzle toward the target.

Note. Notify the local ammunition supply and issue point of any unusual occurrence, regardless of whether the weapon fires or not. Examples include excessive overpressure, recoil, or heat on your face after you have fired the weapon (caused by the propellant burning after the round leaves the muzzle).

RESTORATION TO CARRYING CONFIGURATION

2-25. If the launcher is prepared to fire, but then is not fired, it must be taken out of operation as follows:

- Release the forward safety.
- Push forward and to the left on the cocking lever, and let it spring back into the SAFE (uncocked) position.
- Move the launcher from your shoulder, ensuring the muzzle is pointed in the direction of fire.
- With the launcher cradled in your left arm, replace the transport safety pin until it is fully seated in the retainer hole.
- To avoid breaking off the rear sight, remember to reset the range indicator to the 200-meter setting before closing the rear sight cover.
- Lay down the sights and close their covers.
- Snap the shoulder stop into the closed position.
- Sling the launcher over your right shoulder and move to another location.

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Chapter 3

MARKSMANSHIP FUNDAMENTALS, M136 AT4

Many factors contribute to shoulder-launched munition marksmanship. Soldiers who combine these factors well, and continue to practice doing so, can retain their skills. The factors for the M136 AT4 are grouped into four basic areas known as marksmanship fundamentals: steady hold, aiming procedures, breath control, and trigger manipulation. As the M136 AT4 can only be fired from the right shoulder, instructions are given for right-handed firers. (See Chapters 5 and 6, respectively, for M72-series and M141 BDM marksmanship fundamentals.)

STEADY HOLD

3-1. Maintaining a steady hold involves holding the launcher as steady as possible while sighting and firing. To maintain the proper sight picture and sight alignment until you fire, hold the launcher in a tight, comfortable position so that it becomes a natural extension of your body (Figure 3-1). Keep your elbows close to your body to help balance the weapon and prevent you from jerking or flinching when you fire. With your left hand, grasp the carrying sling where it attaches to the launcher near the muzzle. With your right hand on the trigger mechanism, pull the shoulder stop into your right shoulder pocket.

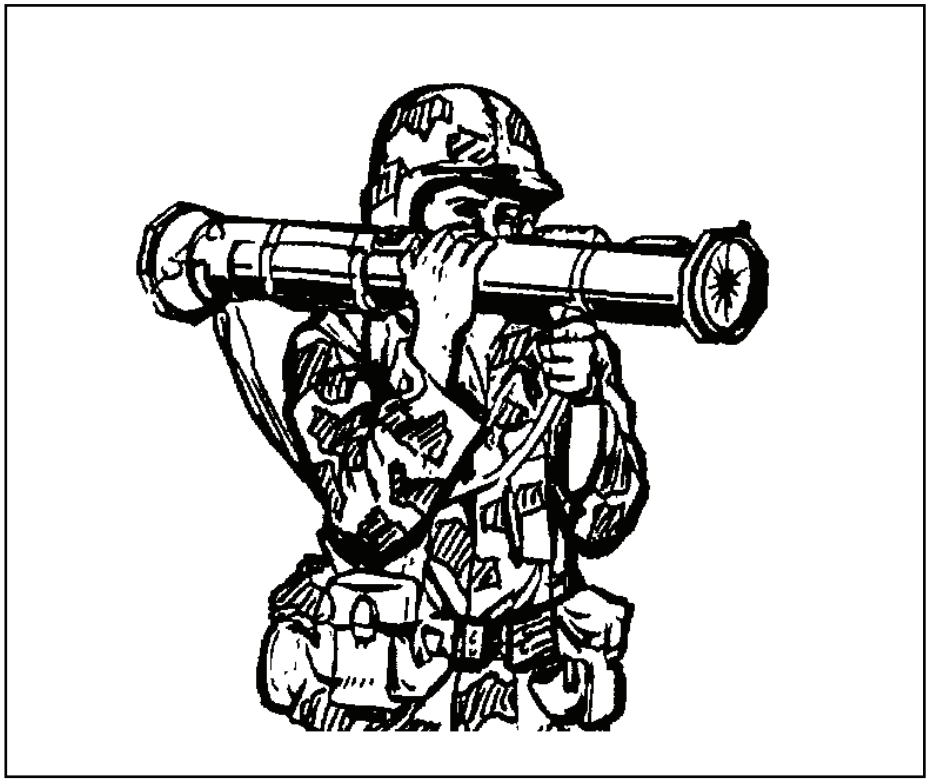

Figure 3-1. Steady hold position.

AIMING PROCEDURES

3-2. Aiming procedures include placing the eye correctly, obtaining a sight picture, and aligning the sight. Combining these procedures is critical to correctly aiming light antiarmor weapons.

EYE PLACEMENT

3-3. Estimate the range before sighting the weapon (Chapter 7). Place your firing eye between 2 1/2 to 3 inches from the rear sight. This distance is necessary for correct sight alignment and to prevent injury to the firer from the weapon's recoil (Figure 3-2).

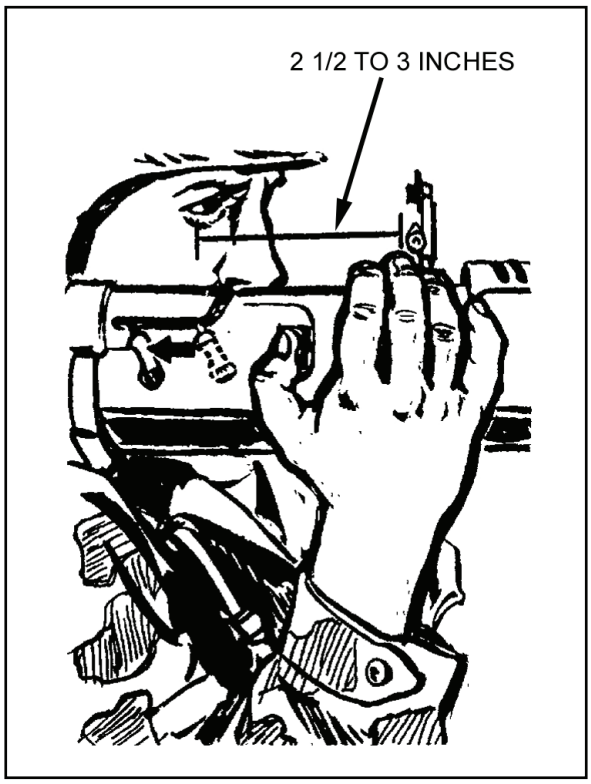

Figure 3-2. Eye placement.

WARNING

When firing the M136 AT4, do not place your eye closer than 2 1/2 inches from the rear sight. The M136 AT4's recoil could cause the rear sight to injure your firing eye.

SIGHT ALIGNMENT

3-4. Align the sights correctly with the target. Position the rear sight so that the white semicircle of the front sight is a hazy line around the bottom half of the rear sight opening. Position the front sight posts on the target (Figure 3-3). Align the sight by moving your head forward or backward.

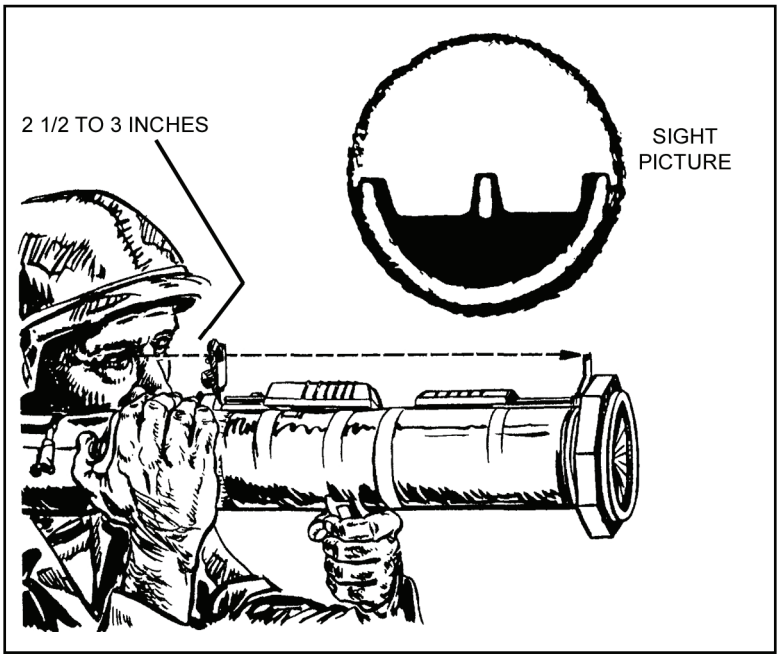

Figure 3-3. Sight alignment for the M136 AT4.

SIGHT PICTURE

3-5. Position the front sight on the target.

Stationary Targets

3-6. Stationary targets include fixed positions and fortifications as well as vehicles moving directly toward or away from the firer. Adjust the rear sight for the correct range and place the center sight post in the center of the target (Figure 3-4).

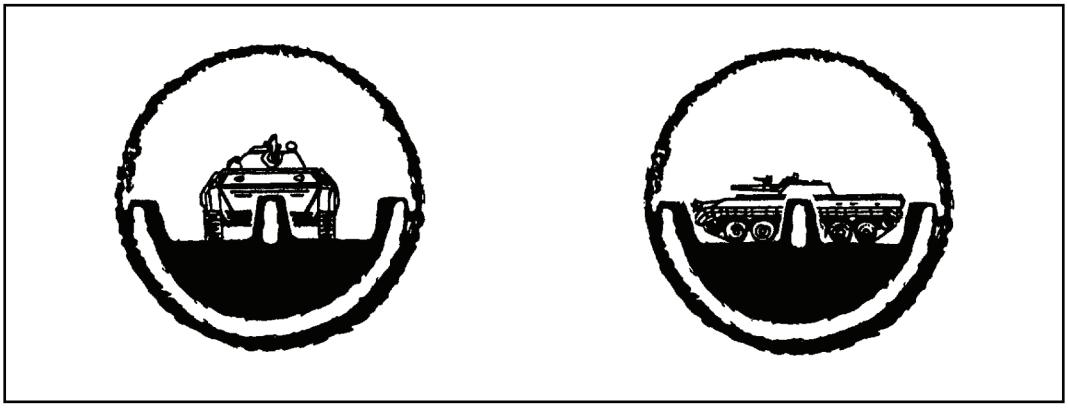

Figure 3-4. Sight picture, stationary targets.

Slow-moving Vehicles

3-7. Slow-moving vehicles are those with an estimated speed of 10 miles per hour or less or those moving in an oblique direction. Place the center sight post on the front or leading edge of the vehicle (Figure 3-5, page 3-4).

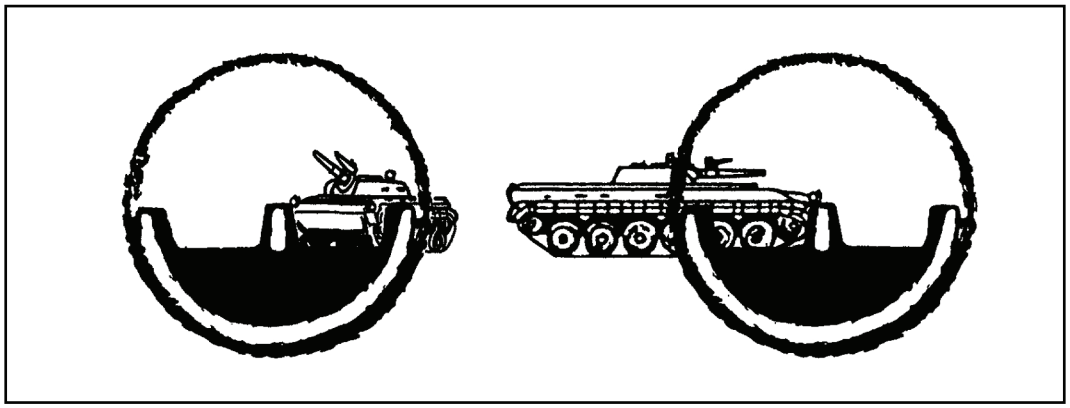

Figure 3-5. Sight picture, slow-moving targets.

Fast-moving Vehicles

3-8. Fast-moving vehicles are those estimated to be moving faster than 10 miles per hour. Place either the left or right lead post on the center of the target. For example, if the target is moving from left to right, place the left lead post on the target's center of mass, and vice versa (Figure 3-6).

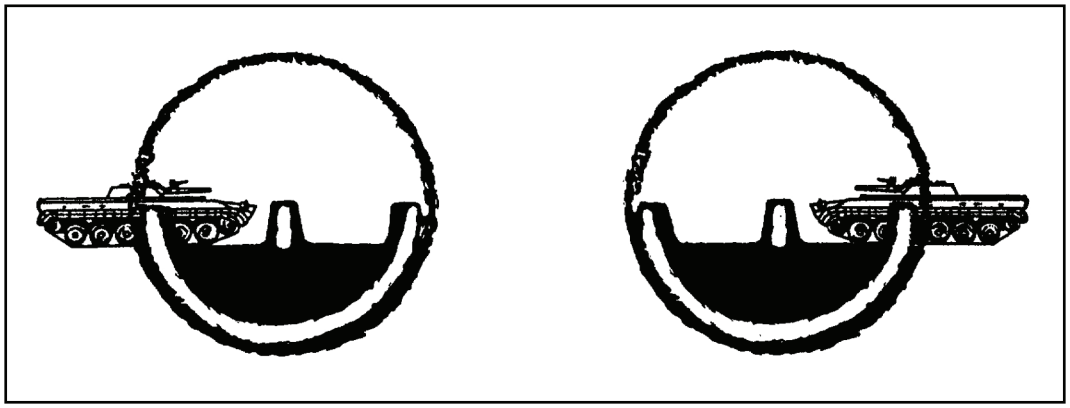

Figure 3-6. Sight picture, fast-moving targets.

BREATH CONTROL

3-9. Breath control is as important when firing the M136 AT4 as it is when firing an individual weapon. Improper breath control while firing can cause a miss. To control breathing, the firer breathes deeply a couple of times, takes one last deep breath, exhales partly, holds his breath, sights, and then fires.

TRIGGER MANIPULATION

3-10. To fire the M136 AT4, the firer must apply firm and steady forward pressure to the trigger with the thumb of the firing hand (Figure 3-7). Soldiers can practice trigger manipulation and control techniques on an expended launcher or FHT.

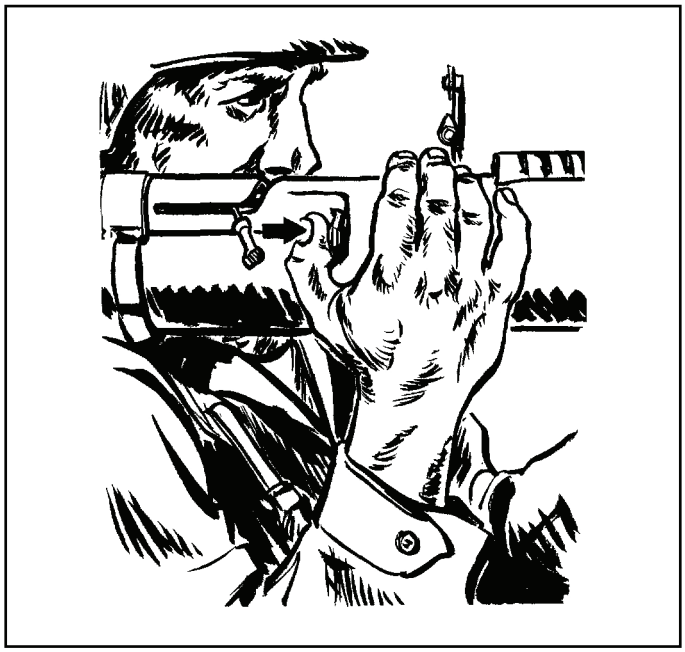

Figure 3-7. Trigger manipulation.

INTEGRATED ACT OF SHOOTING

3-11. Correct sight alignment is critical, as sight alignment errors increase as the range to the target increases. Maintaining the correct relationship between the rear and front sights is as important as placing the aiming point. The steps for doing this should become automatic. No matter how quickly they are done, these steps are always distinct because the human eye can only focus at one distance and on one point at a time. The firer focuses on the front sight to obtain the correct sight alignment, and then places the aiming point to complete the sight picture. He shifts or adjusts the position of the launcher as necessary. The entire time he is pressing the trigger, the firer maintains the sight picture.

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Chapter 4

FIRING POSITIONS

This chapter explains the basic firing positions used with the M136 AT4. Instructions are given for right-handed firers. The weapon can be fired from all four of the basic firing positions; individual physique determines exact body and hand positions. Firing from a supported position naturally increases accuracy, which improves the odds for a first-round hit or kill. Basic safety considerations are the same for all shoulder-launched munitions, but additional considerations for each firing position are provided here.

STANDING POSITION

4-1. Two standing positions are used: a basic standing position and one modified for the infantry fighting position for use in combat only

BASIC STANDING POSITION

4-2. Raise the launcher slightly higher than shoulder level. Execute a left face, rotate your shoulder under the launcher, and spread your feet a comfortable distance apart. Move your left foot 15 to 24 inches forward, keeping your hips level and your weight balanced on both feet. To obtain a firm, stable position, tuck both elbows tightly into your body (Figure 4-1, page 4-2). To smoothly track a moving target, turn your body at the waist—not with your legs. Grasp the sling near the launcher with your left hand and the shoulder stop with your right hand. Raise the launcher above shoulder level. After placing the launcher on your shoulder, release the shoulder stop and place your right hand on the trigger. Place your firing eye 2 1/2 to 3 inches from the rear sight. Unless you are behind a protective barrier, such as a wall, the standing position exposes you to enemy observation and possible suppression more than any other position.

WARNING

Always keep the launcher pointed in the direction of fire.

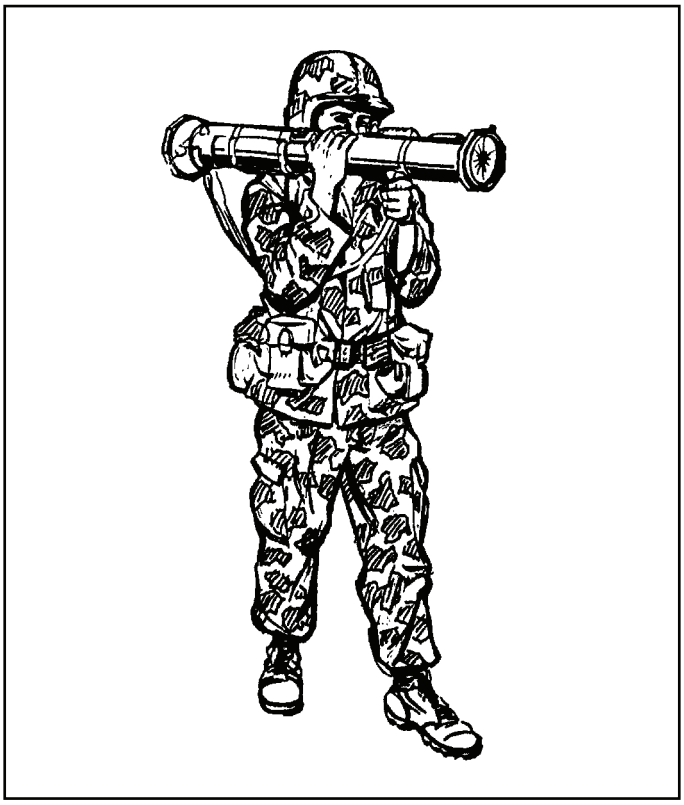

Figure 4-1. Basic standing position.

MODIFIED STANDING POSITION (FOR USE IN COMBAT ONLY)

4-3. Use this position when you occupy an infantry fighting position. Assume the basic standing position, but instead of stepping forward, lean against the back wall of the fighting position. Ensure that the venturi, or rear of the weapon, extends beyond the rear of the fighting position (Figure 4-2). Ensure that **NONE** of the following are in your backblast area:

- Other Soldiers.
- Other fighting positions.
- Equipment.
- Any part of your own fighting position.
- Obstructions within 5 meters.

Note. Leaders must ensure that light antiarmor weapons are positioned so that the backblast misses other fighting positions.

DANGER

FIRE THE AT4 FROM THE FIGHTING POSITION IN COMBAT ONLY. DO NOT FIRE THE AT4 FROM THE FIGHTING POSITION DURING TRAINING DUE TO THE RISK OF INJURY TO THE OPERATOR.

DANGER

DO NOT FIRE FROM AN ENCLOSURE OR FROM IN FRONT OF A BARRIER.

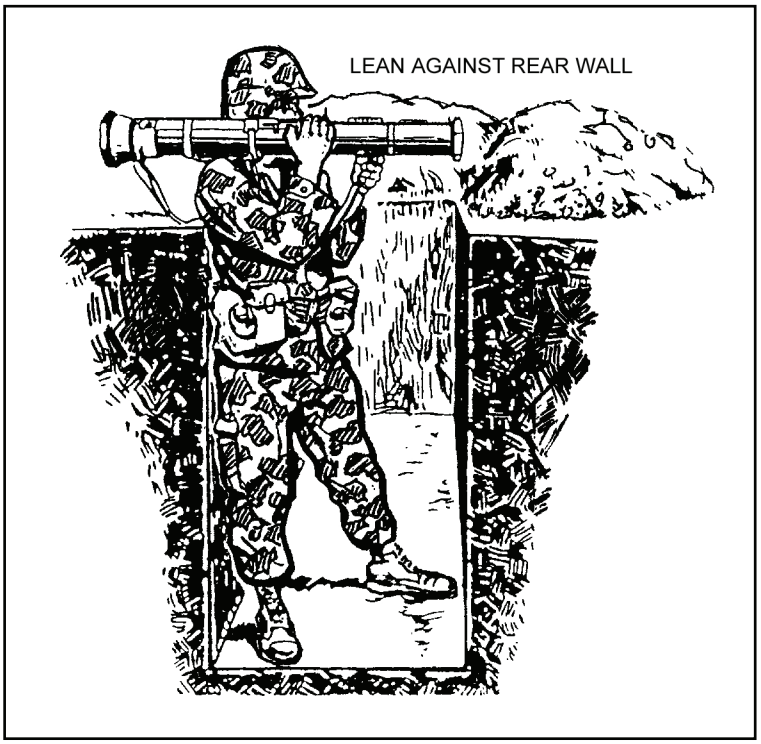

Figure 4-2. Modified standing position.

KNEELING POSITION

4-4. The basic kneeling position is the best position for tracking moving targets. The modified kneeling position is best for engaging stationary targets, since it is a supported position. However, either can be used for stationary or moving targets.

BASIC KNEELING POSITION

4-5. From the basic standing position, kneel onto your right knee, keeping your left thigh parallel to the ground. Rotate your lower right leg 90 degrees to the left. (This removes your right foot from exposure to the backblast.) Keep your right thigh and back straight and perpendicular to the ground. Point your left foot in the direction of fire and tuck your elbows in to your sides. Though this is not a supported position, it should be a firm and stable one (Figure 4-3, page 4-4).

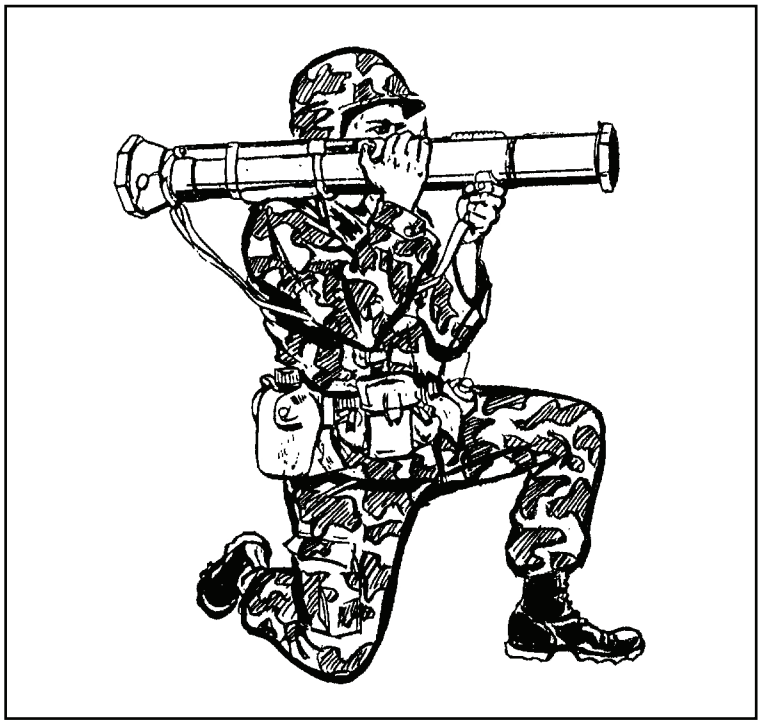

Figure 4-3. Basic kneeling position.

MODIFIED KNEELING POSITION

4-6. From the basic kneeling position, sit back on your right heel. Place the back of your upper left arm on your left knee, making sure you do not have bone-to-bone contact between your left elbow and left knee. Keep your right elbow tucked in close to your right side. Use any protective barriers available (Figure 4-4).

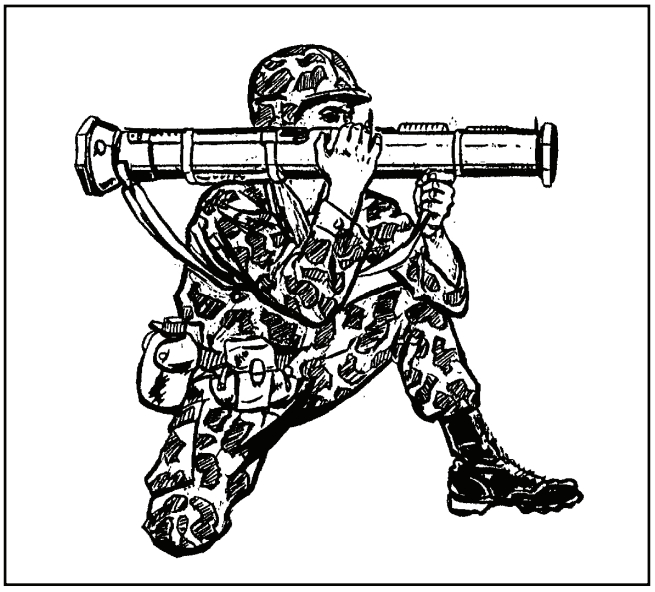

Figure 4-4. Modified kneeling position.

SITTING POSITION

4-7. The sitting position is the most stable firing position for the M136 AT4. In this position, the arms are placed on the legs for support. Depending on his physique, the firer can use either of two versions of the sitting position, both of which are suitable for engaging stationary targets.

BASIC SITTING POSITION

4-8. Sit on your buttocks while facing the target, and spread your feet a comfortable distance apart. Lean forward and place the backs of your upper arms on your knees, avoiding bone-to-bone contact or elbows inside of thighs (Figure 4-5).

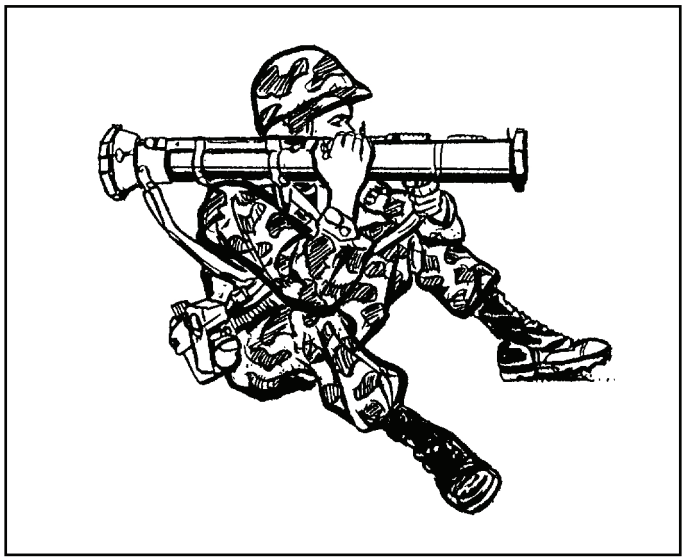

Figure 4-5. Basic sitting position.

MODIFIED SITTING POSITION

4-9. This position is the same as the basic sitting position except you must cross your ankles for added support. Raise or lower your knees to adjust for elevation on the target (Figure 4-6).

Figure 4-6. Modified sitting position.

PRONE POSITION (FOR USE IN COMBAT ONLY)

4-10. The prone position is the most dangerous position in regards to potential backblast injury, due to its proximity to the ground. It also offers the most protection from enemy observation. Ideally, the ground should slope downward from the rear of the launcher, which reduces the effects of the backblast.

- Lie on your stomach with your body at a 90-degree angle to the direction of fire, and with your body and legs to the left of the direction of fire. *Ensure that neither the body nor the legs are in the backblast area.*
- Unlike other firing positions, this one prevents you from placing the launcher on your right shoulder. Instead, you must hold the launcher in place against your upper right arm. For stability, apply extra pressure on the firing mechanism with your right hand. The prone position is the *least* stable of all firing positions for the M136 AT4. You must practice it often to become confident using it. (Figure 4-7 shows the prone position.)

DANGER

FIRE THE AT4 FROM THE PRONE POSITION IN COMBAT ONLY. DO NOT FIRE THE AT4 FROM THE PRONE POSITION DURING TRAINING DUE TO THE RISK OF INJURY TO THE OPERATOR.

DANGER

FAILURE TO MAINTAIN A 90-DEGREE ANGLE FROM THE DIRECTION OF FIRE COULD CAUSE INJURY OR DEATH TO THE FIRER.

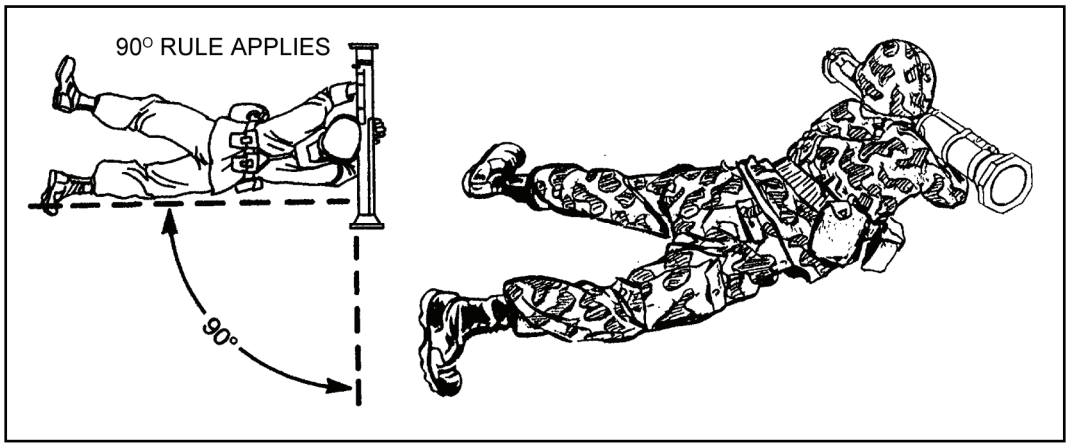

Figure 4-7. Prone position.

Chapter 5

M72-SERIES LIGHT ANTIARMOR WEAPON

This chapter provides information and technical data for the M72-series light antiarmor weapons. The M72A2 and M72A3 LAWs were produced in the early 1960's for use against the light tanks of that era. More recent and improved versions of the M72 (M72A4, M72A5, M72A6, and M72A7 light antiarmor weapons) were produced in the 1990's. This chapter also discusses the characteristics, nomenclature, functioning, operation, marksmanship fundamentals, and firing positions for the entire M72-series.

DESCRIPTION M72A2 AND M72A3 LIGHT ANTIARMOR WEAPON

5-1. The M72A2/A3 LAW is a lightweight, self-contained, antiarmor weapon consisting of a rocket packed in a launcher (Figure 5-1). It is man-portable, may be fired from either shoulder, and is issued as a round of ammunition. It requires little from the user—only a visual inspection and some operator maintenance. The launcher, which consists of two tubes, one inside the other, serves as a watertight packing container for the rocket and houses a percussion-type firing mechanism that activates the rocket.

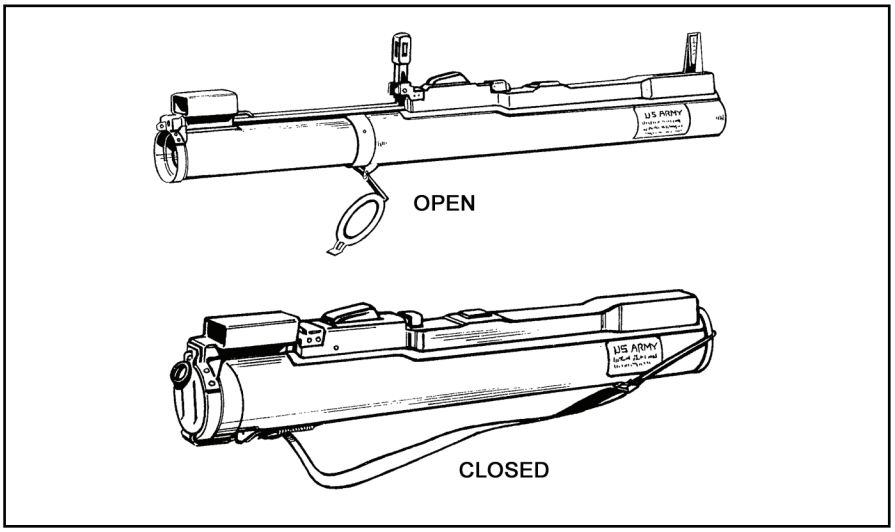

Figure 5-1. The M72A2 or M72A3 LAW.

OUTER TUBE

5-2. The trigger housing assembly (which contains the trigger assembly) is on the upper surface of the outer tube. So are the front and rear sight assemblies, the trigger arming handle, and the launcher's rear cover.

INNER TUBE

5-3. The inner tube telescopes outward toward the rear, guided by a channel assembly that rides in an alignment slot in the outer tube's trigger housing assembly. The channel assembly also houses the firing pin rod assembly, which includes a detent lever assembly. The detent lever assembly moves under the trigger

assembly in the outer tube, locking the inner tube in the extended position and cocking the weapon. All this must occur before the weapon can be fired.

ROCKET

5-4. The rocket is a percussion-ignited, fin-stabilized, fixed munition. The rocket is attached by the igniter to the inside of the launcher. The rocket consists of a 66-mm high-explosive antiarmor (HEAT) warhead; a point-initiating, base-detonating fuze; and a rocket motor. Six spring-loaded fins are attached to the rear of the rocket motor. These fins are folded forward along the motor when the rocket is in the launcher. When ignited, the propellant in the rocket motor burns completely, producing gases about 1,400 degrees Fahrenheit (760 degrees Centigrade). The gas pressure pushes the rocket toward the target and exits to the rear of the launcher as the backblast.

TECHNICAL DATA

5-5. The following data applies to the M72A2 and M72A3 LAW:

LAUNCHER

- Length (extended): Less than 1 meter (34.67 inches)
- Length (closed): 0.67 meter (24.8 inches)
- Weight (complete M72A2): 2.3 kilograms (5.1 pounds)
- Weight (complete M72A3): 2.5 kilograms (5.5 pounds)
- Firing mechanism: Percussion
- Front sight: Reticle graduated in 25-meter range increments
- Rear sight: Peep sight adjusts automatically to temperature change

ROCKET, CALIBER 66-MM

- Length: 50.8 centimeters (20 inches)
- Weight: 1.8 kilograms (2.2 pounds)
- Muzzle velocity: 144.8 meters per second (475 feet per second)
- Minimum range (combat): 10 meters (33 feet)
- Minimum arming range: 10 meters (33 feet)
- Maximum range: 1,000 meters (3,300 feet)
- Maximum effective ranges:
  - Stationary target: 200 meters (660 feet)
  - Moving target: 165 meters (541 feet)
  - (Beyond these ranges, there is less than a fifty percent chance of hitting the target.)

AMMUNITION

5-6. The M72A2/A3 LAW is issued as a round of ammunition. It contains a nonadjustable propelling charge and a rocket. Every M72A2/A3 has an integral HEAT warhead in the rocket's head (or body) section. The fuse and booster are in the rocket's closure section. The propellant, its igniter, and the fin assembly are in the rocket's motor. No inert versions are available (Figure 5-2). Appendix B provides information about appropriate gunnery training devices and ammunition. Although the M72A2/A3 is mainly used as an antiarmor weapon it may be used with limited success against secondary targets such as gun emplacements, pillboxes, buildings, or light vehicles. Chapter 7 provides more information about combat techniques.

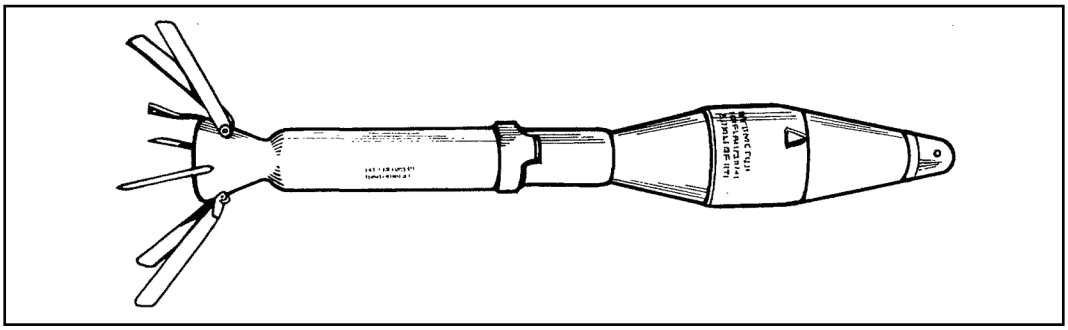

Figure 5-2. High-explosive antiarmor rocket (ammunition).

DESCRIPTION IMPROVED M72 LIGHT ANTIARMOR WEAPON

5-7. The improved M72 light antiarmor weapon system is a compact, light weight, single shot, and disposable weapon with a family of warheads optimized to defeat lightly armored vehicles and other hard targets at close combat ranges (Figure 5-3). The improved M72 light antiarmor weapon systems offer significantly enhanced capability beyond that of the combat-proven M72A3. The improved M72 light antiarmor weapon system consists of a 66-mm unguided rocket prepackaged at the factory in a telescoping, throw-away launcher. The system performance improvements include a higher velocity rocket motor that extends the weapon effective range, increased lethality warheads, lower more consistent trigger release force, rifle type sight system, and better overall system reliability and safety. The improved M72 is transportable by all forms of rail, air, road, and sea transport, including tactical wheeled and tracked vehicles, without any safety constraints, and is certified for air delivery by individual parachutist or by pallet. Issued as a round of ammunition, it requires no maintenance.

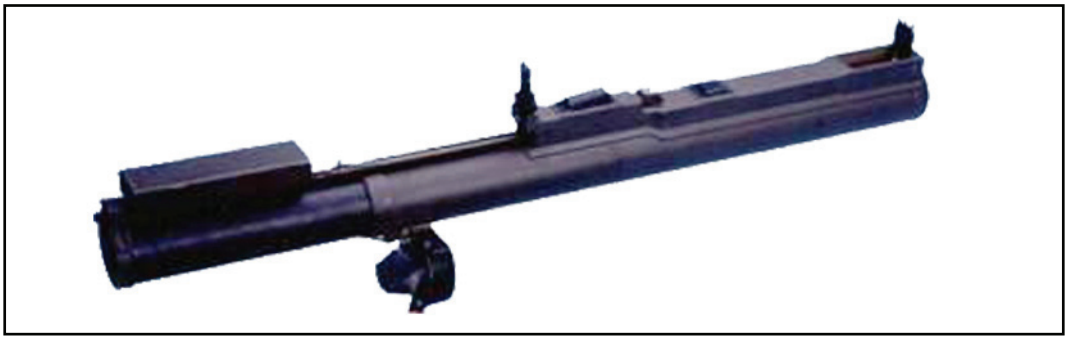

Figure 5-3. Improved M72.

TECHNICAL DATA

5-8. The following data applies to the M72A4/5/6/7 light antiarmor weapons:

Launcher

- Length (extended): 980 millimeters (38.6 inches)
- Length (closed): 775 millimeters (30.5 inches)
- Weight: 3.6 kilograms (8.0 pounds)
- Firing mechanism: Percussion
- Front sight: Three-post
- Rear sight: Peep, adjustable to 350 meters in 50 meter increments

Rocket, Caliber 66-mm

- Length: 50.8 centimeters (20 inches)
- Weight: 1.8 kilograms (2.2 pounds)
- Muzzle velocity: 200 meters per second (656 feet per second)
- Maximum range: 1,400 meters
- Maximum altitude: 950 meters
- Range:
  - Maximum: 350 meters
  - Effective: 220 meters
  - Minimum: 25 meters

DESCRIPTION

5-9. The 66-mm HEAT rocket warhead consists of a tapered, thin-gauge steel body (Figure 5-4). Once it explodes, the force and heat of the explosive focus into a small but powerful gas jet. This directional jet penetrates the target and, if the target is a vehicle, sprays molten metal inside. If the jet hits an engine or ammunition, it may start a fire or cause an explosion. Figure 5-5 shows how the warhead penetrates 300 millimeters of rolled homogeneous steel armor.

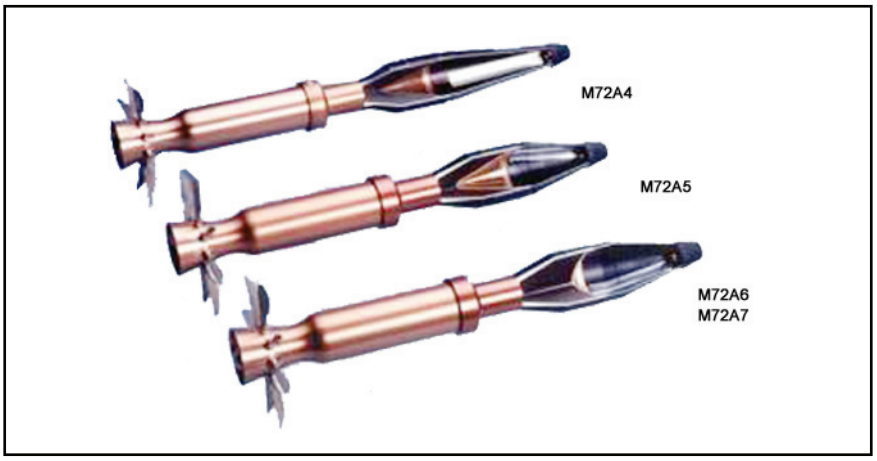

Figure 5-4. 66-mm HEAT rocket warhead.

Impact

5-10. The nose cone crushes; the impact sensor activates the fuze.

Ignition

5-11. The ogive crush switch activates the electric detonator. The booster detonates, initiating the main charge.

Penetration

5-12. The main charge fires and forces the warhead body liner into a directional gas jet that penetrates armor plate.

After-Armor Effects (Spalling)

5-13. The projectile fragments and incendiary effects produce blinding light and highly destructive results (Figure 5-5).

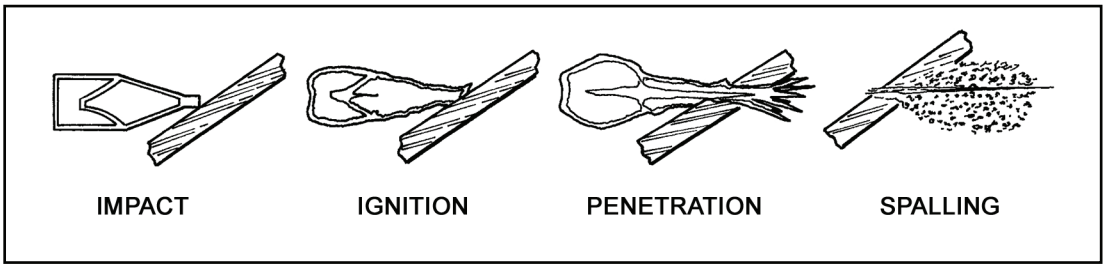

Figure 5-5. Effects of M72-series LAW warhead.

CHARACTERISTICS

5-14. The head of the round is olive drab stenciled in yellow. The M412 fuze is drop-safe and bore-safe. Its minimum arming distance is about 33 feet (10 meters). Six stabilizing fins are attached as part of the motor. As the rocket clears the launcher, springs force open the fins, which stabilize the rocket in flight.

PACKAGING

5-15. Five complete M72-series LAWs are packaged within a fiberboard inner pack for a total weight of 12.5 kilograms (27 1/2 pounds). Three inner packs are then placed in a wire-bound wooden box, the gross weight of which is 54.5 kilograms (120 pounds) (Figure 5-6).

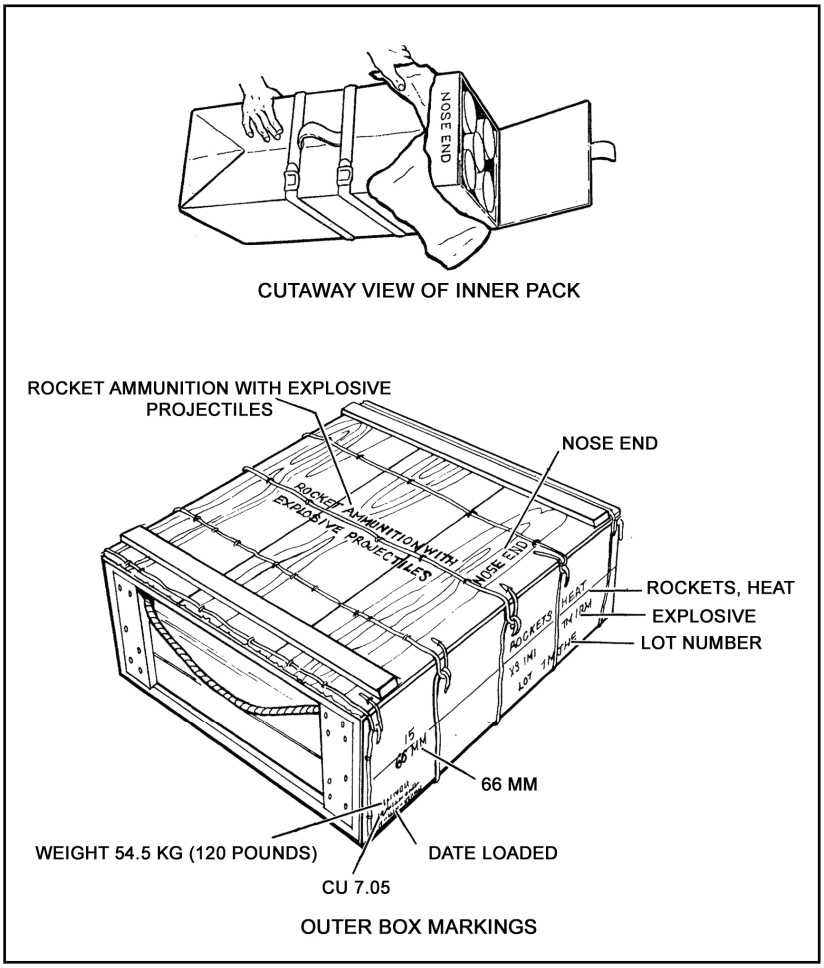

Figure 5-6. Packaging for M72-series LAW.

INSPECTION

5-16. Because the M72-series LAW is issued as a round of ammunition rather than as a weapon, inspection is limited to a visual examination of the sealed unit. **Inspect the launcher's overall condition before preparing the launcher for use.**

- Check the body for dents, cracks, or bulges.
- Check the rubber boots covering the trigger bar and barrel detent for tears or punctures.
- Ensure the arming handle is present and on SAFE and that the pull pin is in place.
- Check the data plate for the phrase, W/COUPLER (Figure 5-7).

DANGER

1. IF THE M72A2 LAW DOES NOT STATE "W/COUPLER" ON ITS DATA PLATE, TURN THE WEAPON IN TO THE UNIT AMMUNITION SECTION.

2. THE COUPLER PREVENTS THE INNER AND OUTER TUBES FROM SEPARATING AND POSSIBLY CAUSING PREMATURE DETONATION.

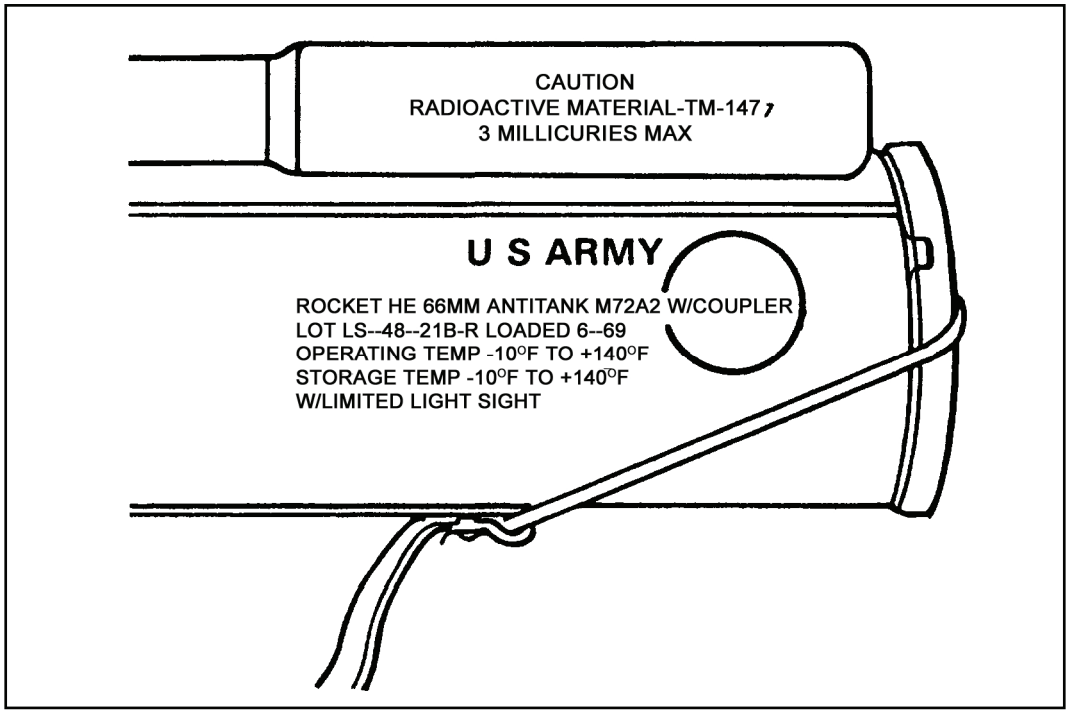

Figure 5-7. Launcher data plate.

FIRING MECHANISM

5-17. The firing mechanism includes the trigger arming handle, the trigger assembly, and the firing pin rod assembly (Figure 5-8).

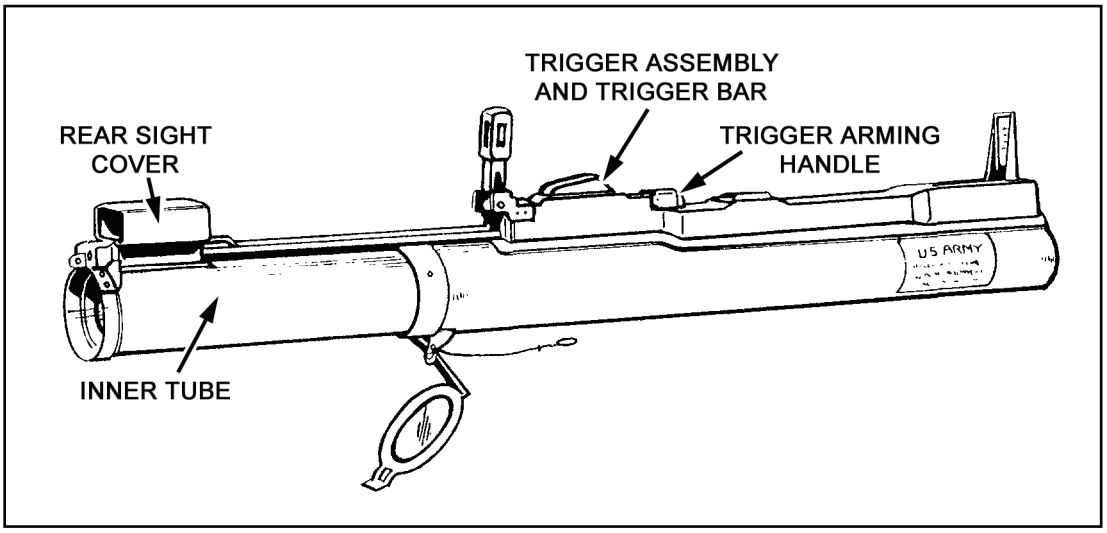

Figure 5-8. Firing mechanism.

TRIGGER ARMING HANDLE

5-18. The trigger arming handle is located forward of the trigger bar and has two positions: SAFE and ARM. Leave the trigger arming handle on SAFE until the launcher is in the correct firing position (Figure 5-9). To press the trigger, you must first pull the arming handle forward and lock it in the ARM position.

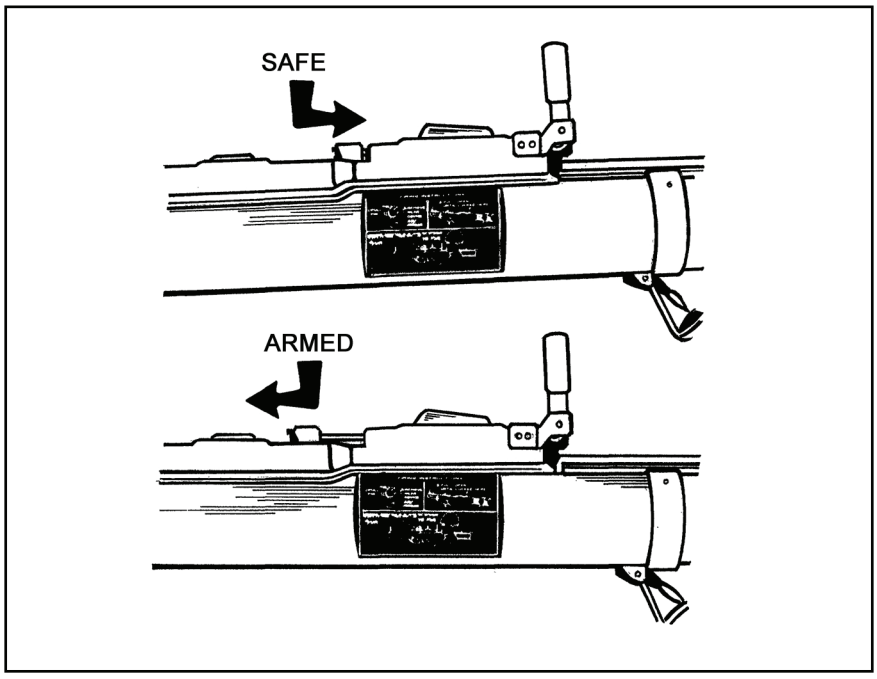

Figure 5-9. Trigger arming handle.

TRIGGER ASSEMBLY

5-19. The trigger assembly is on the top rear of the outer tube. To fire the launcher, press downward on the trigger bar.

FIRING PIN ROD ASSEMBLY

5-20. The rear sight cover and the firing pin housing are on the top rear of the inner tube. Inside the housing, the primer and the firing pin rod are aligned (Figure 5-10). Pressing the trigger bar releases the tension on the firing pin rod assembly, allowing the firing pin to strike the center of the primer.

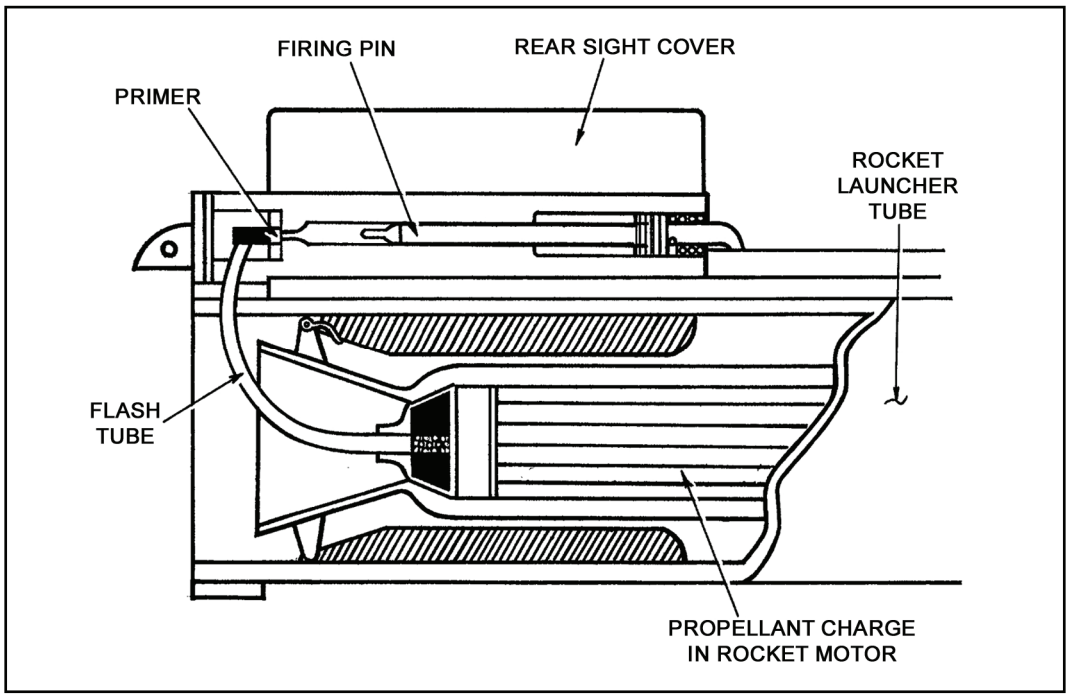

Figure 5-10. Firing pin, primer, and propellant charge.

SIGHTS

5-21. This paragraph discusses the front and rear sights and their proper use.

FRONT SIGHT, M72A2 AND M72A3 LAWS

5-22. The front sight has a raised vertical range line marked with ranges from 50 to 350 meters in 25-meter increments (Figure 5-11). Two curved stadia lines are etched on the front sights. Do not use the stadia lines on this sight to estimate range, because they are inaccurate. Lead indicators are located on either side of the stadia lines to help engage moving targets. On the M72A3, use the front sight illuminated range marks at the 100-meter and 150-meter points to help engage targets in low light.

WARNING

Do not touch the range marks; they are illuminated with promethium, which is mildly radioactive.

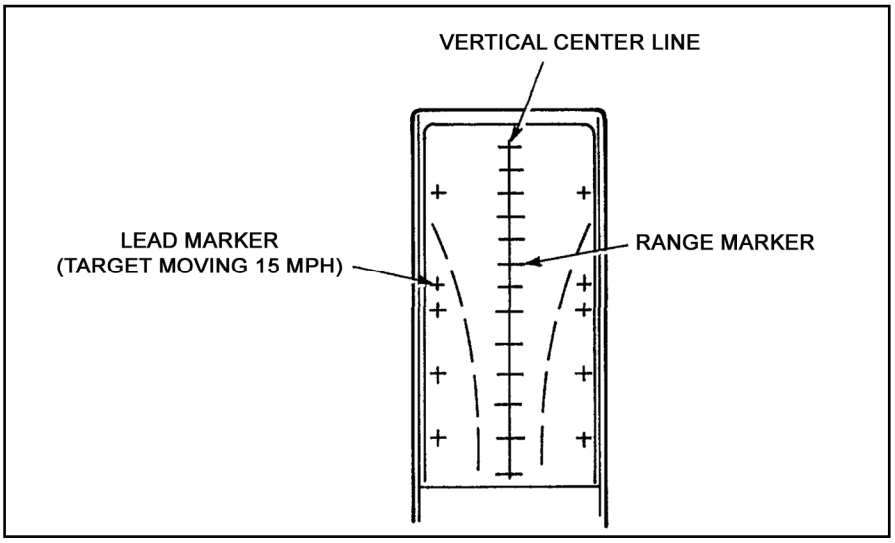

Figure 5-11. Front sight, M72A2 and M72A3 LAWs.

REAR SIGHT, M72A2 AND M72A3 LAWS

5-23. The rear sight consists of a steel bracket with a rubber boot and plastic peep sight. This sight automatically adjusts to changes in temperature (Figure 5-12), which means that its settings are unaffected by temperature.

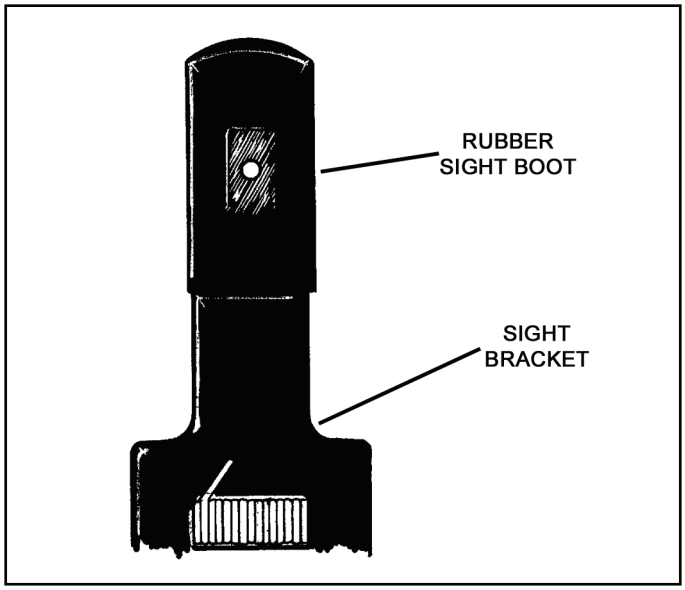

Figure 5-12. Rear sight, M72A2 and M72A3 LAWs.

AN/PVS-4 NIGHTSIGHT

5-24. This nightsight is issued with various accessories, including a bracket that, when mounted on an M72-series LAW, allows use of an AN/PVS-4 on the LAW. However, this works only if DS maintenance has already installed an M72A1 reticle in the AN/PVS-4. Though the reticle was developed for the M72A1 LAW, it can also be used with the other M72-series models. Use the following procedures to mount the M72A1 bracket assembly on any M72-series LAW:

- Place the bracket assembly on top of the rocket launcher so that the square cutout in the top of the bracket fits over the extension release button (Figure 5-13).
- Swing the lower adapter section up and under the rocket launcher and secure it by turning the locking latch clockwise to fully engage the latch shoulder screw.
- Place the sight in the groove on the bracket and align the threaded screw hole in the base of the sight with the lever screw assembly. Tighten the lever screw assembly firmly.

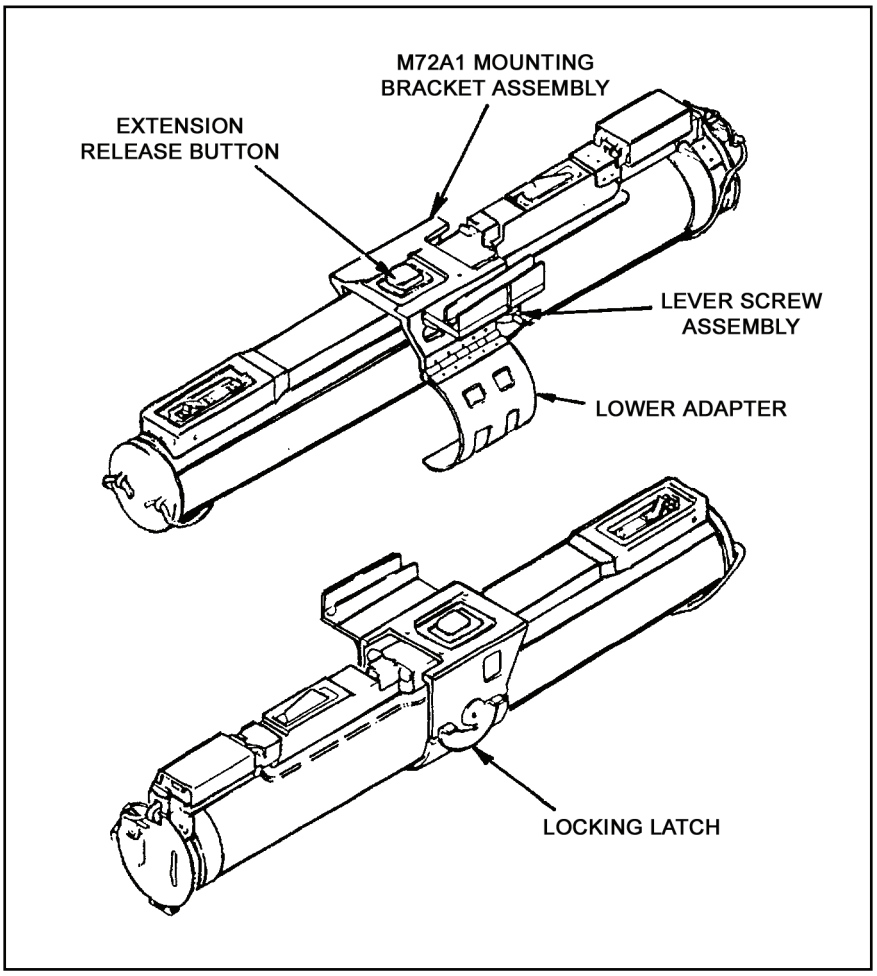

Figure 5-13. Installing M72A1 mounting bracket assembly.

- Use the M72A1 reticle to estimate the range to a 20-foot target such as a tank viewed from the side (Figure 5-14). Place the sight so that the rear and front of a flanking target fit between the curved vertical lines (Figure 5-15). When you read the range from the scale, note that the width of the tank is about one-half the tank's length. This means you can estimate the range to a target, whether it is headed straight toward you or straight away from you, by placing its sides between the curved vertical lines and halving the range shown at that point. The bottom of each vertical line in the center of the reticle corresponds to an additional 25 meters. The length of a horizontal line represents 5 mils, and the spaces between lines represent 5 mils. Use the stadia lines to estimate range *only* when using the AN/PVS-4's M72A1 reticle pattern.

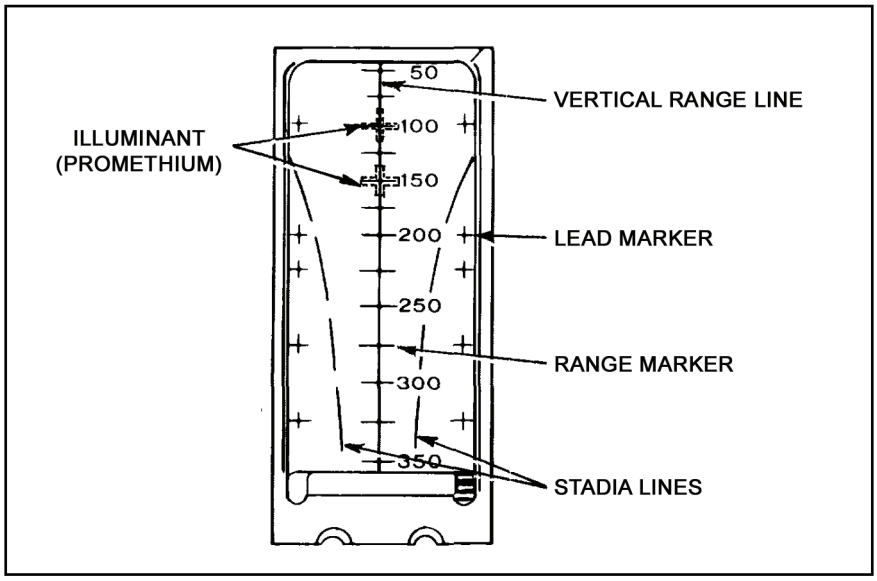

Figure 5-14. M72A1 reticle.

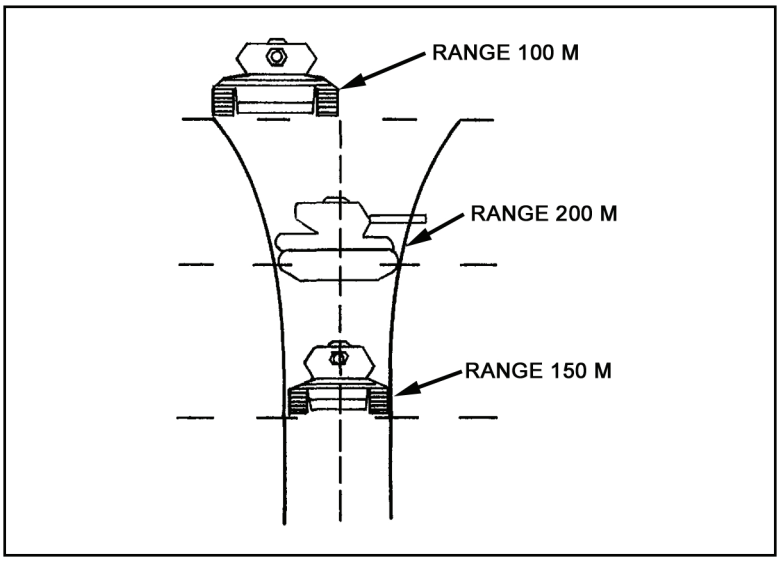

Figure 5-15. Using M72A1 stadia lines to engage targets.

- Align the nightsight's reticle pattern to the LAW sights only once. After that, you can move the nightsight from LAW to LAW without having to realign it each time (Figure 5-16, page 5-12). To align the sight reticle pattern to the LAW sights, place a target at 25 meters. Install the mounting bracket and sight, and select a stable firing position for the LAW. Turn both the TUBE BRIGHTNESS and RETICLE BRIGHTNESS knobs ON. Align the 200-meter range mark on the daysight with the aiming point on the target. Without moving the LAW, adjust the nightsight reticle so that its 200-meter range mark coincides with an aiming point 6.3 centimeters left and 3.5 centimeters above the target aiming point.

DANGER

IF YOU CANNOT FIND AN EMPTY LAUNCHER TO USE TO ALIGN THE NIGHTSIGHT, YOU MAY USE AN UNFIRED LAUNCHER, BUT THIS IS EXTREMELY DANGEROUS.

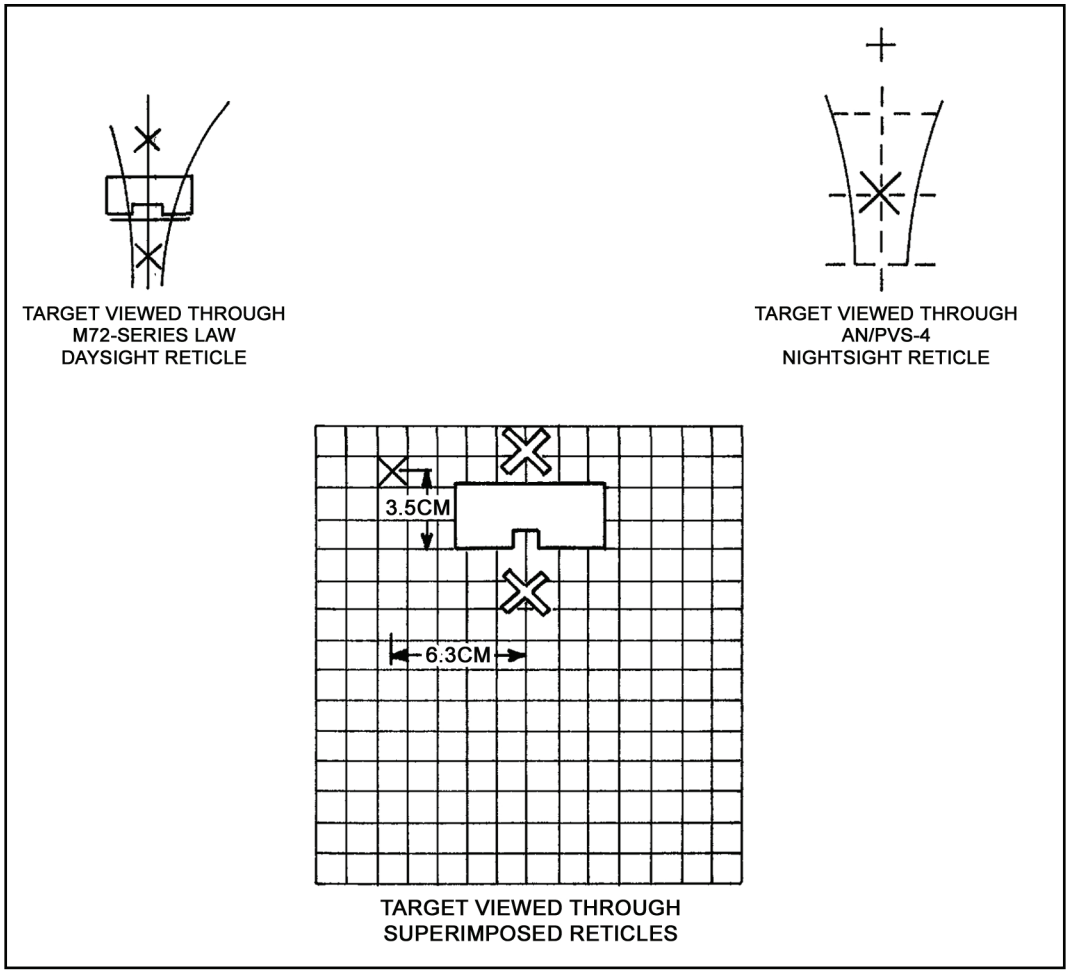

Figure 5-16. M72A1 alignment target for the AN/PVS-4.

OPERATION AND FUNCTION

5-25. Before preparing the launcher for use, the firer inspects its overall condition.

- To extend the rocket launcher —
  - Remove the pull pin and rotate the rear cover downward so the front cover and adjustable sling assembly can fall free (Figures 5-17 and 5-18). Do not discard the sling assembly until after you fire the rocket.

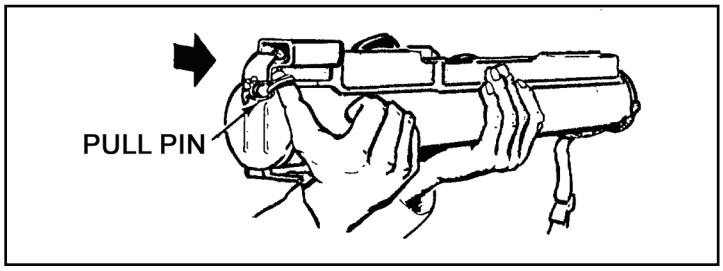

Figure 5-17. Removing the pull pin.

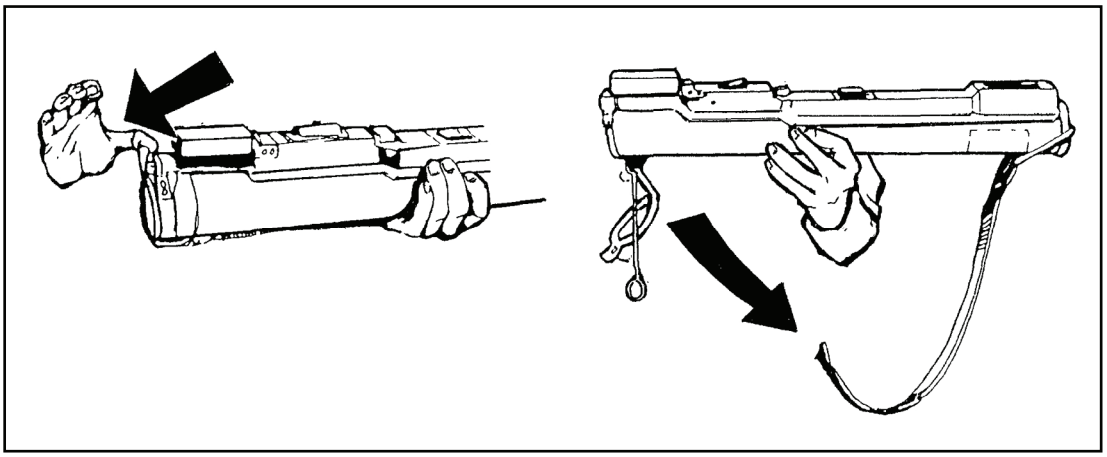

Figure 5-18. Removing the front cover and the adjustable sling assembly.

- With your firing hand, grasp the rear sight cover and with your nonfiring hand, grasp the launcher forward of the barrel detent. Pull your hands sharply in opposite directions to extend the launcher (Figure 5-19). To ensure the launcher is fully extended and locked, try to close it (Figure 5-20, page 5-14).

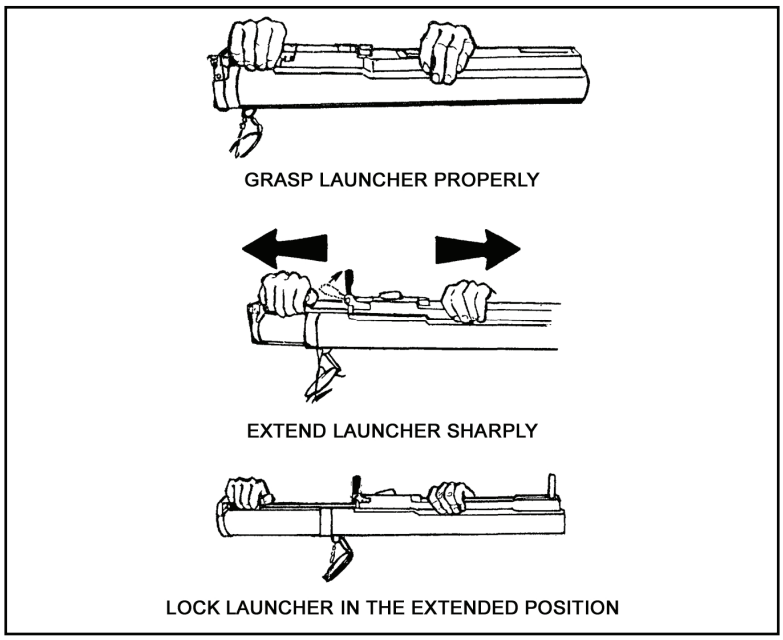

Figure 5-19. Extending the launcher.

- To fire the rocket launcher, raise it slightly above shoulder level, rotate your body under it, and place it on your shoulder. Check the backblast area, pull the trigger arming handle to the ARM position, aim the launcher, and depress the rubber boot on the trigger bar firmly to ensure the launcher fires (Figure 5-21). If the trigger arming handle will not remain in the ARM position, the launcher is not fully extended. Pressing the trigger bar causes the firing pin to strike the primer, which ignites the black powder in the flash tube, which in turn ignites the propellant in the rocket motor.

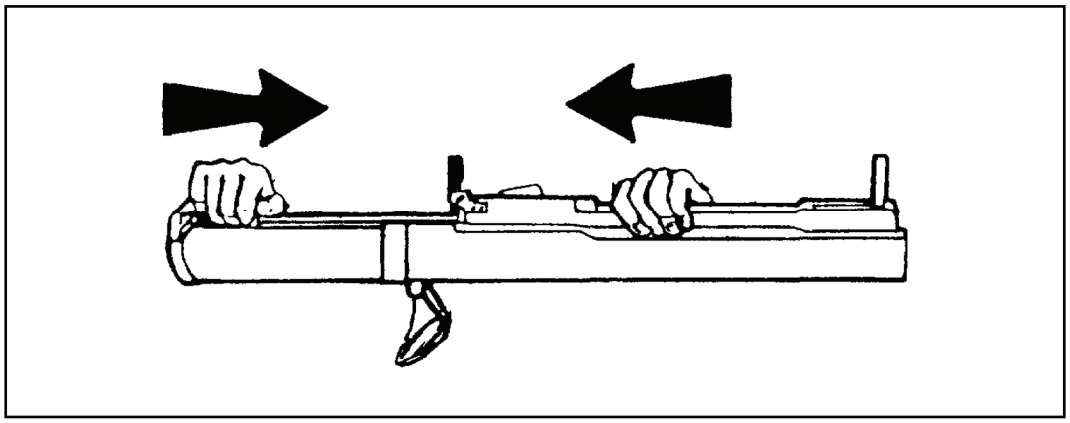

Figure 5-20. Ensuring launcher is locked in the extended position.

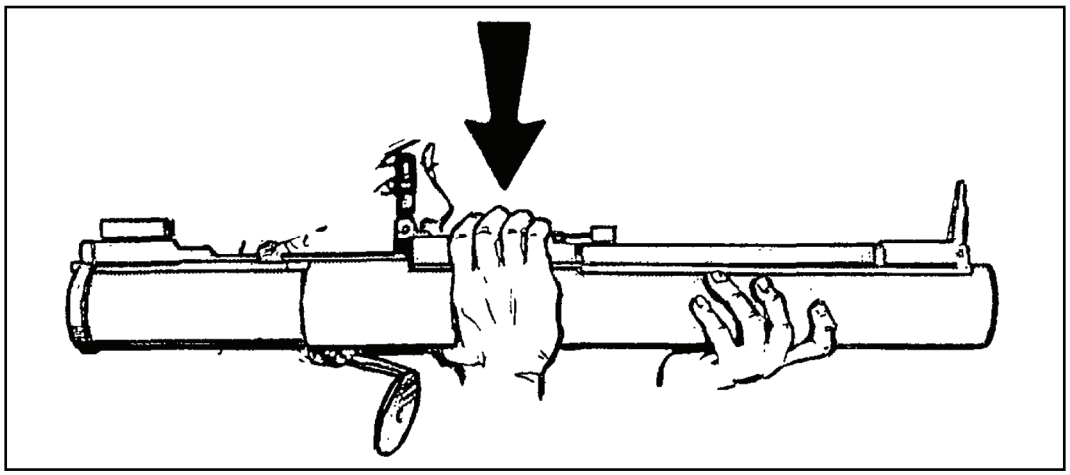

Figure 5-21. Firing the launcher.

DANGER

WHEN OPERATING THE LAW, KEEP IT POINTED DOWNRANGE. ENSURE YOUR WHOLE BODY IS CLEAR OF THE MUZZLE AND REAR OF THE LAUNCHER, AND ENSURE THE BACKBLAST AREA IS CLEAR.

MISFIRE PROCEDURES

5-26. A misfire is a complete failure to fire caused by a procedural or mechanical failure. The misfire procedures used depends on whether the firer is in a combat or training environment.

CAUSES

5-27. A misfire is usually caused by one of the following factors:

- The launcher may not be fully extended.
- The trigger arming handle may not be armed.
- The firing mechanism or the propelling charge explosive train may be faulty.

WARNING

Keep your weapon pointed toward the target.

COMBAT ENVIRONMENT

5-28. Use the following procedures if a misfire occurs in combat:

- Squeeze the trigger again immediately.
- If the launcher still fails to fire, place the trigger arming handle on SAFE.
- Partly collapse the launcher, than extend it to cock it again.
- Place it on your shoulder, check the backblast area again, and then arm, aim, and fire the launcher.
- If the LAW still fails to fire, squeeze the trigger again and return the trigger arming handle to SAFE. Collapse the launcher, set it aside, and try another one. As soon as possible, dispose of the misfired LAW IAW unit SOP.

TRAINING ENVIRONMENT

5-29. Use the following procedures if an M72A2, M72A3, or M190 subcaliber device misfires on a live-fire training range:

- Squeeze the trigger again.
- If the launcher still fails to fire, keep the launcher on your shoulder, announce “Misfire,” and wait 10 seconds. Place the trigger arming handle on SAFE.
- Move the launcher from your shoulder and wait one minute.
- Extend the launcher to cock it again, check the backblast area, place the launcher back on your shoulder, pull the arming handle to the ARM position, aim, and squeeze the trigger bar.
- If the launcher again fails to fire, wait 10 seconds before returning the trigger arming handle to the SAFE position.
- Keep the launcher trained on the target area at least one minute; DO NOT collapse the launcher.
- Move the launcher to a safe area and dispose of it IAW unit SOP.

RESTORATION TO CARRYING CONFIGURATION

5-30. If the launcher is prepared to fire, but then is not fired, it should be returned to the carrying configuration by reversing the preparation procedure. After the launcher has been prepared for firing, it is no longer watertight. Therefore, when carrying the launcher, sling it over either shoulder with the muzzle (forward) end down. Only the rocket and rocket motor ignition system are waterproof.

- Return the trigger arming handle to the SAFE position.
- Remove the launcher from your shoulder, depress the barrel detent, collapse the launcher tube, and guide the front and rear sights into position.
- Close the rear cover, replace the cover pull pin, and replace the sling assembly.

WARNING

To prevent injury, remove your thumb from the detent after collapsing the launcher 1/2 to 1 inch.

MARKSMANSHIP FUNDAMENTALS

5-31. Many factors contribute to light antiarmor weapon marksmanship. Soldiers who combine these factors well, and continue to practice doing so, can retain their skills. The factors are grouped into four basic areas known as marksmanship fundamentals: steady hold, aiming procedures, breath control, and trigger manipulation. Instructions are given for right-handed firers, but the M72-series LAW can be fired from either shoulder by simply reversing the instructions.

STEADY HOLD

5-32. Maintaining a steady hold involves holding the launcher as steady as possible while sighting and firing.

- To maintain the proper sight picture and sight alignment until firing, the firer must hold the launcher in a tight, comfortable position so that it becomes a natural extension of his body (Figure 5-22). Keep your elbows close to your body to help balance the weapon and prevent jerking or flinching when you fire. Place your left hand, palm facing upward, under the launcher near the muzzle and grasp the launcher. Firmly pull the rear cover into your right shoulder pocket.

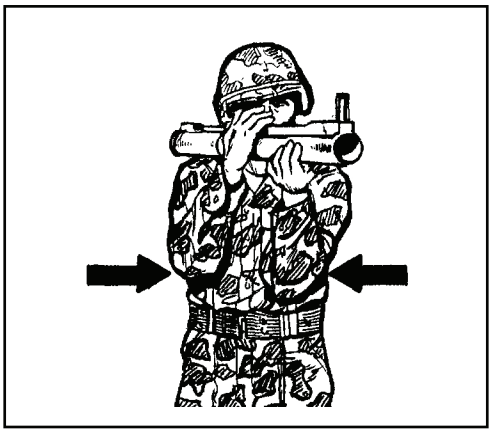

Figure 5-22. Steady hold position.

AIMING PROCEDURES

5-33. Aiming procedures include placing the eye correctly, obtaining a sight picture, and aligning the sight. Combining these procedures is critical to correctly aiming light antiarmor weapons.

Eye Placement

5-34. Before sighting the weapon, estimate the range. (Chapter 7 discusses range estimation.) Place your firing eye as close to the rear sight as is comfortable (Figure 5-23).

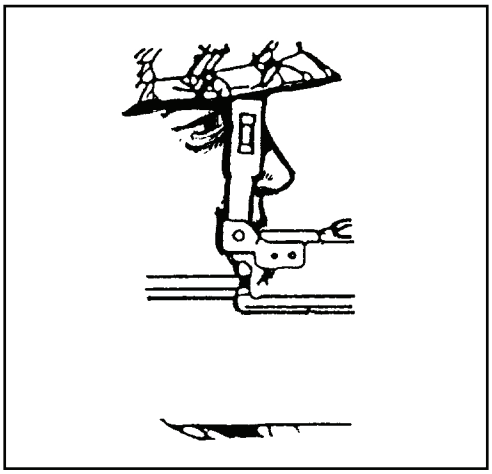

Figure 5-23. Eye placement.

Sight Alignment

5-35. Align the sights correctly with the target. Position the rear sight so that your eye is near and in line with the peephole in the rear sight. Look through the peephole at the front sight reticle and place the range line that corresponds to the target's range on the target (Figure 5-24).

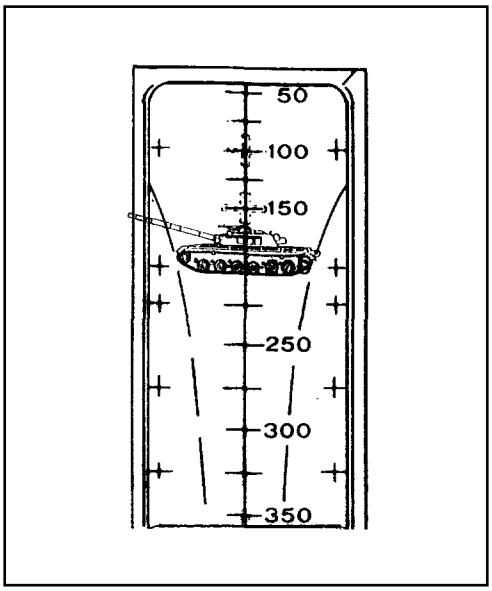

Figure 5-24. Sight alignment.

Sight Picture

5-36. Position the front sight on the target. *Stationary targets* include those moving directly toward or away from the firer. Place the correct vertical range line in the center of the target (Figure 5-25, page 5-18). *Slow-moving targets* include those with an estimated speed of 5 miles per hour or slower, or those moving in an oblique direction. Place either the left or right lead cross mark on the vehicle's center of mass (Figure 5-26, page 5-18). *Fast-moving targets* include those with an estimated speed of more than 5 miles per hour. Place either the left or right lead cross mark on the leading edge of the vehicle (Figure 5-27, page 5-19).

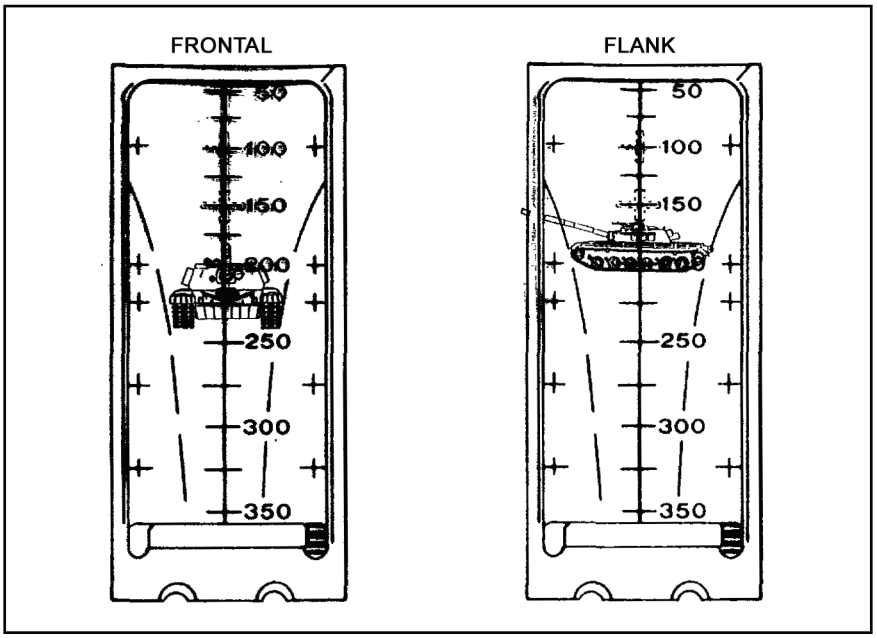

Figure 5-25. Sight picture, stationary targets.

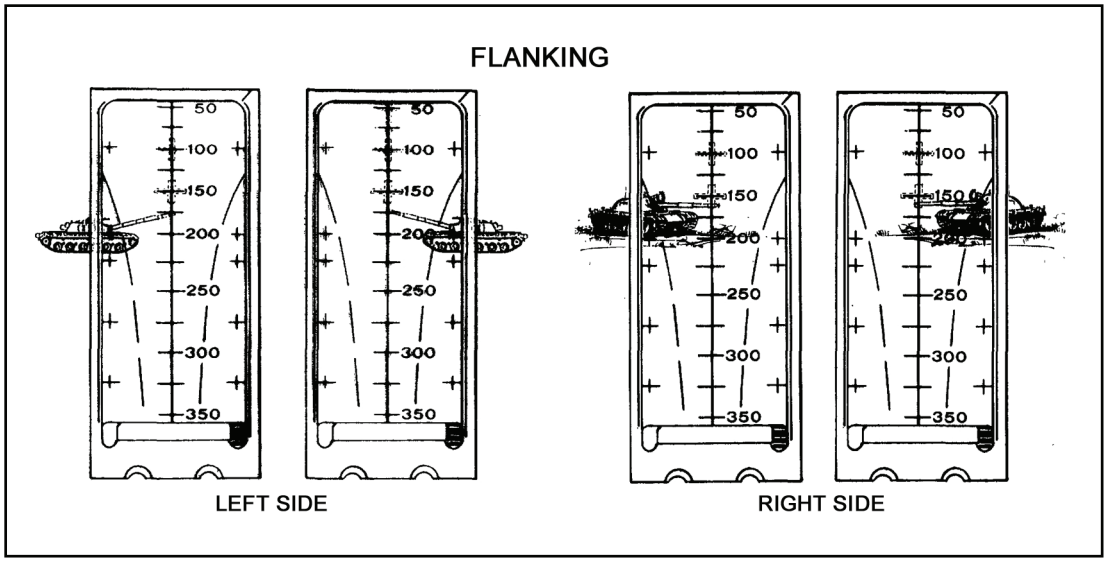

Figure 5-26. Sight picture, slow-moving targets.

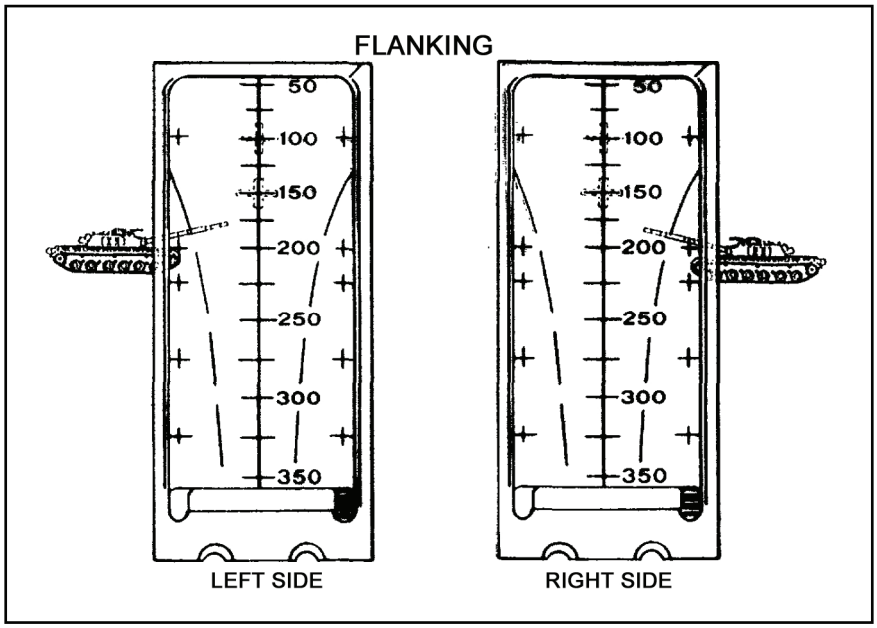

Figure 5-27. Sight picture, fast-moving targets.

BREATH CONTROL

5-37. Breath control is as important when firing a light antiarmor weapon as it is when firing an individual weapon. Breathing can cause a miss. To control breathing, the firer breathes deeply a couple of times, takes one last deep breath, exhales partly, holds his breath, and then sights and fires.

TRIGGER MANIPULATION

5-38. To fire the LAW, the firer must apply firm and steady downward pressure to the trigger with the fingers of his firing hand (Figure 5-28).

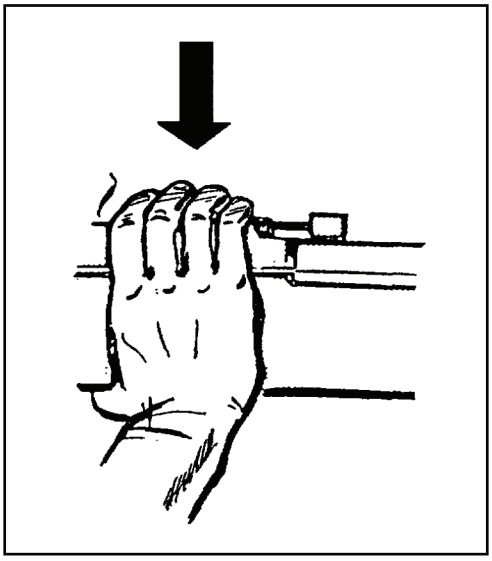

Figure 5-28. Trigger manipulation.

M72A4/5/6/7 SIGHTS

5-39. This paragraph discusses the front and rear sights and their proper use.

FRONT SIGHT, M72A4/5/6/7 LAWS

5-40. The front sight has three lead posts to help line up fast moving, slow moving, or stationary targets. The front sight is spring-loaded to automatically adjust for temperature-induced performance differences (Figure 5-29).

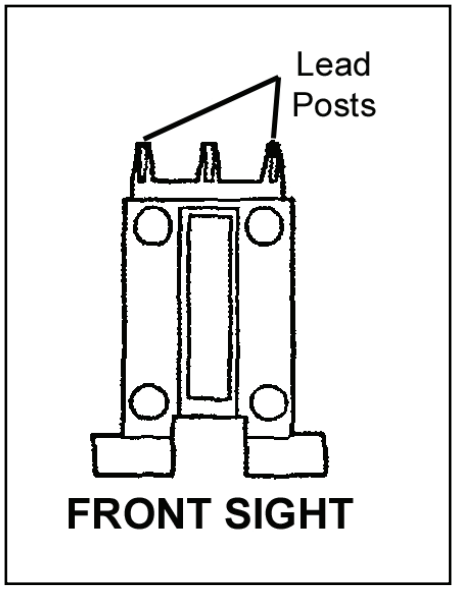

Figure 5-29. Front sight, M72A4/5/6/7.

REAR SIGHT, M72A4/5/6/7

5-41. The rear sight is more like a standard gunner's sight; it has a range setting knob, a range indicator in 50-meter increments (Figure 5-30), and two apertures (peep holes), a daylight aperture and a low light aperture.

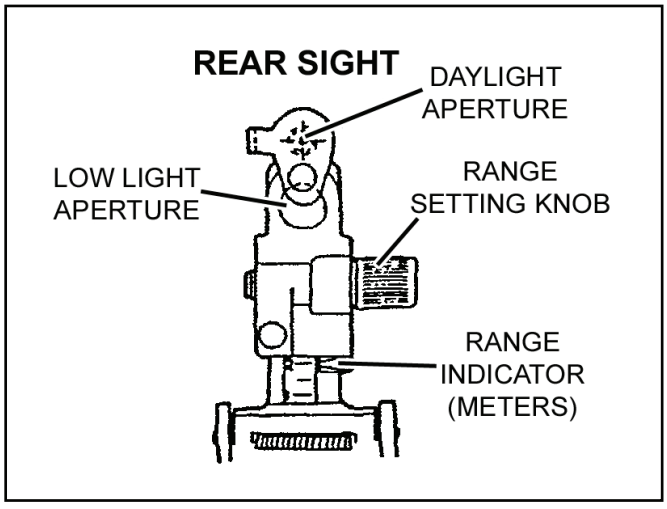

Figure 5-30. Rear sight, M72A4/5/6/7.

INTEGRATED ACT OF SHOOTING

5-42. Correct sight alignment is critical. Sight alignment errors are increased as the range to the target increases. Therefore, maintaining the correct relationship between the rear and front sights is as important as placing the aiming point. The steps for doing this should become automatic. No matter how quickly they are done, these steps are always distinct, because the human eye can only focus at one distance and on one point at a time. The firer focuses on the front sight to obtain correct sight alignment, then places the aiming point to complete the sight picture. He shifts or adjusts the position of the launcher as necessary. The whole time he is pressing the trigger, he maintains the sight picture.

FIRING POSITIONS

5-43. The M72-series LAW can be fired from either shoulder by simply reversing the instructions. Though each weapon can be fired from all four of the basic firing positions, individual physique determines exact body and hand positions. Firing from a supported position naturally increases accuracy, which improves the odds for a first-round hit or kill. Basic safety considerations are the same for all light antiarmor weapons, but additional considerations for each firing position are provided here.

STANDING POSITION

5-44. Two standing positions are used: a basic standing position and one modified for the infantry fighting position.

Basic Standing Position

5-45. Raise the launcher slightly higher than shoulder level. Execute a left face, rotate your shoulder under the launcher, and spread your feet a comfortable distance apart. Move your left foot 15 to 24 inches forward, keeping your hips level and your weight balanced on both feet. To obtain a firm, stable position, tuck both elbows tightly into your body. To track a moving target, turn your body at the waist—not with your legs. This enables you to track the target smoothly. Unless you are behind a protective barrier, such as a wall, the standing position exposes you more than any other position to enemy observation and possible suppression. Place your nonfiring hand about 4 inches from the front of the muzzle, with your firing hand on the rear cover. After placing the weapon on your shoulder, release the rear cover and place your firing hand on the trigger. Cup the launcher in the palm of your nonfiring hand. Position your firing eye as close to the rear sight as is comfortable (Figure 5-31, page 5-22).

WARNING

Always keep the launcher pointed in the direction of fire.

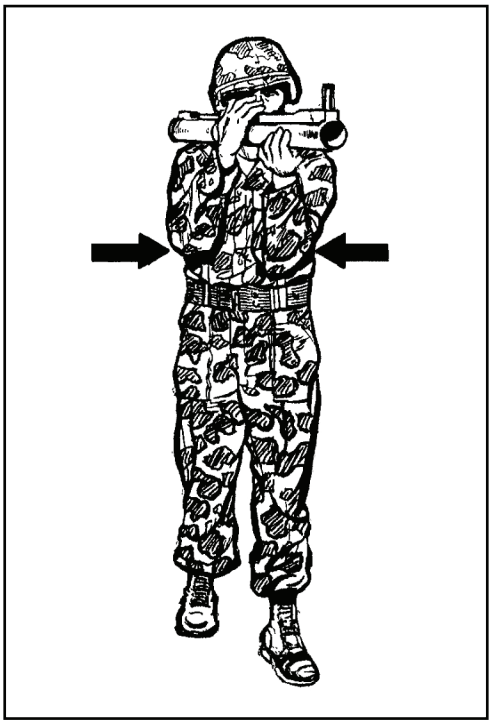

Figure 5-31. Basic standing position.

Modified Standing Position

5-46. Use this position when you occupy an infantry fighting position. Assume the basic standing position, but instead of stepping forward, lean against the back wall of the fighting position. Ensure that the venturi or rear of the weapon extends beyond the rear of the fighting position. Figure 5-32 shows the modified standing position for the M72-series LAW. Ensure that NONE of the following are in your backblast area:

- Other Soldiers.
- Other fighting positions.
- Equipment.
- Any part of your own fighting position.
- Obstructions within 5 meters.

NOTE: Leaders must ensure that light antiarmor weapons are positioned so that the backblast misses other fighting positions.

DANGER

NEVER FIRE FROM WITHIN A COMPLETELY ENCLOSED, UNVENTILATED BUNKER OR FIGHTING POSITION.

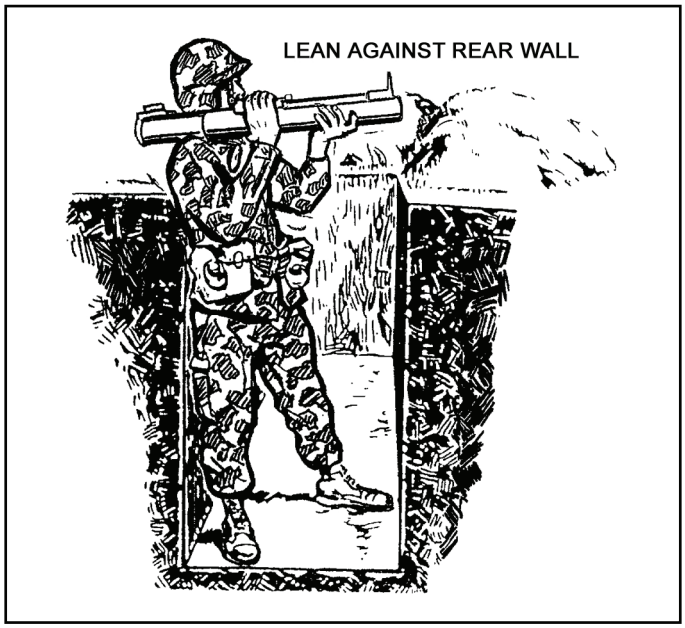

Figure 5-32. Modified standing position.

KNEELING POSITION

5-47. The basic kneeling position is the best position for tracking moving targets. The modified kneeling position is best for engaging stationary targets, since it is a supported position. However, either can be used for stationary or moving targets.

Basic Kneeling Position

5-48. Kneel from the basic standing position onto your right knee, keeping your left thigh parallel to the ground. Rotate your lower right leg 90degrees to the left. (This removes your right foot from exposure to the backblast.) Keep your right thigh and back straight and perpendicular to the ground. Point your left foot in the direction of fire and tuck your elbows in to your sides. Though this is not a supported position, it should be a firm, stable one. (Figure 5-33 shows the basic kneeling position.)

Figure 5-33. Basic kneeling position.

Modified Kneeling Position

5-49. From the basic kneeling position, sit back on your right heel. Place the back of your upper left arm on your left knee, making sure you do not have bone-to-bone contact between your left elbow and left knee. Keep your right elbow tucked in close to your right side. Use any protective barriers available. (Figure 5-34 shows the modified kneeling position.)

Figure 5-34. Modified kneeling position.

SITTING POSITION

5-50. The sitting position is the most stable firing position. In this position, the arms are placed on the legs for support. Depending on his physique, the firer can use either of two versions of the sitting position, which are both suitable for engaging stationary targets.

Basic Sitting Position

5-51. Sit on your buttocks while facing the target, and spread your feet a comfortable distance apart. Lean forward and place the backs of your upper arms on your knees, avoiding bone-to-bone contact. (Figure 5-35 shows the basic sitting position.)

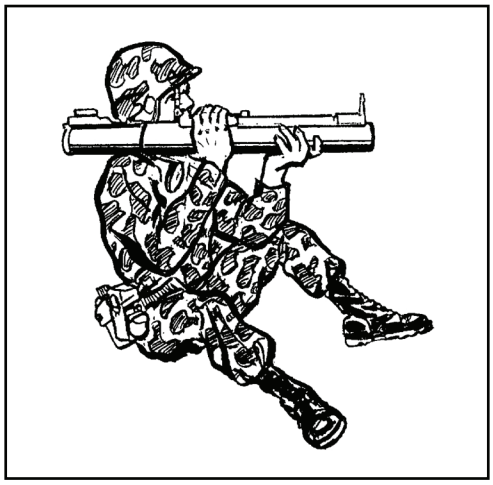

Figure 5-35. Basic sitting position.

Modified Sitting Position

5-52. From the basic sitting position, cross your ankles for added support. Raise or lower your knees to adjust for elevation on the target. (Figure 5-36 shows the modified sitting position.)

Figure 5-36. Modified sitting position.

PRONE POSITION

5-53. The prone position is the most dangerous position due to its proximity to the ground. Ideally, the ground should slope downward from the rear of the launcher, which reduces the effects of the backblast.

- Lie on your stomach with your body at a 90-degree angle to the direction of fire, and with your body and legs to the left of the direction of fire, for the improved launcher lie with your body at a 45-degree angle.
- *Ensure that neither the body nor the legs are in the backblast area.*
- Unlike other firing positions, the prone position prevents you from placing the launcher on your right shoulder. Instead, you must hold the launcher in place against your upper right arm. For stability, apply extra pressure on the firing mechanism with your right hand. The prone position is the least stable of all firing positions. You must practice it often to become confident using it. (Figure 5-37, page 5-26, shows the prone position for M72A2/A3; Figure 5-38, page 5-26, shows the prone position for the M72A4/5/6/7 due to the improvements of the rockets.)

DANGER

FAILURE TO MAINTAIN A 90-DEGREE OR A 45-DEGREE ANGLE FROM THE DIRECTION OF FIRE COULD CAUSE INJURY OR DEATH TO THE FIRER.

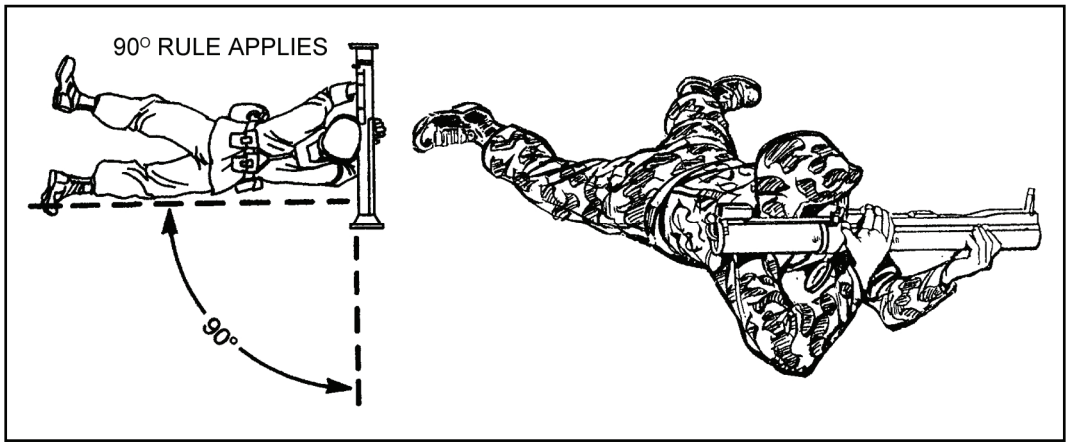

Figure 5-37. Prone position for M72A2/A3.

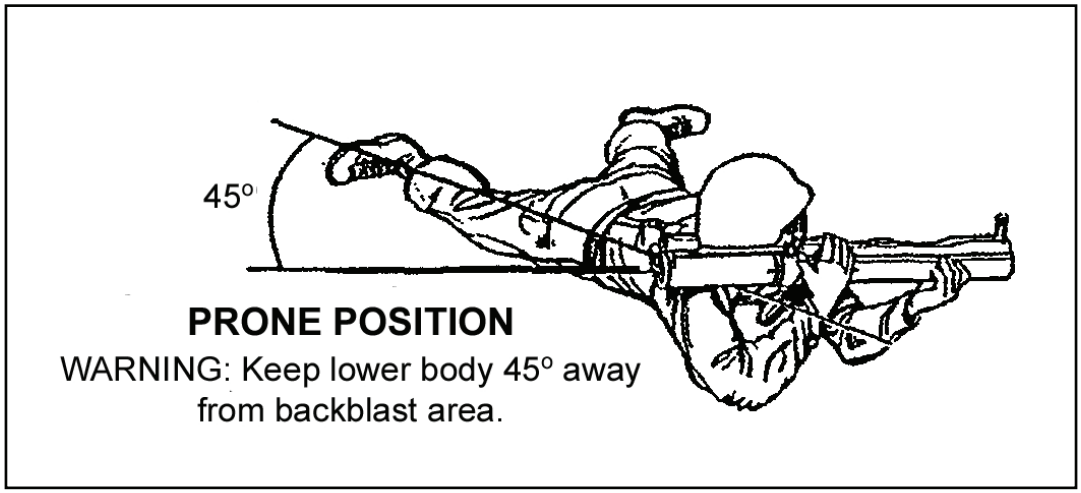

Figure 5-38. Prone position for the M72A4/5/6/7.

Chapter 6

ROCKET AND LAUNCHER ASSEMBLY, M141 BUNKER DEFEAT MUNITION

This chapter provides information and technical data for the M141 BDM (a shoulder-launched, multipurpose assault weapon-disposable [SMAW-D]). It also discusses its characteristics, nomenclature, functioning, operation, marksmanship fundamentals, and firing positions.

DESCRIPTION

6-1. The M141 BDM is a disposable, lightweight, self-contained, man-portable, shoulder-fired, high-explosive, multipurpose weapon that contains all gunner features and controls necessary to aim, fire, and engage targets. The weapon system consists of an unguided free-flight rocket, which is packed in an expendable, telescoping launcher that also serves as the storage container (Figure 6-1). It provides water resistant protection for the rocket during weapon storage, transportation, and use. All propulsion unit operation occurs within the launch tube. The M141 BDM is issued as a round of ammunition, requires no maintenance, and can only be fired from the gunner's right shoulder. The weapon system structure consists of inner and outer filament-wound composite tubes, which are stored one within the other to provide for a shorter carry length.

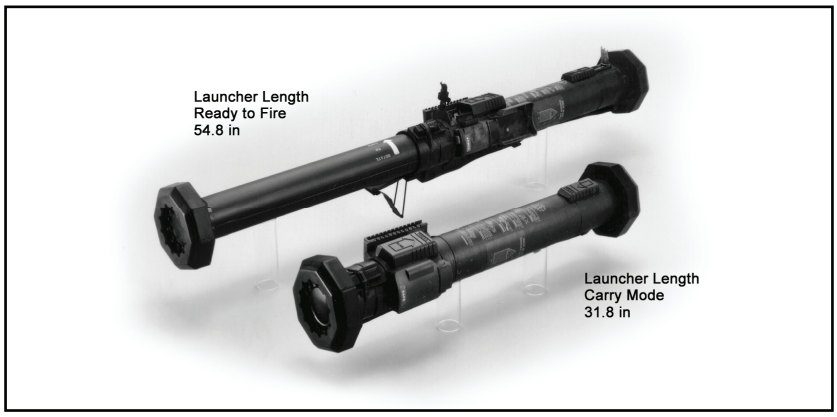

Figure 6-1. The M141 BDM.

6-2. The M141 BDM addresses the need to destroy hardened targets, such as bunkers and other fixed enemy positions, and incapacitate the enemy personnel located within these targets. Optimized for the close fight in the contemporary operating environment, the M141 BDM is effective at distances ranging from 15 to 300 meters. It can be employed effectively against double-reinforced concrete walls up to 8 inches thick, triple brick structures, and standard earth and timber bunkers. The M141 BDM can incapacitate threat personnel when employed against cave complexes. It can also perforate up to 20 millimeters of rolled homogenous steel, which provides a capability against lightly armored and thin-skinned vehicles.

OUTER TUBE

6-3. The outer tube is complete with a carry sling, front and rear rifle-type sight assemblies, firing mechanism, shoulder stop, and NVD mounting rail. Bumpers are attached to the ends of each launcher tube to prevent weapon damage during handling and transportation (Figure 6-2).

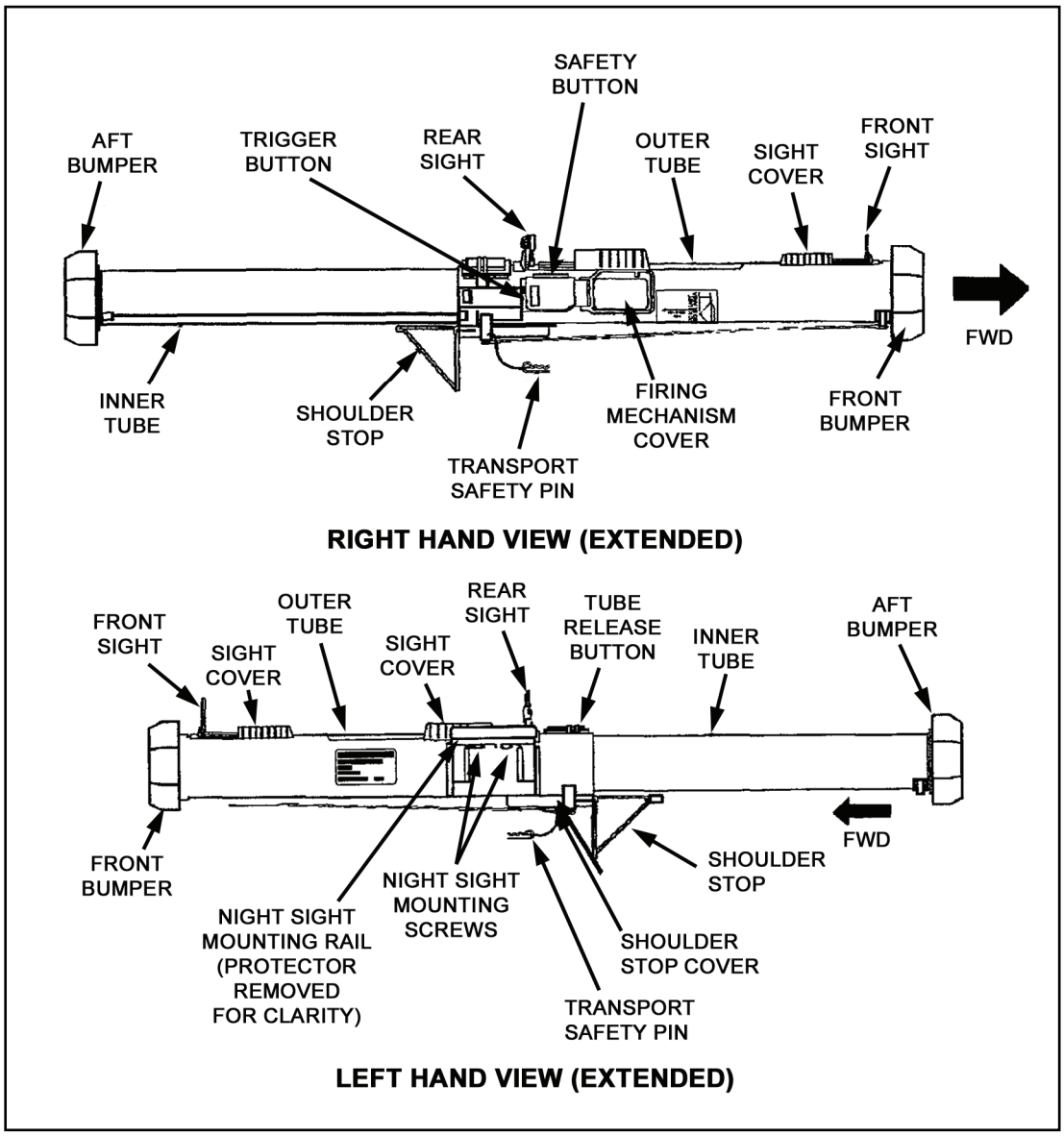

Figure 6-2. M141 BDM profile and components (top, right hand extended view; bottom, left hand extended view).

INNER TUBE

6-4. The inner tube can be extended to the ready-to-fire position by removing the transportation locking pin and pressing the tube detent button. The inner and outer tubes are locked together for firing by rotating the inner tube clockwise, which also completes an electrical connection between the firing mechanism and the rocket.

ROCKET

6-5. The M141 BDM utilizes the 83-mm high-explosive, dual-mode assault rocket. The dual-mode rocket consists of three major components: a high-explosive warhead, a dual-mode fuze, and a rocket motor (Figure 6-3). Warhead function, in quick or delay mode, is automatically determined by the fuze when the rocket impacts a target. The M141 BDM is fired at hard or soft targets without any selection steps required by the gunner. This automatic feature assures that the most effective kill mechanism is employed. The rocket is ignited by electrical power from the launcher firing mechanism. This signal initiates an electric match in the igniter, which in turn ignites the rocket motor propellant. The rocket motor propellant is completely burned out before the rocket leaves the muzzle of the launcher, which protects the gunner from adverse propellant exhaust effects. As the rocket leaves the launcher muzzle, eight spring-loaded fins automatically deploy to aerodynamically stabilize the rocket in flight.

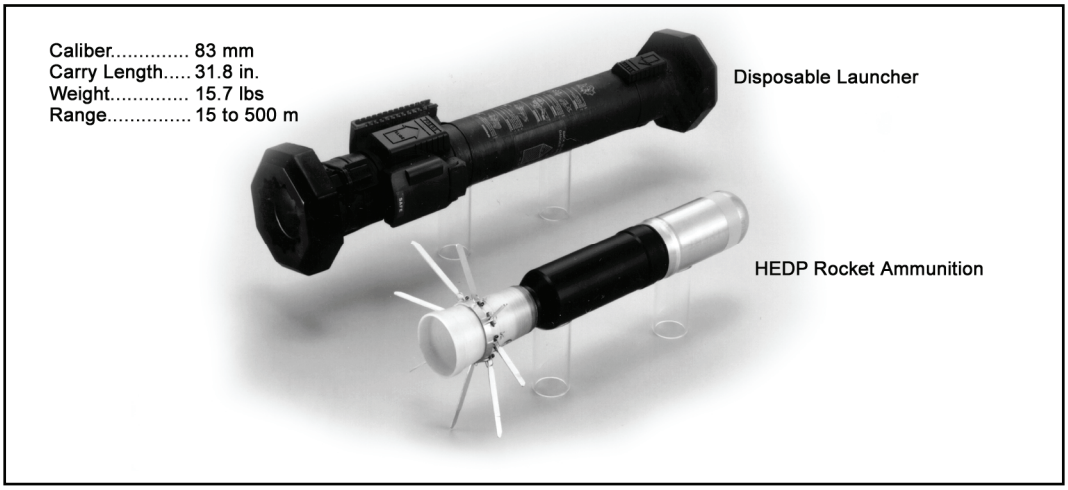

Figure 6-3. The 83-mm high-explosive, dual-mode rocket.

TECHNICAL DATA

6-6. The technical data for the M141 BDM weapon system is as follows:

- Length (extended/ready to fire): 1,371 millimeters (54.8 inches).
- Length (closed/carry): 792 millimeters (31.8 inches).
- Weight (ready to fire): 7.12 kilograms (15.7 pounds).
- Weight (ready to fire): 7.12 kilograms (15.7 pounds).
- Front sight: rifle-type, 3 posts.
- Rear sight: peep (2-mm and 7-mm settings) with sight rack 100 to 500 meters in 50-meter increments.
- Rocket muzzle velocity: 217 meters per second (712 feet per second).
- Rocket diameter: 83 millimeter (3.26 inches).
- Minimum arming range: 15 meters.
- Maximum effective range: 300 meters.
- Maximum range: 500 meters.
- Operating temperature limits: -32° Centigrade to +49° Centigrade (-25° Fahrenheit to +120° Fahrenheit).
- Storage temperature limits: -45° Centigrade to +70° Centigrade (-50° F to +160° F).
- Firing instruction label: yellow printing.
- Color code: yellow band, HE warhead; gold band, inert field handling trainer.

AMMUNITION

6-7. The M141 BDM is issued as a round of ammunition. It contains a nonadjustable propelling charge and a rocket. Every M141 BDM has an integral high-explosive, dual-mode warhead in the rocket's head. The fuze and adapter are in the rocket's closure section. The propellant, its igniter, and the fin assembly are in the rocket's motor (Figure 6-4, page 6-4).

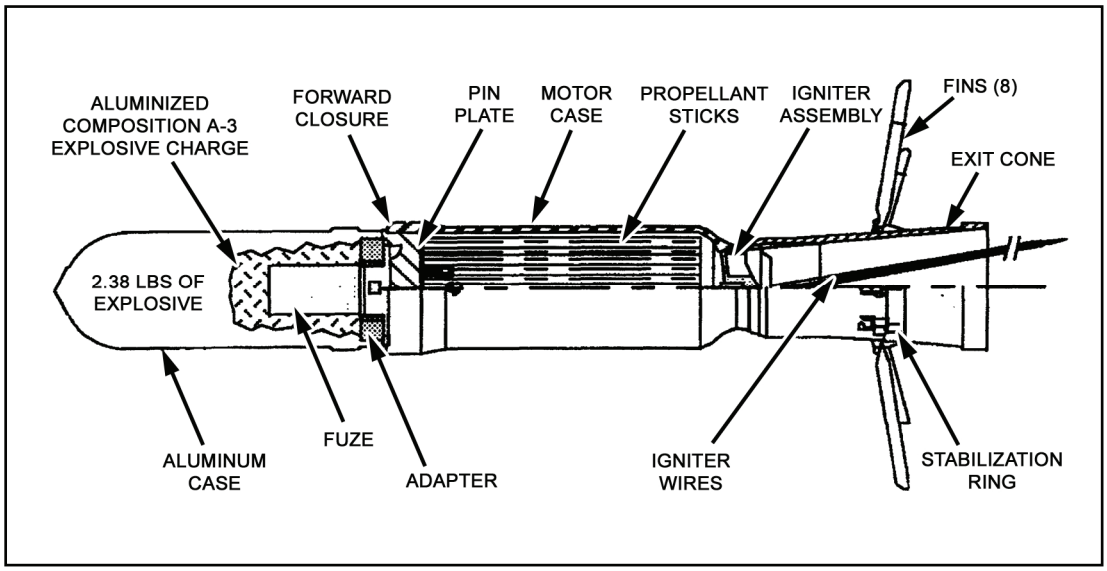

Figure 6-4. Dual-mode rocket components.

DESCRIPTION

6-8. The 83-mm high-explosive, dual-mode assault rocket warhead consists of a dual-mode fuze, an aluminized composition A-3 explosive charge, and 2.38 pounds of explosive.

Impact

6-9. Warhead detonation is instantaneous when impacting a hard target, such as a brick or concrete wall, or an armored vehicle. Impact with a softer target, such as a sandbagged bunker, results in a fuze time delay that permits the rocket to penetrate into the target before warhead detonation.

Penetration

6-10. Penetration of a soft target is enhanced by the high kinetic energy retained by the rocket as it impacts the target. The rocket motor case is located directly behind the warhead providing additional energy to drive the warhead into the target. The rocket configuration also provides directional stability as the rocket enters soft targets, which greatly enhances lethality, especially when engaging targets at oblique angles. This directional stability after impact keeps the rocket from deflecting away from the target wall.

CHARACTERISTICS

6-11. The head of the round and the tail section are silver and the motor case is black. Its minimum arming distance is 15 meters. Eight stabilizing fins are attached as part of the motor. As the rocket clears the launcher, springs force open the fins, which stabilize the rocket in flight. The fins are designed to produce a slow roll rate to reduce the rocket-on-target dispersion.

PACKAGING

6-12. The M141 BDM will usually be delivered to the supply point in a palletized configuration. It comes encased in a folding unit pack which in turn is encased in a metal ammunition container (Figure 6-5). Each pallet contains an FHT, which is an inert training round, and a set of training materials. The FHT and training materials are packaged inside the standard ammunition container and are identified by gold painted ends on the containers.

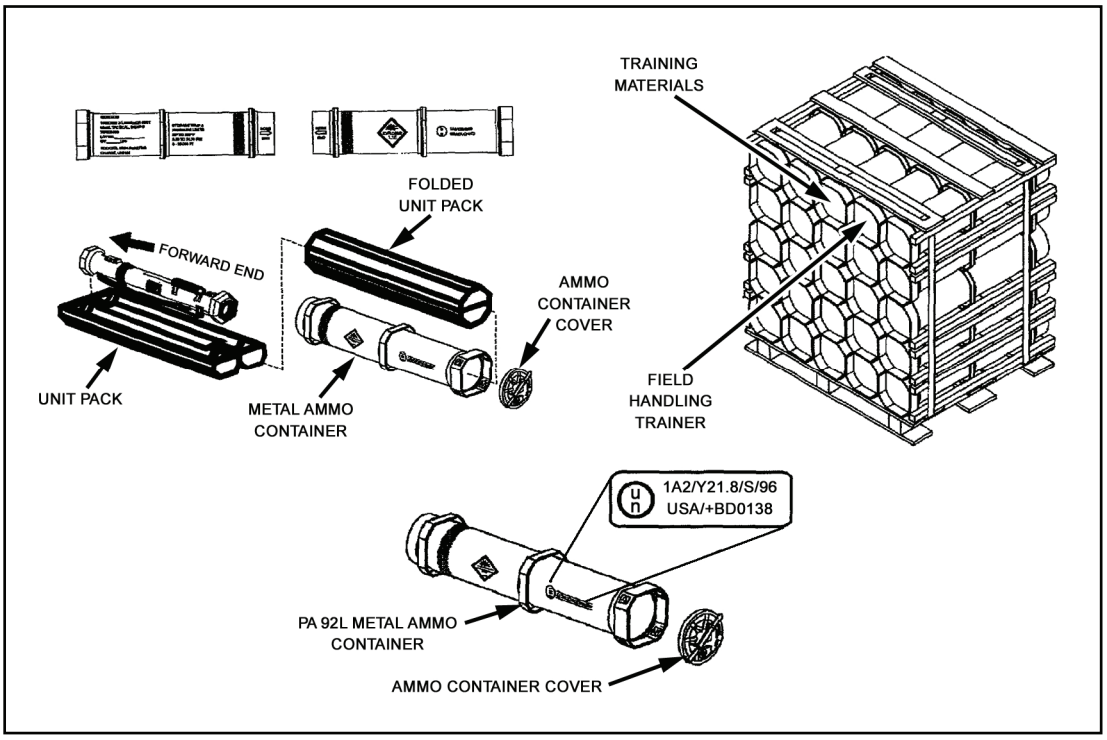

Figure 6-5. Packaging and pallet details.

Packaging Inspection

6-13. The metal ammunition container should be inspected for damage. If the container has been punctured or damaged, notify a supervisor. The container should also be inspected for correct markings, including the serial number and bar code on the end of container.

Unpacking

6-14. To unpack the M141 BDM, remove the metal ammunition container cover and remove the unit pack from the container. Open the unit pack and remove the weapon.

INSPECTION

6-15. The M141 BDM weapon system is issued as a round of ammunition and requires no scheduled maintenance. The inspection is limited to a visual inspection of the outer tube and its components (Figure 6-6, page 6-6) as follows:

- Inspect the body for dents, cracks, gouges, or holes.
- Ensure the front and rear caps are present and there are no holes, tears or punctures.
- Ensure the front sight cover, rear sight cover, firing mechanism cover, tube release button cover, and shoulder stop cover are all present and not damaged.
- Ensure the front and rear sights and the shoulder strap are present and not damaged.

- Inspect the sling for signs of fraying.
- Gently shake the weapon and listen for sounds of loose or broken material inside the tube.

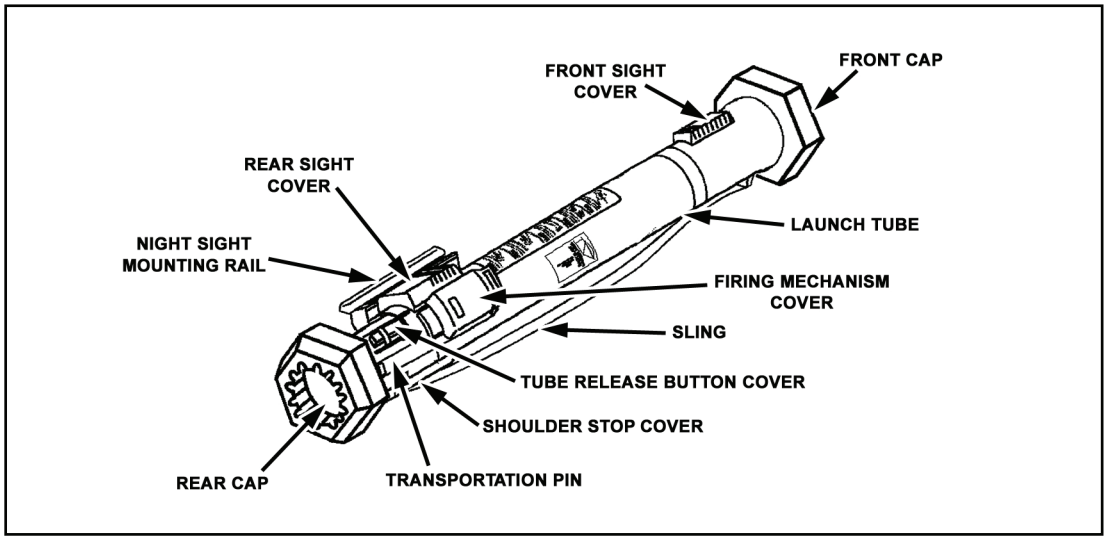

Figure 6-6. Inspection points.

WARNING

Do not extend the launcher if any deficiencies are noted.

WEAPON LABELS AND MARKINGS

6-16. Each M141 BDM has labels and markings that provide operating instructions, backblast danger zone data (Figure 6-7), and safe, armed, and lock indications (Figure 6-8). (The backblast danger zone is discussed in detail in Appendix A.)

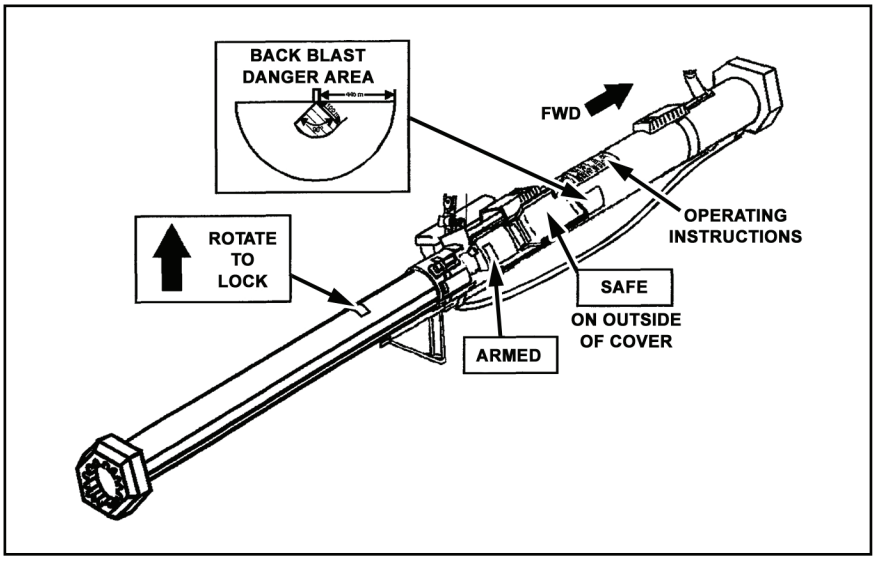

Figure 6-7. Weapon labels and markings.

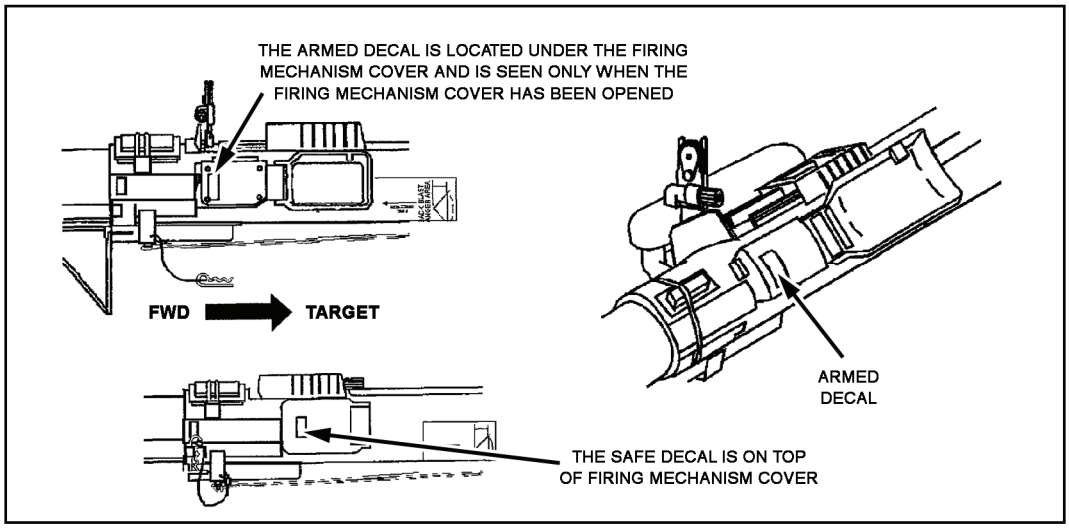

Figure 6-8. Firing mechanism label details.

SIGHTS

6-17. Successful engagement of targets depends on the gunner's ability to employ good aiming techniques. This paragraph discusses the front and rear sights and NVD, and their proper use.

FRONT SIGHT

6-18. The front sight is a rifle-type sight that has three posts: a central post for engaging stationary targets, or moving targets head-on or straight away; and side posts to assist in engaging targets moving from the left or right. The front sight contains a white semicircle mark that will match the curve of the rear sight peep when properly aligned to assist in proper aiming.

REAR SIGHT

6-19. The rear sight consists of a 2-mm peep for use under normal daylight conditions and a 7-mm aperture for use under low light or flare illumination conditions. The rear sight is pre-set to open at the 150-meter battle sight range setting, and is adjustable in 50-meter increments out to 500 meters (Figure 6-9).

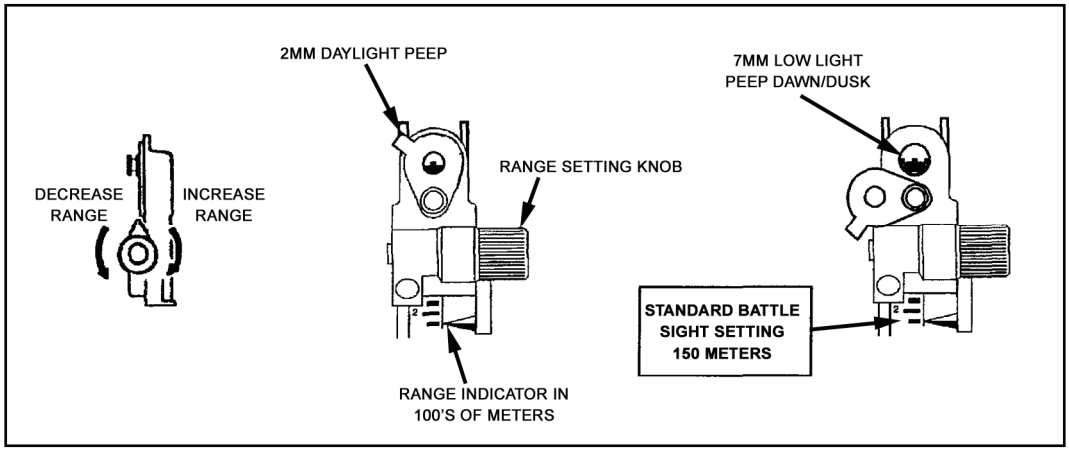

Figure 6-9. Rear sight.

SIGHT PICTURE

6-20. To aim the M141 BDM, set the correct range on the rear sight, then sight through it. Place the top of the middle front sight post in the center of the rear sight aperture. Next, place the middle post on the center of mass of the target. The gunner's eye should be 8 to 9 inches from the rear sight when the weapon is properly positioned for firing. The white semicircle on the front sight will match the curve of the rear sight peep when the gunner is in the correct position (Figure 6-10).

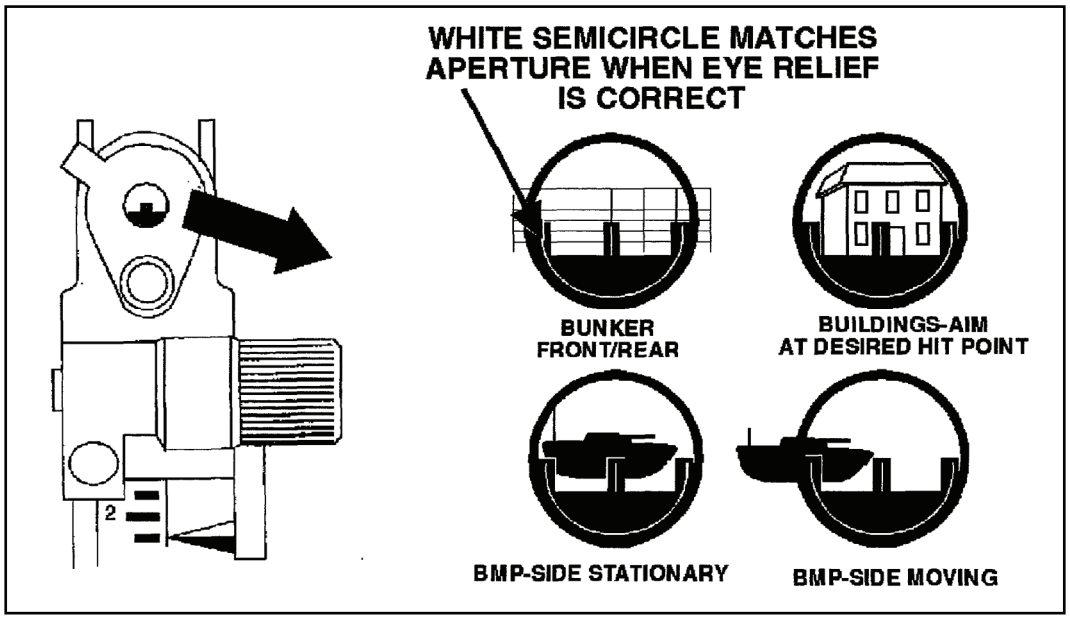

Figure 6-10. Aiming techniques.

NIGHT VISION DEVICE MOUNT

6-21. A NVD mounting rail is permanently attached to each M141 BDM. The mount has an alignment groove that accepts the AN/PVS-4, AN/PAQ-4, and any other devices that use the rail grabber style mount, without the need for additional adapters or brackets. The mounting procedures are the same for both the AN/PVS-4 and AN/PAQ-4:

- Employ the front sight by pushing the front sight cover forward, releasing the front sight.
- Remove the protective cover from the launcher nightsight mounting rail.
- Place the NVD in the nightsight mounting rail.
- Adjust the nightsight fore and aft until one of the mounting screws engages the threaded hole.
- Either of the M141 BDM nightsight mounting screws can be used for attaching the AN/PVS-4, depending on the sight relief distance desired by the gunner (Figure 6-11).

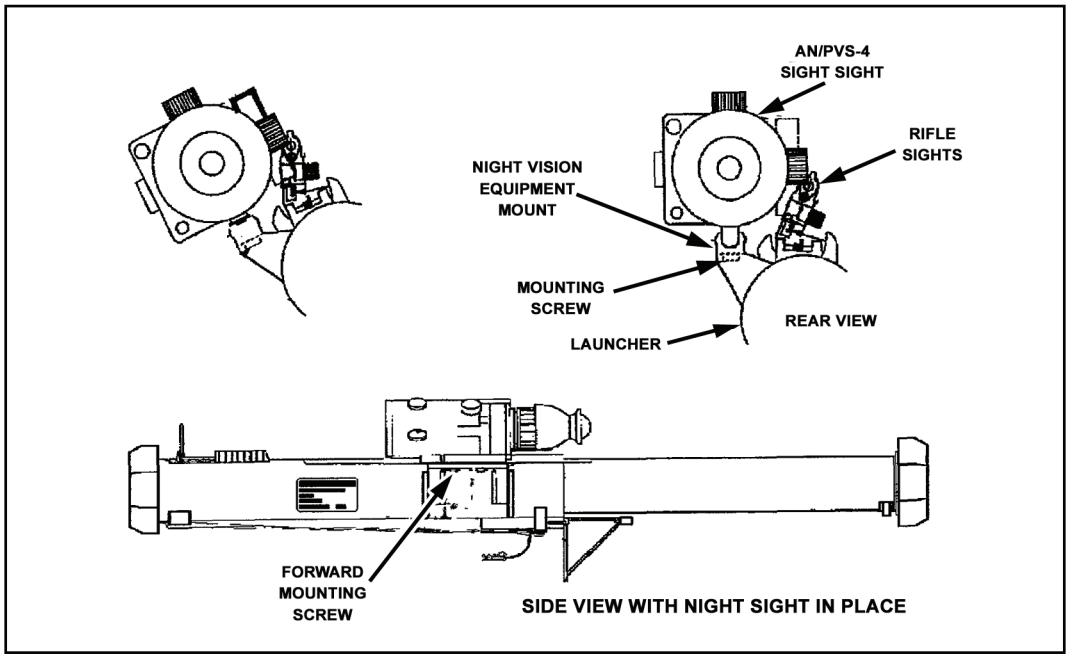

Figure 6-11. AN/PVS-4 nightsight mounting screws.

- Only the forward mounting screw can be used with the AN/PAQ-4A aiming light, due to the position of the ON/OFF switch (Figure 6-12).

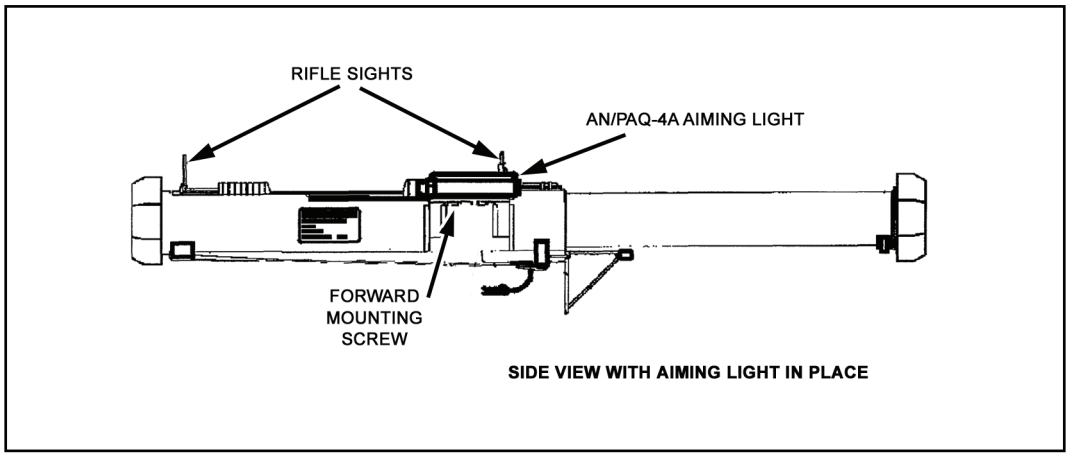

Figure 6-12. AN/PAQ-4A mounting screw.

- Either mounting screw can be used with the AN/PAQ-4B and AN/PAQ-4C light, depending on gunner preference (Figure 6-13, page 6-10).
- Tighten the mounting screw by turning clockwise (hand tight only).

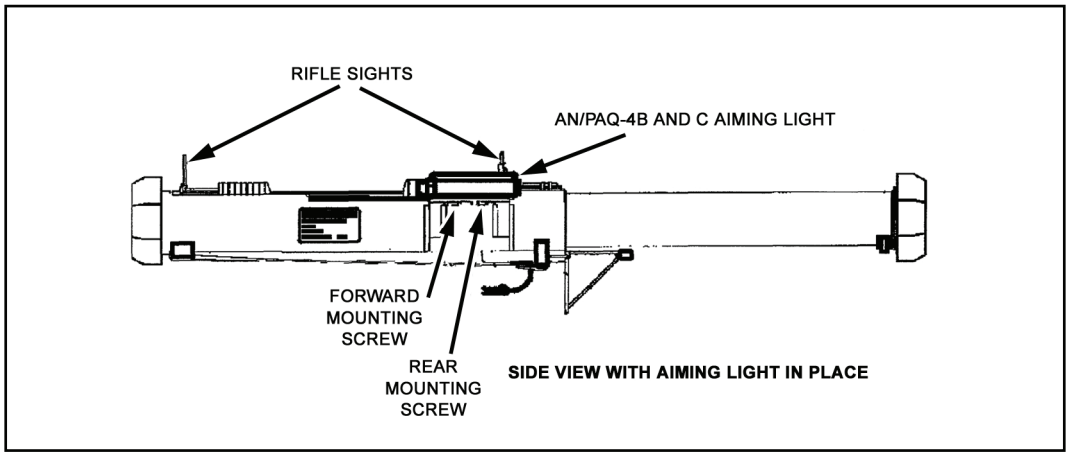

Figure 6-13. AN/PAQ-4B and 4C mounting screws.

NIGHT VISION DEVICE BORESIGHTING PROCEDURE

6-22. The M141 BDM NVD mounting rail is positioned on the launcher to permit simple nightsight alignment to the weapon in the field. No special tools or equipment are required. These procedures will align the AN/PVS-4 and AN/PAQ-4 to each individual M141 BDM using the rifle sights.

- Select an object at a known distance from launcher A (distance of 150 meters is the minimum desired distance).
- The inner tube can be safely extended up to 36 inches in order to facilitate nightsight alignment without interference from the inner tube rear bumper.

WARNING

When zeroing the nightsight with a tactical M141 BDM round, be extremely careful to prevent accidental firing of the weapon. Never open the firing mechanism cover during this procedure.

- With the weapon system front and rear sights open, position the launcher on a stable surface such as a table or sandbags.
- Adjust the M141 BDM rear sight setting for the distance to the selected aiming object.
- Ensure the launcher front sight is level before adjusting the nightsight. Adjust the launcher position until the rifle sights are properly aimed at the selected aiming object.
- Adjust the nightsight until the aim point coincides with the launcher rifle sight picture on the selected aim point.

NOTE: Be careful not to move the launcher during the boresighting process. Verify that the rifle sights are still properly aligned with the aiming object.

- The nightsight is now boresighted to the M141 BDM weapon at the selected range. The nightsight can be removed from the launcher and reattached at a later time and will still be correctly boresighted to that particular launcher. If the nightsight is attached to a different launcher, the boresight procedure must be repeated.

NOTE: The AN/PVS-4 reticle will not be level when boresighted to the M141 BDM, which is normal. Carefully note the reticle angle—you will have to hold the launcher at the same angle when firing at night. Your firing will be accurate, because that same angle was used in boresighting the nightsight to the launcher's rifle sights.

OPERATION AND FUNCTION

6-23. Before preparing the launcher for use, insert earplugs, unsling the weapon from your shoulder, and inspect its overall condition.

- Place the rocket launcher in the ready-to-fire position (Figure 6-14).
  - Keeping the weapon muzzle pointed downrange, face to the rear and place the weapon under your left arm.
  - Remove the transportation locking pin by pulling the lanyard or pin body.
  - Depress the tube release button with your left thumb, grasp the rear tube (inner tube) just in front of the end cap with your right hand, and extend the inner tube rearward until it stops. A yellow band is visible at the inner tube front end when the tube is fully extended. Release the tube release button.

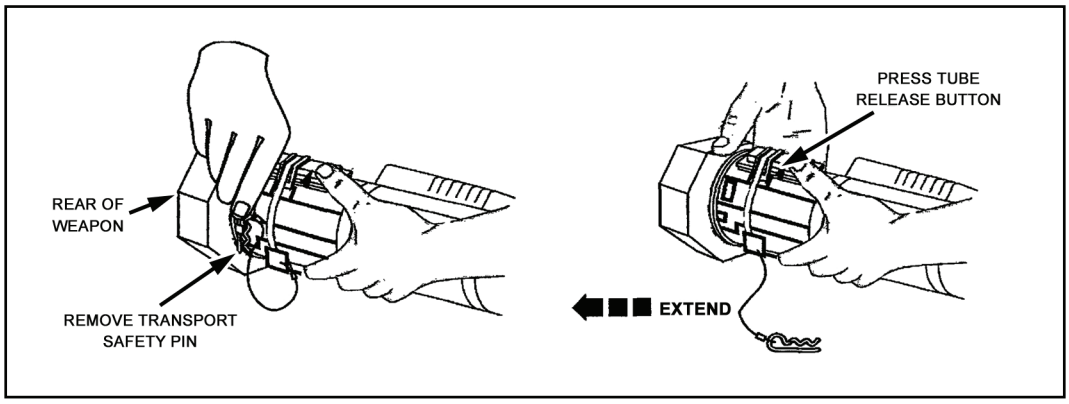

Figure 6-14. Launcher tube extension procedures.

  - Rotate the inner tube clockwise (in the direction of the arrow) until it locks (Figure 6-15).

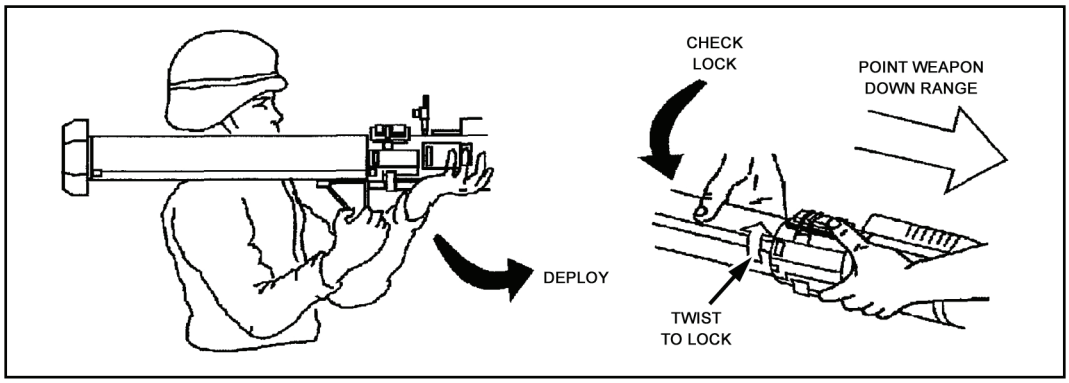

Figure 6-15. Locking the inner tube.

  - Verify the inner tube is locked by attempting to rotate the inner tube counterclockwise (opposite to the arrow).

NOTE: If the tubes are not locked, the weapon will not arm.

- The launcher is now in the ready-to-fire position.

- Fire the rocket launcher.
  - Raise the weapon out and away from your body. Keep the weapon pointed downrange while pivoting your body 180 degrees to face the target, and place the weapon on your right shoulder.
  - Hold the center of the outer tube with your right hand, reach underneath the tube with your left hand, grasp the shoulder stop, and pull it rearward until it deploys from the shoulder stop cover.
  - Reach forward with your left hand, grasp the front sight cover, press down and slide it rearward.
  - With your left hand, grasp the rear sight cover, press down and slide it forward.
  - Grasp the firing mechanism cover with your right hand and rotate the cover all the way forward until the cover is flush with the outer tube. The word ARMED can be seen in red letters when the cover is opened (Figure 6-16).

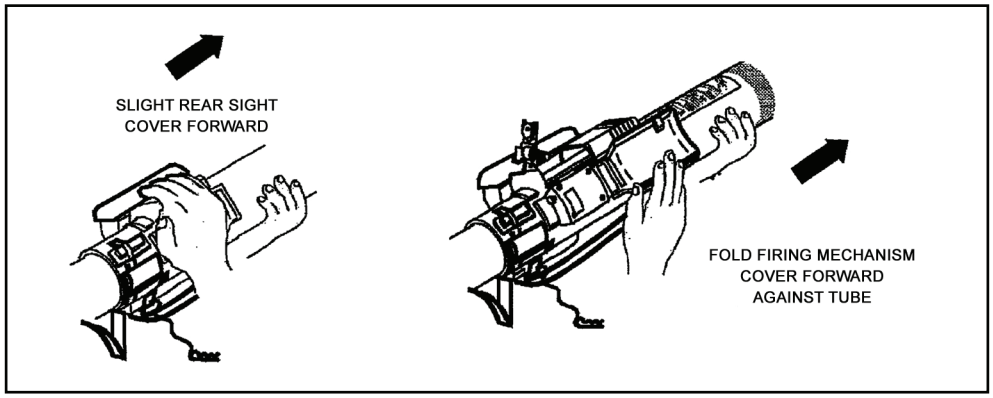

Figure 6-16. Deploy sights and arm firing mechanism.

NOTE: If the firing mechanism cover is not flush with the launcher tube, the weapon will not arm.

  - Pull the shoulder stop against your shoulder, and adjust the rear sight for correct range.
  - Check the backblast area, and aim the weapon at the target.
  - Place the fingertips of your right hand on the safety button (located on top of the firing mechanism) and press down; then place your right thumb on the red trigger button.
  - Press the trigger button forward with the thumb of your right hand until the weapon fires.

- The following is the sequence of events when the weapon is fired.
  - Pressing the safety button and then the trigger button ignites the propelling charge; rocket motion begins (Figure 6-17).
  - The propelling charge burns out before the rocket's exit.
  - The rocket exits the launch tube.

NOTE: When the rocket has traveled 15 meters, the fuze arming cycle is complete.

  - The rocket impacts the target and the warhead detonates.

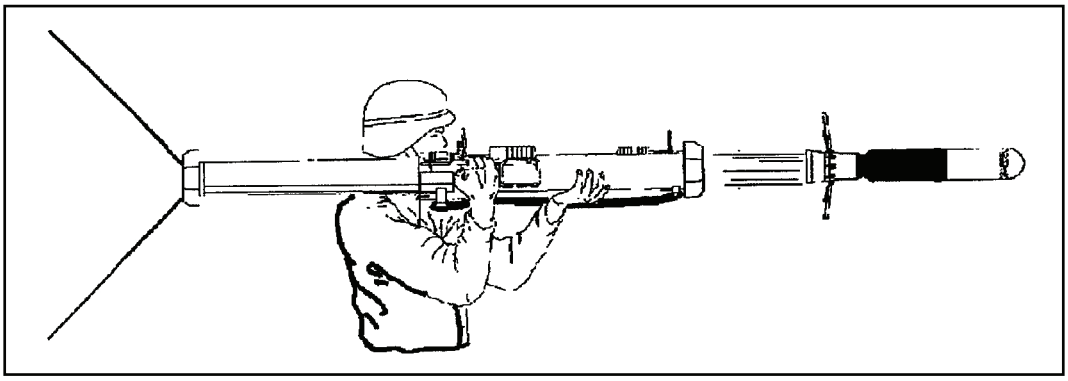

Figure 6-17. Sequence of firing events.

DANGER

WHEN OPERATING THE M141 BDM, KEEP THE LAUNCER POINTED DOWNRANGE. ENSURE YOUR WHOLE BODY IS CLEAR OF THE MUZZLE AND REAR OF THE LAUNCHER, AND ENSURE THE BACKBLAST AREA IS CLEAR.

MISFIRE PROCEDURES

6-24. A misfire is a complete failure to fire caused by a procedural or mechanical failure. It may be due to a faulty firing mechanism or a faulty component in the firing circuit. A misfire is not dangerous, but since it cannot be immediately distinguished from a delay in the functioning of the firing mechanism (hang fire), it should be considered as a possible hang fire until such possibility has been eliminated.

CAUSES

6-25. A misfire is usually caused by one of the following factors:

- The firing mechanism may not be armed.
- The inner tube may not be fully extended and locked.
- The firing mechanism or the propelling charge explosive train may be faulty.

WARNING

Keep your weapon pointed toward the target throughout the entire misfire procedure.

PROCEDURES

6-26. Conduct misfire procedures as follows:

- Keep the weapon aimed at the target.
- Release the trigger button and safety button.
- Resqueeze the safety button firmly, aim, and press the trigger button a second time.
- If the weapon does not fire, release the trigger and safety buttons, and return the firing mechanism cover to the closed, SAFE position.

- Recheck the backblast area, open the firing mechanism cover again (flush with the tube), squeeze the safety button, aim, and fire.
- If the weapon still does not fire, release the trigger and safety buttons, and close the firing mechanism cover to the SAFE position.
- Wait 60 seconds, remove the weapon from your shoulder, and carefully lay your weapon on the ground facing the target.
- If the tactical situation permits, follow your unit's safety SOP and notify your supervisor.

RETURNING THE M141 BDM TO THE CARRY MODE

6-27. If the weapon is prepared for firing but is not used, it must be returned to the carry mode to permit safe storage, transportation, and use at a later time. This assures the physical integrity of the round and reduces the likelihood of environmental damage from moisture and debris intrusion. The procedures for returning the weapon to the carry mode are accomplished by performing the preparation to fire in reverse.

- Close the firing mechanism cover.
- Return the rear sight to the battle sight setting (150 meters). Fold the rear sight down and, while holding it down, close the rear sight cover.
- Fold the front sight down and, when holding it down, close the front sight cover.
- Store the shoulder stop. Take the weapon off your shoulder, rotate your body 180 degrees (keeping the weapon pointed downrange) and grip the weapon under your left arm against your body.
- Depress and hold the tube release button with your left hand and rotate the inner tube counterclockwise (against the direction of the yellow arrow) with your right hand, release the tube release button, and pull the inner tube forward with the right hand until it is fully closed.
- Reinstall the transportation lock pin through the post just forward of the rear bumper.

WARNING

Keep the weapon pointed downrange while returning the M141 BDM to carry mode.

- The M141 BDM will only be slung when in the carry configuration. If the weapon must be transported in the extended configuration, it should only be carried for a short distance, such as moving to a different firing position, and must be cradled in the gunner's arms with the weapon pointed toward the target (Figure 6-18).

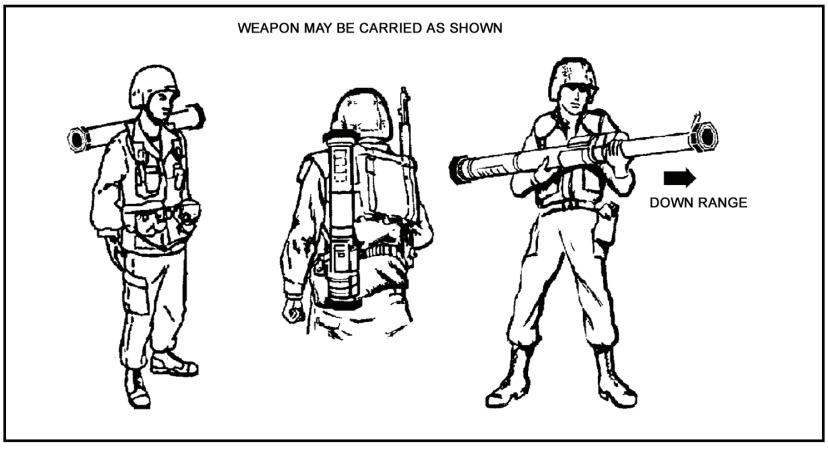

Figure 6-18. Carry positions.

- When possible, the M141 BDM should be returned to the original overpack for storage.

WARNING

Never sling the M141 BDM while in the extended configuration.

MARKSMANSHIP FUNDAMENTALS

6-28. Many factors contribute to light antiarmor weapon marksmanship. Soldiers who combine these factors well, and continue to practice doing so, can retain their skills. The factors are grouped into four basic areas known as marksmanship fundamentals: steady hold, aiming procedures, breath control, and trigger manipulation.

STEADY HOLD

6-29. Maintaining a steady hold involves holding the launcher as steady as possible while sighting and firing. To maintain the proper sight picture and sight alignment until firing, hold the launcher in a tight, comfortable position so that it becomes a natural extension of your body. Keep your elbows close to your body to help balance the weapon and prevent jerking or flinching when you fire. Place your left hand, palm facing upward, under the launcher near the muzzle and grasp the launcher. Firmly pull the shoulder stop into your right shoulder pocket.

AIMING PROCEDURES

6-30. Aiming procedures include placing the eye correctly, obtaining a sight picture, and aligning the sight. Combining these procedures is critical to correctly aiming light antiarmor weapons.

Eye Placement

6-31. Before sighting the weapon, estimate the range. (Chapter 7 discusses range estimation). Your eye should be 8 to 9 inches from the rear sight.

Sight Alignment

6-32. Align the sights correctly with the target. Position the rear sight so that your right eye is in line with the peephole in the rear sight. Look through the peephole at the front sight posts.

Sight Picture

6-33. *Stationary targets* include those moving directly toward or away from the firer. Place the top of the middle front sight post in the center of the rear sight aperture. Next, place the middle post on the center of mass of the target. *Slow-moving targets* include those with an estimated speed of 5 miles per hour or slower, or those moving in an oblique direction. Place either the left or right front sight post on the vehicle's center of mass. *Fast-moving targets* include those with an estimated speed of more than 5 miles per hour. Place either the left or right front sight post on the leading edge of the vehicle.

BREATH CONTROL

6-34. Breath control is as important when firing a light antiarmor weapon as it is when firing an individual weapon. If the gunner breathes while firing, it can cause the shot to be off target. To control breathing, the firer breathes deeply a couple of times, takes one last deep breath, exhales partly, holds his breath, sights, and fires.

TRIGGER MANIPULATION

6-35. To fire the M141 BDM, the firer must apply firm and steady downward pressure to the safety trigger button with the fingers of his firing hand.

INTEGRATED ACT OF SHOOTING

6-36. Correct sight alignment is critical. Poor sight alignment errors increase as the range to the target increases. Therefore, maintaining the correct relationship between the rear and front sights is as important as placing the aiming point. The steps for doing this should become automatic. No matter how quickly they are done, these steps are always distinct, because the human eye can only focus at one distance and on one point at a time. The gunner focuses on the front sight to obtain correct sight alignment, and then places the aiming point to complete the sight picture. The gunner shifts or adjusts the position of the launcher as necessary. The whole time the gunner is pressing the trigger, he maintains the sight picture.

FIRING POSITIONS

6-37. The M141 BDM can only be fired from the right shoulder. *The M141 BDM may not be fired from the sitting position.*

STANDING, MODIFIED STANDING (FOR USE ON COMBAT ONLY), KNEELING, MODIFIED KNEELING POSITIONS

6-38. These positions are the same as for the M136 AT4 and can be referenced in Chapter 4. Exact body position may vary slightly to allow for the shape of the gunner's body. The position must be stable and comfortable, and the most suitable for engaging the target based on the situation and terrain at hand. When aiming and firing, use methods of steady hold. All of these positions are suitable for stationary targets. Situation, terrain, and individual preference should govern the selection of the best firing position. Whenever possible, use these positions with support. A supported position is more stable and aids in accurate aiming, which improves the odds for a first-round hit or kill. Basic safety considerations are the same for all light antiarmor weapons.

DANGER

FIRE THE BDM FROM THE FIGHTING POSITION IN COMBAT ONLY. DO NOT FIRE THE BDM FROM THE FIGHTING POSITION DURING TRAINING DUE TO THE RISK OF INJURY TO THE OPERATOR.

WARNING

Always keep the launcher pointed in the direction of fire.

NOTE: Leaders must ensure that shoulder-launched munitions are positioned so that the backblast misses other fighting positions.

DANGER

DO NOT FIRE THE BDM FROM AN ENCLOSURE OR FROM IN FRONT OF A BARRIER DUE TO THE RISK OF INJURY TO THE OPERATOR.

PRONE POSITION

6-39. The prone position is the only position that differs from the M136 AT4 positions. It is the most dangerous position, in regards to potential backblast injury, due to its proximity to the ground. It also provides the gunner a great deal of protection from enemy observation. Ideally, the ground should slope downward from the rear of the launcher, which reduces the effects of the backblast (Figure 6-19). Although the prone position is the most stable position for firing the M141 BDM, stability can be increased if support for the launcher is available. Additional considerations for the prone firing position are provided herein.

- Lie on the stomach with the body at an angle of not less than 45 degrees to the line of fire and with the body and legs to the left of the direction of fire (in order to keep clear of the backblast area). Ensure that neither the body nor the legs are in the backblast area.
- Move the left leg as far forward as possible without being uncomfortable, and keep the inside of both heels on the ground. Hold both elbows well below the launcher.
- Hold the head as steady as possible, with the right eye lined up with the sights.

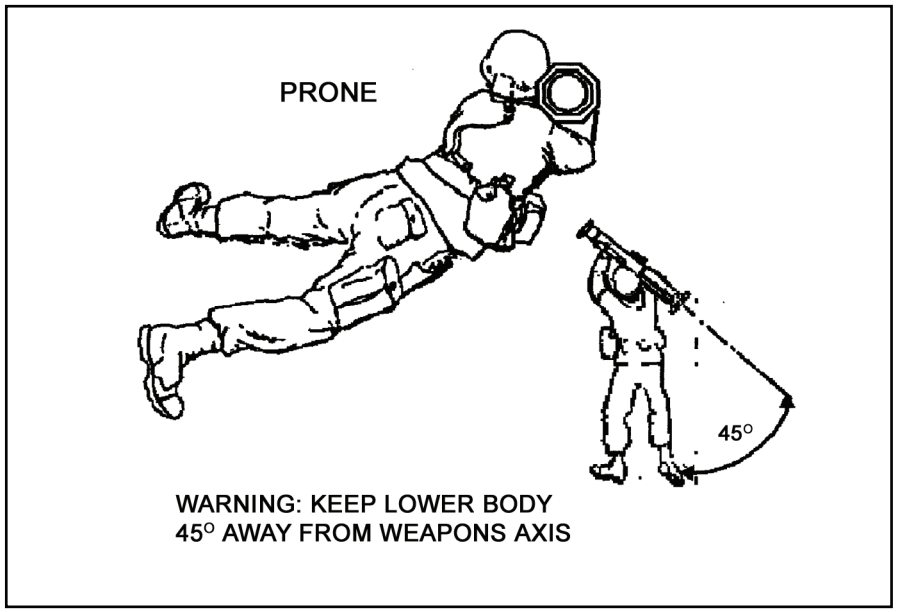

Figure 6-19. Prone firing position.

DANGER

FAILURE TO MAINTAIN AN ANGLE OF NOT LESS THAN 45 DEGREES FROM THE DIRECTION OF FIRE COULD CAUSE INJURY OR DEATH TO THE FIRER.

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Chapter 7

COMBAT TECHNIQUES

This chapter discusses employment techniques for shoulder-launched munitions, all of which require at least basic gunnery skills. Techniques that require advanced skills are identified as such.

RANGE ESTIMATION

7-1. A firer who can accurately estimate the range to the target has a better chance of hitting it, regardless of the weapon used. Common methods of estimating range are listed below from the most to the least accurate. The tactical situation determines the method to be used.

- Using range finders.
- Measuring the distance on a map after correctly plotting your own position.
- Pacing. Remember your individual pace count.
- Using pair and sequence methods of target engagement. This method should only be used when in contact with the enemy.
- Estimating range visually. This is the least accurate method of estimating range and therefore, the least desirable. However, in an offensive operation or hasty defense, it may be the only method available to the firer. Thus, Soldiers must continually train to improve their skill at visual estimation (STP 21-1-SMCT). Leaders should identify, coordinate, and record ranges to possible armored vehicle engagement locations on squad and platoon sector sketches.

SPEED ESTIMATION

7-2. Of the weapons discussed in this manual, the M136 AT4 is the best for engaging moving armored vehicles. One of its advantages is the speed of its round, which travels faster and farther than the other shoulder-launched munitions. However, the firer is the key in any engagement, especially a moving target engagement. Once firers learn to estimate speeds and engage moving targets at known ranges, they should rehearse until they achieve a high hit-to-kill ratio. As their abilities improve, the leaders should vary the ranges, speeds, and types of armored vehicles used (Figure 7-1, page 7-2). Trainers and Soldiers develop other methods through practice and are limited only by their imaginations. (Chapter 3 discusses obtaining a sight picture in detail.) Use the following procedures to estimate how far the vehicle travels in 1 second.

- Start when the front end of the vehicle passes the object.
- Count, “One thousand and one” (takes about one second).
- If *more* than half of the vehicle passes the object, estimate it as a *fast-moving* vehicle (10 miles per hour or faster). If *less* than half of the vehicle passes the object, estimate it as a *slow-moving* vehicle (less than 10 miles per hour).

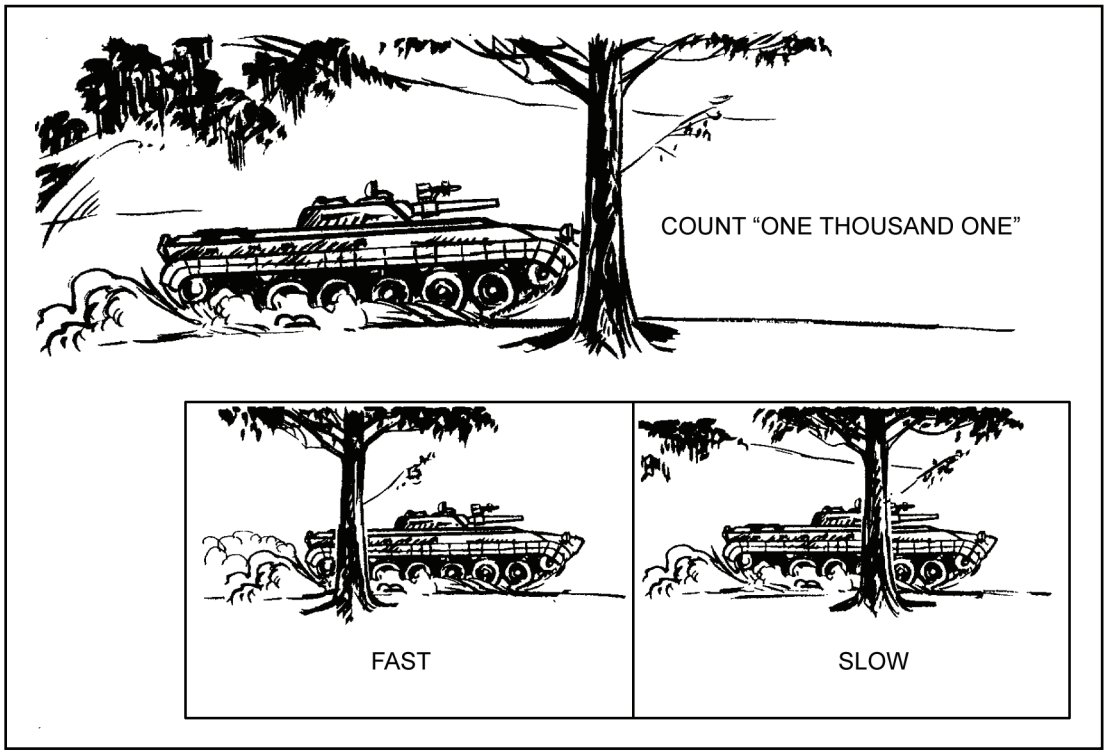

Figure 7-1. Speed estimation.

ARMORED VEHICLE WEAKNESSES

7-3. Armored vehicles usually have their heaviest armor in front, because they are designed mainly for offensive operations against other armored vehicles (Figure 7-2). All vehicles are vulnerable to repeated hits on their flanks and rear, though the flank offers the largest possible target. Firers should always aim center of mass to increase the probability of a hit. The older the vehicle model, the less protection it has against shoulder-launched munitions. Newer versions may use bolt-on (appliqué) armor to improve their survivability. Some vehicles are equipped with reactive armor, which consists of metal plates and plastic explosives. Reactive armor usually covers the forward-facing portions and sides of the vehicle and can defeat shaped-charge weapons such as the M72-series LAW and the M136 AT4. When reactive armor detonates, it disperses metal fragments to 200 meters. The M72-series LAW and the M136 AT4 cause only a small entry hole in an armored vehicle target, though some fragmentation or spall may occur.

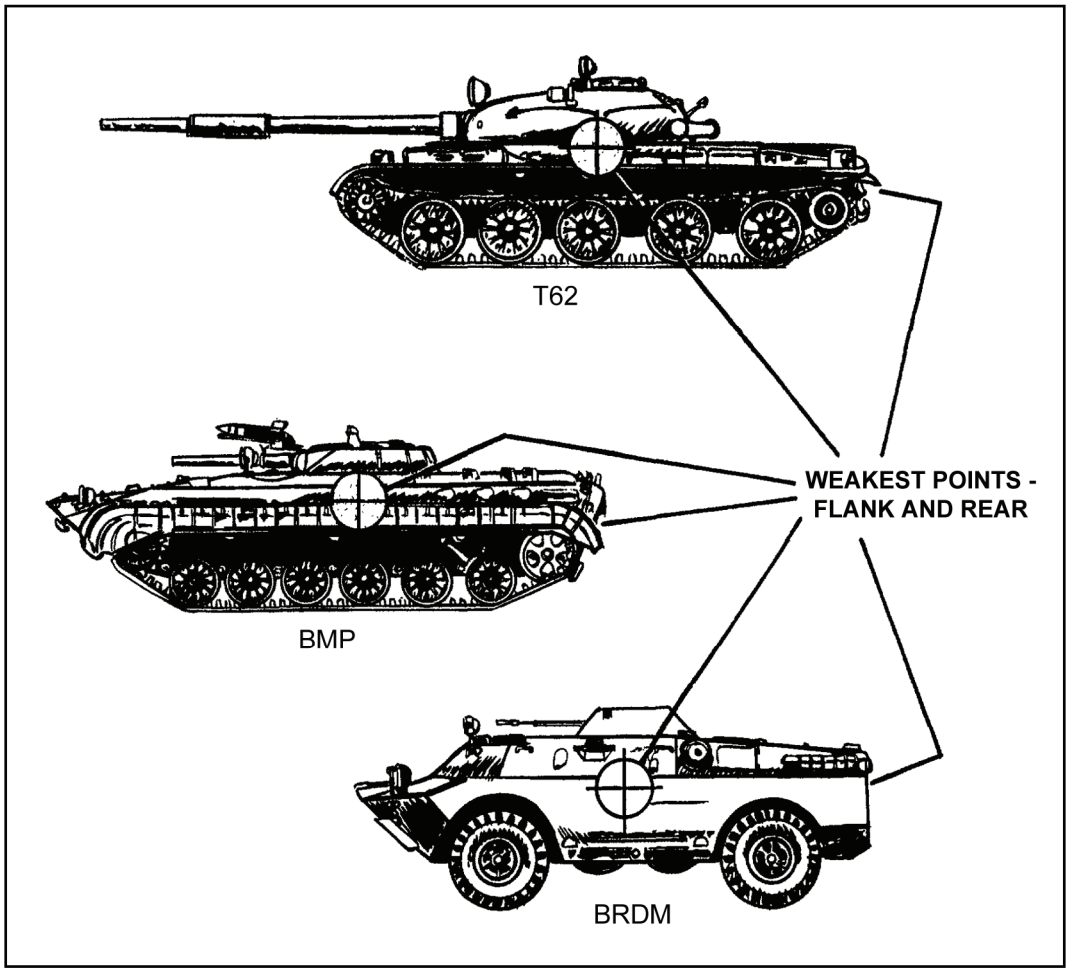

Figure 7-2. Armored vehicle weak points.

7-4. Natural or man-made obstacles can be used to force the armored vehicle to slow, stop, or change direction. This pause enables the firer to achieve a first-round hit. If he does not achieve a catastrophic kill on the first round, he or another firer must be ready to engage the target vehicle immediately with another round.

7-5. An enemy armored vehicle without close protection (dismounted infantry) in woods, urban, or other restrictive terrain is vulnerable to close attack. A close attack is most likely to originate from well-armed infantry-type teams organized into armor-killer teams. (Non-infantry units may also be required to perform this mission). Skilled firers from these teams should engage the suspension or engine compartment of vehicles that have appliqué or reactive armor. When an armored vehicle is buttoned up—all hatches are closed and personnel are inside the vehicle—the armored vehicle crew cannot see well enough to protect itself from close attacks or attacks from the flanks or rear. The personnel inside cannot see anything within 10 meters of the vehicle, and they cannot shoot at anything (using their main guns) within 20 meters. The gray area in Figure 7-3 (page 7-4) shows the most favorable direction of attack when the turret is facing to the front; the white area shows the vehicle's principal direction of fire and observation when the turret is facing to the front. Volley fires (paragraph 7-11) can greatly degrade the additional protection that appliqué and reactive armors provide to the target vehicle.

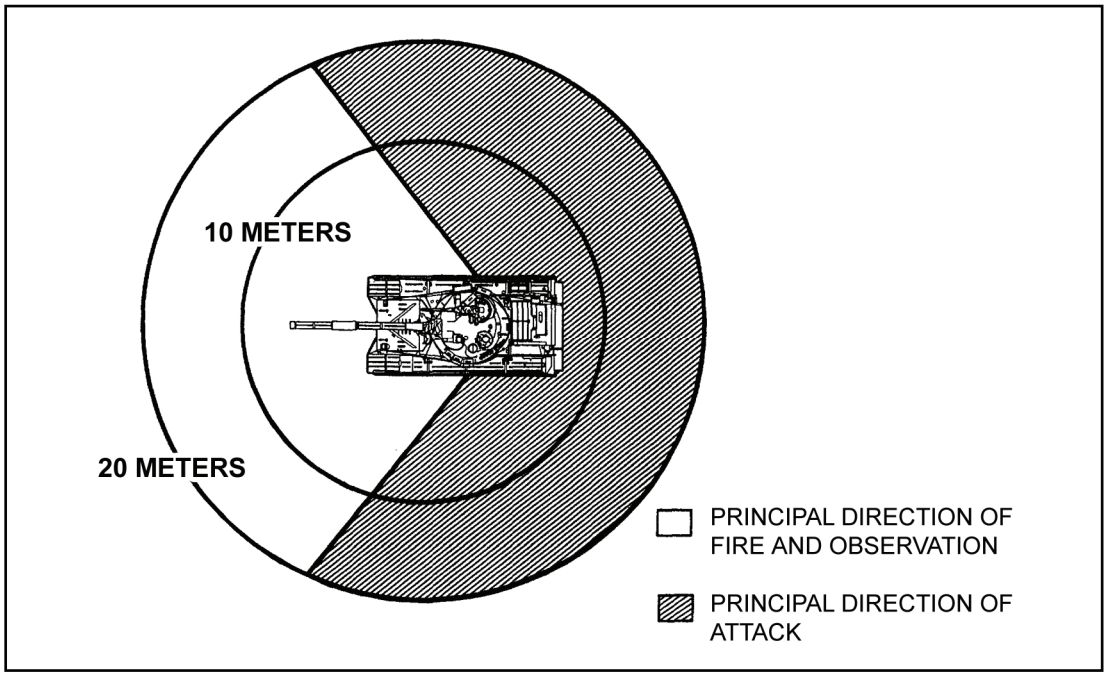

Figure 7-3. Limited visibility of armored vehicles.

7-6. Armored vehicle kills are classified according to the level of damage achieved (Table 7-1).

Table 7-1. Armored vehicle kills.

TYPE OF KILL	PART OF VEHICLE DAMAGED OR DESTROYED	CAPABILITY AFTER KILL
Mobility Kill	Suspension (track, wheels, or road wheels) or power train (engine or transmission) has been damaged.	Vehicle cannot move, but it can still return fire.
Firepower Kill	Main armament has been disabled.	Vehicle can still move, so it can get away.
Catastrophic Kill	Ammunition or fuel storage section has been hit by more than one round.	Vehicle completely destroyed.

METHODS OF ENGAGEMENT

7-7. The four engagement methods include single, sequence, pair, and volley firing. The leader evaluates the situation on the ground to determine which of these methods to use. Regardless of whether they are used singly or in combination, communications are needed as well. The methods of engagement are rehearsed IAW unit SOP.

SINGLE FIRING

7-8. A single Soldier with one shoulder-launched munition may engage an armored vehicle, but this is not the preferred method of engagement. Several shoulder-launched munitions are required to kill an armored vehicle. A single firer firing one round must hit a vital part of the target to damage it at all (Figure 7-4). A single firer can engage targets out to 225 meters with the M72-series LAW or 300 meters with the M136 AT4 when he knows the actual range.

Figure 7-4. Single firing.

SEQUENCE FIRING

7-9. A single firer, equipped with two or more shoulder-launched munitions prepared for firing, engages the target. After engaging with the first round and observing the impact, the firer adjusts his point of aim, engages with another round, and so on until he destroys the target or runs out of rounds (Figure 7-5).

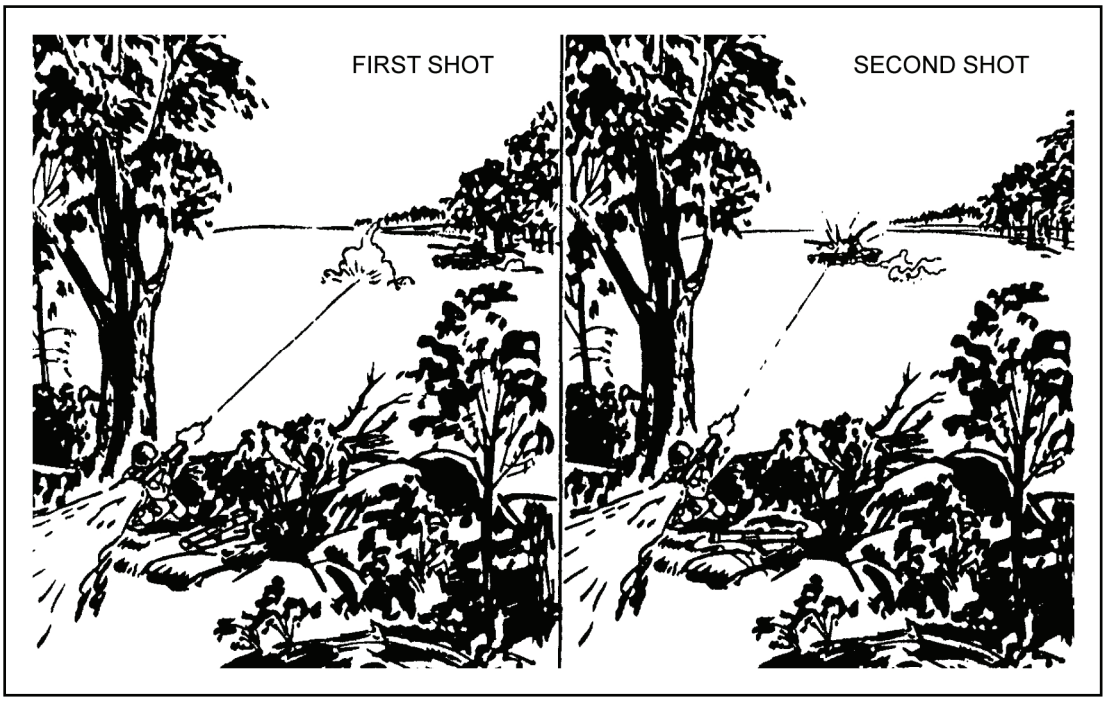

Figure 7-5. Sequence firing.

PAIR FIRING

7-10. Two or more firers, equipped with two or more shoulder-launched munitions prepared for firing, engage a single target. Before firing, the first firer informs the others of the estimated speed and distance to the target. If the impact of his round proves his estimate to be correct, the other firers engage the target until it is destroyed. If the impact of the round proves his estimate to be incorrect, the second firer informs the others of his own estimate, and then he engages the target. This continues until the target is destroyed or all rounds are expended (Figure 7-6).

Figure 7-6. Pair firing.

VOLLEY FIRING

7-11. Two or more firers can engage a single target when the range is known. These firers engage the target at the same time on a prearranged signal such as a command, whistle, booby trap, mine, or target reference point (TRP). This can be the most effective means of engagement as it places the most possible rounds on one target at one time, increasing the possibility of a kill (Figure 7-7).

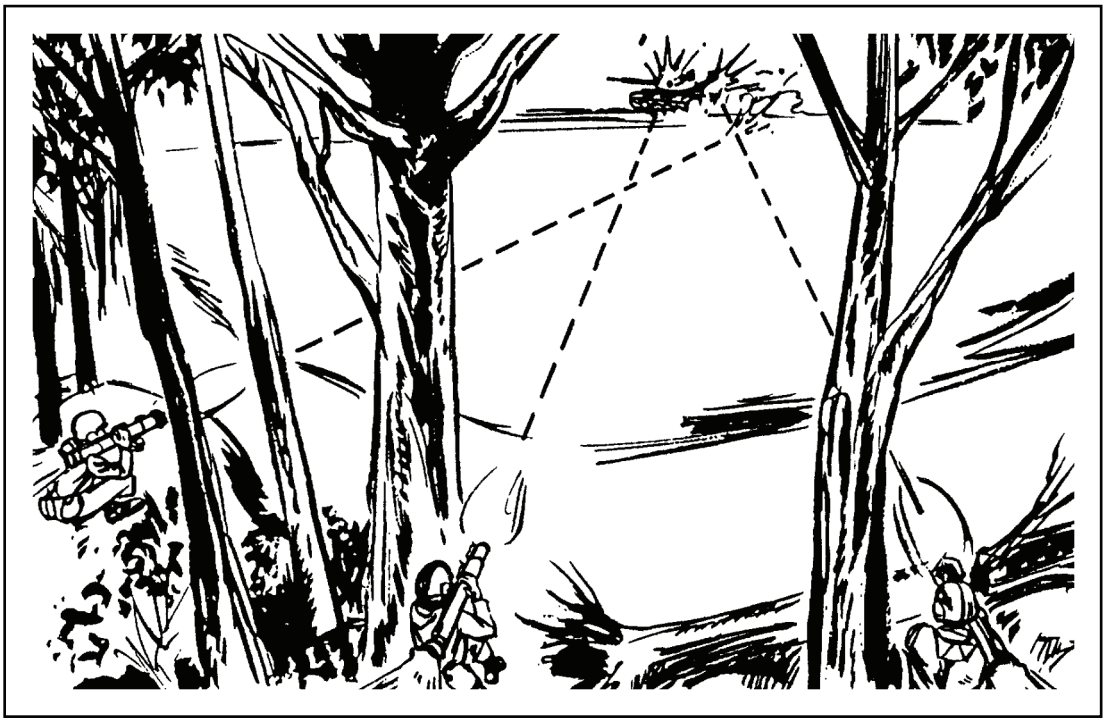

Figure 7-7. Volley firing.

COMMUNICATIONS

7-12. Leaders control all unit fire and communicate this information to the entire unit IAW unit SOP. Shoulder-launched munitions firers must know —

- Designated firers.
- Target priority.
- Method of engagement.
- Range and lead to target (if known).
- Command or signal to fire.
- Command or signal to cease fire.

ENGAGEMENT OF OTHER VEHICLES

7-13. The M72-series LAW proves more effective against light vehicles; the M136 AT4 proves more effective against armored vehicles. Non-armored vehicles, such as trucks, cars, and boats, are considered *soft targets*. Firing along their length offers the greatest chance of a kill, because this type of shot is most likely to hit their engine block or fuel tank.

ENGAGEMENT OF FIELD FORTIFICATIONS AND BUILDINGS

7-14. The M72-series LAW and the M136 AT4 have proven to have little effect against field fortifications and buildings. The M141 BDM was designed to better enhance the destruction of these fortifications. Its warhead contains a dual-mode fuze that automatically adjusts for the type of target on impact. For soft targets, such as sandbagged bunkers, the M141 BDM warhead automatically adjusts to delayed mode, hits the target with high kinetic energy; this energy propels the warhead through the barrier and into the fortification or building where the fuze detonates the warhead and causes greater damage. Soldiers should not expect to severely damage these type of targets with the M72-series LAW or M136 AT4. However, if

the alternatives shown in Table 7-2, page 7-8, are used, Soldiers may be able to gain a temporary advantage.

Table 7-2. Effects of the M136 AT4 and M72-series LAW on field fortifications or bunkers.

AIM POINT	EFFECT WHEN WEAPON IS FIRED AT AIM POINT	RECOMMENDED FIRING TECHNIQUE
BUNKER OR FIGHTING POSITION		
Firing Port or Aperture	Rounds fired into firing ports or apertures may be wasted: rounds detonate inside rear of position, causing little structural damage to the position or to the equipment or personnel within, unless they are hit directly. The M136 AT4 produces *less* effect than the M72-series LAW.	Coordinate fire: Fire shoulder-launched munition at a point 6 to 12 inches from the front edge of the firing ports in the berm. Fire *small arms* at the bunker or position to prevent personnel within from returning fire.
Berm	Firing at the berm causes the round to detonate outside the fighting position or inside the berm, creating only a small hole in the berm, dust, or minor structural damage to the position, but no damage to personnel or equipment unless they are hit directly. The M136 AT4 produces *less* effect than the M72-series LAW.	
Window	The round may travel completely through the structure before detonating; if not, it creates dust and causes minor structural damage to the rear wall, but little damage to personnel or equipment, unless they are hit directly. The M136 AT4 produces *less* effect than the M72-series LAW.	Fire 6 to 12 inches from the sides or bottom of a window. Light antiarmor rounds explode on contact with brick or concrete, creating an opening whose size is determined by the type of round used.
Wall	The round detonates on contact, creating dust and causing a small hole and minor structural damage, but little damage to personnel or equipment, unless they are hit directly.	
Corner	Corners are reinforced and thus harder to penetrate than other parts of a wall. Any light antiarmor round will detonate sooner on a corner than on a less dense surface. Detonation should occur in the targeted room, creating dust and causing *overpressure*, which can temporarily incapacitate personnel inside the structure near the point of detonation. The M136 AT4 causes *more* overpressure than the M72-series LAW.	

LIMITED VISIBILITY ENGAGEMENTS USING 7-MM PEEP SIGHT

7-15. Limited visibility engagements can be conducted using various night vision devices (NVD) or with artificial illumination. However, when NVDs or artificial illumination are used, limited visibility can

reduce the maximum effective range for shoulder-launched munitions by at least one-third. To avoid fratricide, leaders must ensure all designated firers are trained to use their weapons in limited visibility.

NIGHT VISION DEVICE

7-16. Before an NVD can be used with the M136 AT4, it must be removed from its designated weapon (M249 machine gun or automatic weapon, or M60 machine gun) and the M136 AT4 mounting bracket must be attached. (Appendix F describes the various NVDs that can be used; it also gives information for mounting, boresighting, and zeroing procedures for each NVD.) The M141 BDM comes with an NVD mounting rail permanently attached.

ARTIFICIAL ILLUMINATION

7-17. If artificial illumination is used during a limited visibility engagement, it should be placed above and slightly beyond the target. The ability to identify and engage a target is less with artificial illumination than with NVDs.

ENGAGEMENT IN CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR CONDITIONS

7-18. Wearing a protective mask limits the firer's ability to sight the weapon. Wearing chemical, biological, radiological, and nuclear (CBRN) gloves limits his ability to manipulate the firing mechanism.

SIGHTING THE WEAPON

7-19. To properly sight the weapon while wearing the protective mask, the firer may have to rotate the weapon slightly counterclockwise. The mask also makes determining the location, identity, and engageability of targets more difficult.

FIRING THE WEAPON

7-20. Practice manipulating the firing mechanism while wearing CBRN gloves.

Note. When live firing either an M136 AT4 or its subcaliber trainer, aim within range firing limits.

DANGER

THE M136 AT4 AND M141 BDM SHOULD NEVER BE FIRED FROM AN ENCLOSURE. THE COMBINATION OF OVERPRESSURE AND BLAST CREATE CONDITIONS THAT CAN KILL, SERIOUSLY INJURE, OR DEAFEN THE FIRER AND/OR ANY OTHER PERSONNEL IN THE ENCLOSURE.

ENGAGEMENT FROM AN ENCLOSURE

7-21. Firing from an enclosure creates unique hazards. As such, before positioning Soldiers in enclosures, leaders must consider several factors that affect safety. The M72-series LAW has been rated safe for use from an enclosure but, only when the enclosure meets the following minimum requirements.

CONSTRUCTION

7-22. The building must be sturdily constructed to reduce the structural damage that would occur in a weakly constructed enclosure such as one made of wood or stucco.

SIZE OF ENCLOSURE

7-23. Minimum measurements for the enclosure are 12 by 15 feet.

VENTILATION TO THE REAR AND SIDES

7-24. To allow for the backblast, at least 20 square feet of ventilation, such as a standard 3-foot by 7-foot doorway, must be provided directly behind the firer. Doors and windows should be removed beside and behind the position to increase ventilation and reduce overpressure, noise, and blast effects. Without sufficient ventilation, the blast can weaken or collapse the walls. On the front wall, windows and doors need to be reinforced, rather than removed, because removing would draw attention to the position. Reinforcing the windows also helps protect the firer from enemy direct-fire weapons.

OBJECTS AND DEBRIS

7-25. Any objects or debris to the rear of the weapon must be removed to prevent them from flying around the room and possibly injuring personnel as a result of the backblast.

MUZZLE CLEARANCE

7-26. Muzzle clearance must be at least 6 inches.

WEAPON CLEARANCE

7-27. Properly positioning the weapons within the enclosure is vital to the safety and survival of all personnel in the enclosure. The weapons should be positioned so that the maximum distance between the firer and the backblast impact area is achieved (see paragraph 7-23).

PERSONNEL POSITIONS

7-28. If any other Soldiers are present, they must remain forward of the rear of the launcher and avoid standing in corners or near walls. If possible, they should construct reinforced positions that will protect them in case the building collapses.

WARNING

To avoid injuring the eardrums, Soldiers must wear the approved brand of ear protection.

ENGAGEMENT BEYOND MAXIMUM EFFECTIVE RANGE (M136 AT4 ONLY)

7-29. A skilled M136 AT4 firer can engage targets beyond the weapon's maximum effective range of 300 meters, up to 550 meters. Beyond 550 meters, the firer must aim higher than center of mass and apply additional lead for moving targets. Commanders must realize that accuracy is reduced at these ranges. Also, firing at these ranges reveals the firing position to the enemy.

OFFENSIVE OPERATIONS

7-30. All elements, even those with other organic antiarmor weapons, use shoulder-launched munitions. Shoulder-launched munitions can influence the action in an attack, so units should routinely stock them beforehand. They are most useful against lightly armored vehicles. They can also be used against soft

targets, such as bunkers, field fortifications, automobiles, and trucks, but their shaped-charge warheads have less effect on these than on armored targets. Unless personnel, ordnance, or flammable material on or inside them are hit, soft targets can normally continue to fight after being attacked by shoulder-launched weapons. Due to their relatively short range, shoulder-launched munitions should be placed throughout the attacking force. They support the maneuver by providing a base of fire, and they enable the assaulting force to engage in close antiarmor combat.

DEFENSIVE OPERATIONS

7-31. Whether or not other organic antiarmor weapons are available, shoulder-launched munitions are an asset in the squad and platoon defensive plan.

- Shoulder-launched munitions are employed with interlocking fires to provide mutual support. Dispersion allows leaders the flexibility to place flank, rear, and oblique fires on targets. This procedure increases the survivability of the firers as well as the probability of achieving kills. Leaders must select positions that avoid fratricide from backblast and short rounds (see Appendix A).
- The squad and platoon leader's sector sketch identifies TRPs and primary areas of possible engagement. The sector sketch also identifies possible avenues of approach for enemy armored vehicles. Each shoulder-launched munition shares a sector of fire with the primary small-arms weapon assigned to its position. Because the shoulder-launched munition is neither a primary nor crew-served weapon, it does not require a separate range card. When assigning sectors of fire, squad and platoon leaders inform firers of all possible target areas, TRPs, and prearranged signals (Figure 7-8). (FMs 7-7, 3-21.71, and 7-8 provide more information about the squad and platoon sector sketch). Leaders provide each designated position with two or more shoulder-launched munitions.

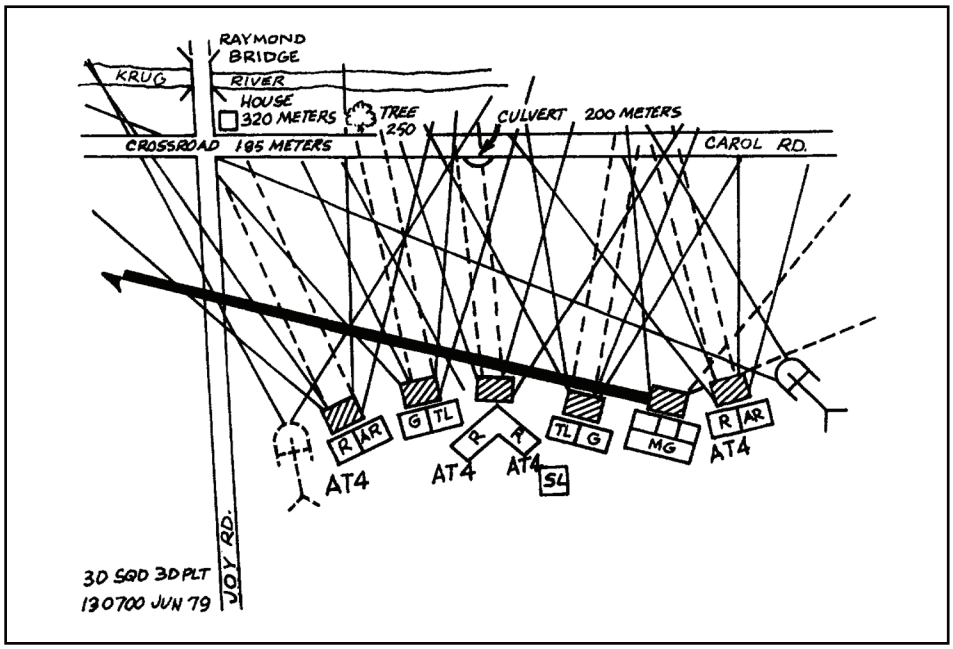

Figure 7-8. Squad sector sketch.

OTHER TACTICAL OPERATIONS

7-32. The weight of the shoulder-launched munition suits it well for combat patrols and rear area operations. (FM 7-8 provides more information about these subjects).

COMBAT PATROLS

7-33. Shoulder-launched munitions are used on combat patrols to destroy enemy equipment, installations, and key points, and to harass enemy forces. The two types of combat patrols are ambushes and raids.

Ambushes (Antiarmor)

7-34. The commander can employ armor-killer teams either during limited visibility or when cover, concealment, and withdrawal routes are available. The key to ambushing armored or other vehicles is to choose terrain that restricts their maneuverability and fields of fire, while allowing friendly forces to engage the vehicles from the flank and rear. Soldiers can emplace antipersonnel mines before the ambush so that dismounting enemy Soldiers deploy into them. Though shoulder-launched munitions can be used independently, they are normally used in support of designated organic antiarmor weapons such as the M47 Dragon (FM 3-23.24). Volley firing shoulder-launched munitions increases the probability of a quick kill (Figure 7-9). Security teams are deployed to stop any enemy from escaping.

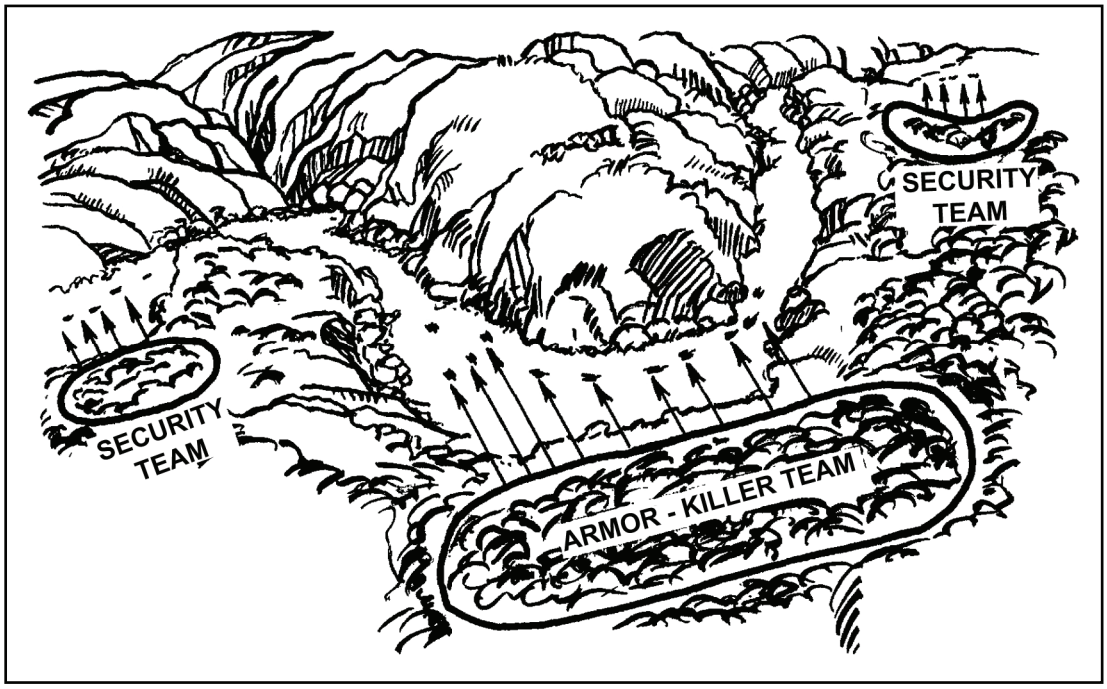

Figure 7-9. Antiarmor ambushes.

Raids

7-35. Using shoulder-launched munitions on raids increases target options. They can also be used to defend against enemy armored vehicles.

REAR AREA OPERATIONS

7-36. Rear area operations usually consist of either defending unit trains and tactical operation centers (TOC), or patrolling rear areas.

Defense of Tactical Operations Centers and Unit Trains

7-37. The mobility of modern vehicles makes the TOC and unit trains prime targets for enemy attacks. Shoulder-launched munitions are used to engage vehicles threatening the unit during the defense of the TOC. Soldiers who use shoulder-launched munitions in this type of operation normally perform

noninfantry-type roles. Unit leaders designate Soldiers to carry shoulder-launched munitions and ensure that these Soldiers receive training on them.

Patrols of Rear Areas

7-38. Rear area patrols are security patrols conducted by designated infantry or military police (MP) units. These patrols can react to any threat they encounter in the rear area. Rear area patrols use the shoulder-launched munitions in a hasty point defense at a roadblock, intersection, or strongpoint.

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Chapter 8
TRAIN-THE-TRAINER AND UNIT TRAINING PROGRAMS

During initial-entry training (IET), Soldiers only receive an orientation of the M136 AT4. When they arrive at their unit, Soldiers need to train to Skill Level 1 proficiency on all assigned weapons and equipment. Each unit must have an ongoing unit training program to allow Soldiers to work together to attain and sustain their skills. This program integrates individual and collective tasks. Operating a unit training program requires the unit to also maintain a train-the-trainer program. Both programs are planned and conducted IAW the unit commander's mission-essential task list (METL).

TRAINING STRATEGY

8-1. Training strategy integrates resources into a year-round program to train both the individual and collective skills needed to perform the unit's wartime mission. This ensures that units are trained to fight and win on the battlefield. The training strategy includes both institutional and unit training.

INSTITUTIONAL TRAINING

8-2. Institutional training is conducted at TRADOC schools. The courses conducted at these schools train critical individual and leader skills required to succeed in combat. Soldiers may train at several institutional schools throughout their career (see the appropriate programs of instruction [POIs]). During institutional training, students are provided the latest doctrine and taught current technical skills associated with the shoulder-launched munitions available within the Army (Table 8-1).

Table 8-1. Institutional training.

ENLISTED	Initial-Entry Training
	Warrior Leader Course
	Basic Noncommissioned Officer Course
	Advanced Noncommissioned Officer Course
OFFICERS	Precommission Training
	Officer Basic Course
	Captains Career Course

UNIT TRAINING

8-3. Unit training consists of sustainment training in individual and collective skills. Commanders carefully manage their resources (devices, simulators, simulations, ranges, and ammunition) to best develop individual and leader skills. Through the use of exercises, such as drills, situational training exercises (STX), and qualification tables, the unit develops skills and integrates individuals into a cohesive crew or squad. Table 8-2 (page 8-2) provides a training guide for building a shoulder-launched munition sustainment training plan. Performance evaluations are further discussed in Appendix C while Appendix E goes into detail on instructional and qualification firing tables.

Table 8-2. Sustainment training plan for shoulder-launched munitions.

1	Designated Soldiers should train as often as needed to maintain proficiency.
2	Performance evaluations should be administered to designated Soldiers quarterly, if resources allow.
3	Designated Soldiers should fire the qualification tables semiannually for verification on designated weapons.
4	Designated Soldiers qualify semiannually on their designated weapons. Qualification consists of a hands-on performance evaluation and qualification firing tables.
5	Designated Soldiers should be trained in advanced *instructional* techniques as often as the unit training program allows. This training helps to maintain their target engagement skills.
6	All Soldiers not designated as shoulder-launched munition gunners should train on these weapons to the extent allowed by resources.

UNIT TRAINING PROGRAM

8-4. Every unit commander, including those commanding combat service (CS) and combat service and support (CSS) units, should develop a program for shoulder-launched munition training. Some units have more than one type of shoulder-launched munition that requires sustainment training. The commander considers preparation and training for both collective and individual tasks. Trainers analyze their collective tasks and the individual tasks that support them. Individual tasks must be integrated into collective training and rehearsals. The units should try to train all organic shoulder-launched munitions at the same time and on the same range (Appendix D). Otherwise, these weapons are trained in alternating quarters of the year.

SUSTAINMENT TRAINING REQUIREMENTS

8-5. Sustainment training is recommended for each Soldier. Active Component (AC) units should conduct sustainment training quarterly and fire the appropriate qualification tables semiannually, depending on the standards in training commission (STRAC) track (TRC) level. Reserve Component (RC) units should conduct sustainment training semiannually and fire the appropriate instructional or qualification tables annually. All units should fire advanced instructional tables semiannually. When possible, they should conduct live fire annually IAW the current STRAC manual (Appendix E provides all the necessary firing tables). Commanders should ensure that designated gunners complete unit sustainment training and live fire tactical shoulder-launched munitions sometime during that quarter. *Training requirements* are divided into four tracks, A through D, based on ammunition allocations (Table 8-3). Table 8-4 provides an example *training frequency chart*. This example is based on the M136 AT4. The same tasks apply to all shoulder-launched munitions, but procedures and standards may vary. Tactical weapons are allocated IAW the current STRAC manual.

Table 8-3. Training requirements.

TRACK	DETERMINES ANNUAL AMMUNITION ALLOCATION FOR:
A	Each Active Component designated firer.
B	Track deleted.
C	Each Reserve Component designated firer.
D	Each Reserve Component training division instructor.

Table 8-4. Example training frequency chart.

TRAINING OBJECTIVE	TASK	FREQUENCY		APPROXIMATE TIME
		AC	RC	
NA	Conduct an orientation safety briefing (as appropriate).	Q	A	10 min
1	Inspect an M136 AT4 for serviceability.	Q	A	30 min
2	Prepare an M136 AT4 for firing.	Q	A	45 min
3	Demonstrate correct M136 AT4 firing positions.	Q	A	45 min
4	Estimate range.	Q	A	60 min
5	Determine the correct M136 AT4 sight picture.	Q	A	30 min
6	Perform M136 AT4 misfire procedures.	Q	A	45 min
7	Return the M136 AT4 to the carrying position.	Q	A	45 min
8	Engage targets with an M136 AT4.	S	B	3 1/2 hr
KEY: **Q = quarterly (every 90 days)** **S = semiannually (twice a year)** **A = annually (once a year)** **B = biennially (every two years)**				

GUNNERY TRAINING REQUIREMENTS

8-6. All designated Soldiers should be trained to standard IAW the combat techniques in Chapter 7 and the performance evaluations in Appendix C.

COLLECTIVE TRAINING

8-7. Individual tasks must be integrated into collective training and rehearsals. To accomplish this, commanders analyze the collective tasks from their unit METL and the individual tasks that support these collective tasks. The commander determines the collective tasks that must be practiced by analyzing the mission outlines in the appropriate mission training plan (MTP). The mission outlines describe the collective tasks required to execute each Army Training and Evaluation Program (ARTEP) mission. Leaders determine the individual tasks that support the collective tasks by referring to the mission task matrix in the appropriate MTP.

- Leaders use the training standards given in the appropriate manual for the individual tasks. Non-infantry units can use FMs 3-21.1, 3-21.71, 7-8, 7-10, and 7-20 to identify infantry-type missions. Some of the tasks identified may include engaging armored vehicles. When planning training, the trainer incorporates the training devices and aids for shoulder-launched munitions into the unit's training. These devices and aids add realism and allow the trainer to properly evaluate the task being conducted. The trainer must also identify deficiencies and correct them by retraining Soldiers until they can employ the selected weapons and their related training devices correctly.
- The Multiple Integrated Laser Engagement System (MILES) Viper is a force-on-force trainer for shoulder-launched munitions. MILES trainers are *not* gunnery trainers and are not used for sustainment training. They are used in all force-on-force training. Table 8-5 provides an example MILES training program.

Table 8-5. MILES training program.

SEQUENCE	FREQUENCY (TIMES PER YEAR)	
	ACTIVE	RESERVE
Squad, platoon, or company FTX or STX	4	1
Battalion FTX	2	0
Battalion ARTEP	2	1
Total MILES training events per year	8	2

TRAIN-THE-TRAINER PROGRAM

8-8. The success of the unit's shoulder-launched munitions training program depends on trainers who are well-trained, competent, and prepared to train Soldiers.

OBJECTIVES

8-9. The train-the-trainer program must teach trainers to —

- Evaluate the unit's training weaknesses.
- Plan training.
- Set up, operate, and maintain training equipment.
- Conduct training.
- Coach firers in gunnery training.
- Evaluate firers' training weaknesses.
- Correct firers' training weaknesses.
- Instill confidence in the firers they train.

MISSION-ESSENTIAL TASK LIST

8-10. The commander must carefully examine his unit's wartime mission and develop a METL. He must then organize the unit's sustainment training program to support the METL. The shoulder-launched munitions sustainment training plan consists of quarterly, semiannual, and annual training events. Between these events, the unit provides additional shoulder-launched munition training. The sustainment plan should prepare the unit for the next round of weapons gunnery while also supporting the unit METL.

TRAINER ASSESSMENT

8-11. Trainers within a unit are normally team, squad, and section leaders and platoon sergeants. Before becoming weapons trainers, they must be assessed carefully and their shortcomings must be corrected. The commander chooses a method of assessing the trainers that ensures that their abilities are accurately evaluated. With the assistance of the platoon leaders and platoon sergeants, the commander then performs the assessment.

COMMAND BENEFITS

8-12. Regular and aggressive train-the-trainer programs provide valuable benefits that gradually spread through the unit. These benefits include a base of expertise, proficiency, and esprit de corps. It is imperative that the train-the-trainer program is sustained because maintaining the base of expertise is easier than recreating it.

TRAINING TASKS

8-13. Successful trainers know how to operate the training devices for the shoulder-launched munitions assigned to their units. Based on the unit's METL, the commander designates the appropriate shoulder-launched munition for specified missions. Appendix C provides the tasks, conditions, and standards for the M136 AT4 and M72-series LAW. The trainers must know the appropriate combat techniques for employing these weapons. They must also perform the following:

- Conduct an orientation safety briefing.
- Inspect the weapons for serviceability.
- Prepare the weapons for firing.
- Demonstrate the correct firing positions.
- Estimate range.
- Determine the correct sight picture.
- Perform the correct combat and training misfire procedures.
- Return the weapon to the carrying configuration.

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Appendix A

SAFETY

This appendix provides safety procedures and hazard awareness for both training and combat. All personnel involved in the operation, care, and cleaning of shoulder-launched munitions must be familiar with all operation, employment, and safety precautions. These weapons contain high-explosive warheads and rockets, which may be dangerous to operating personnel and bystanders if appropriate safety precautions are not followed.

TRAINING SAFETY FOR ALL SHOULDER-LAUNCHED MUNITIONS

A-1. Some safety procedures are common to all shoulder-launched munitions and must be followed during training when using any of the weapon systems. They apply to all types of ranges and training areas.

- Do not extend or arm the launcher until ready to fire.
- Do not fire the launcher until danger areas are clear of personnel, equipment, and obstructions.
- Wear ear plugs when firing the weapon or if within hearing protection danger areas.
- Observe all warnings and instructions.
- Always wear a helmet and protective vest when firing the weapon.
- Inspect each weapon for damage when received; if damaged, do not use.
- Treat duds as hazardous ammunition.
- Follow misfire procedures if the weapon fails to fire.
- Mark the entire backblast area well and clear it of all personnel, equipment, and flammable materials.
- Do not allow anyone to enter the area behind the firing line, or forward of the rear safety line, without permission from the range OIC or safety NCO.
- Store weapon systems to prevent exposure to the sun or extreme temperatures.

Note. Safety procedures that are unique to specific weapon systems, or that are used only in combat situations, are discussed in the appropriate paragraphs in this appendix.

DANGER

USING DAMAGED WEAPONS MAY CAUSE INJURY OR DEATH. INSPECT EACH WEAPON FOR DAMAGE WHEN RECEIVED. IF DAMAGED, DO NOT USE.

M136 AT4

A-2. Safety procedures pertaining to the M136 AT4 are as follows:

BACKBLAST

A-3. Because the M136 AT4 has a closed chamber, it produces a slight recoil. When the weapon is fired, pressure from the warhead propellant builds up in the chamber and ruptures the baseplate. Once the baseplate ruptures, propellant gases exit with tremendous force from the back of the weapon. The resulting backblast can damage equipment or seriously injure personnel who are too close to the rear of the launcher. When operating temperatures fall below freezing (0 degrees centigrade or 32 degrees Fahrenheit), the dimensions of all backblast areas and safety zones double.

Training

A-4. The total backblast area extends 100 meters to the rear of the launcher in a 90-degree fan (Figure A 1). During training, the *entire* backblast area limit must be marked off and kept clear of personnel, equipment, and obstructions. This weapon must not be fired from an enclosure or in front of a barrier (TM 9-1315-886-12). Neither the M136 AT4 nor the M141 BDM is to be fired from a fighting or prone position during training.

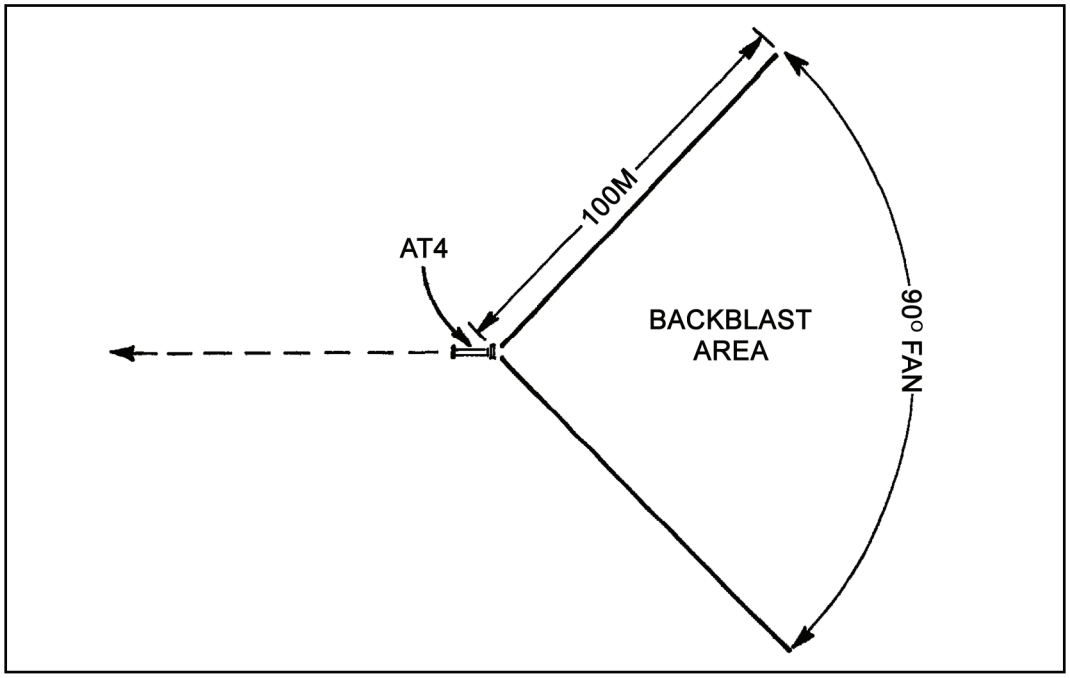

Figure A-1. M136 AT4 backblast danger area.

SURFACE DANGER ZONES

A-5. The surface danger zone (SDZ) requirements for the M136 AT4 are shown in Table A-1 and Figure A-2 and Figure A-3 (page A-4).

Table A-1. M136 AT4 SDZ criteria in meters.

TYPE	DISTANCE X	MINIMUM RANGE TO TARGET	AREA A	AREA B	AREA F[1]	
					DANGER ZONE DEPTH	CAUTION AREA DEPTH
84-mm HEAT M136	2,100	50	227	488	5[2]	95[3]
9-mm Trainer, M939	1,600	N/A	N/A	N/A	N/A	N/A

NOTES:

[1]Area F is 90-degree angle (45 degrees left and right) of rearward extension of launcher target line.

[2]Danger zone occupation could result in fatalities or serious casualties including severe burns, eye damage, or permanent hearing loss. The hazards are baseplate fragments, debris, fireball, high noise levels, and overpressure.

[3]Caution area is an extension of the primary danger area. Occupation of this area could also result in severe casualties due to backblast, debris, high noise levels, and possible baseplate fragments. Primary danger area and caution area are conditions that may not be modified.

Increased dud rates may occur when firing HE (M136) at impact angles of 10 degrees or less.

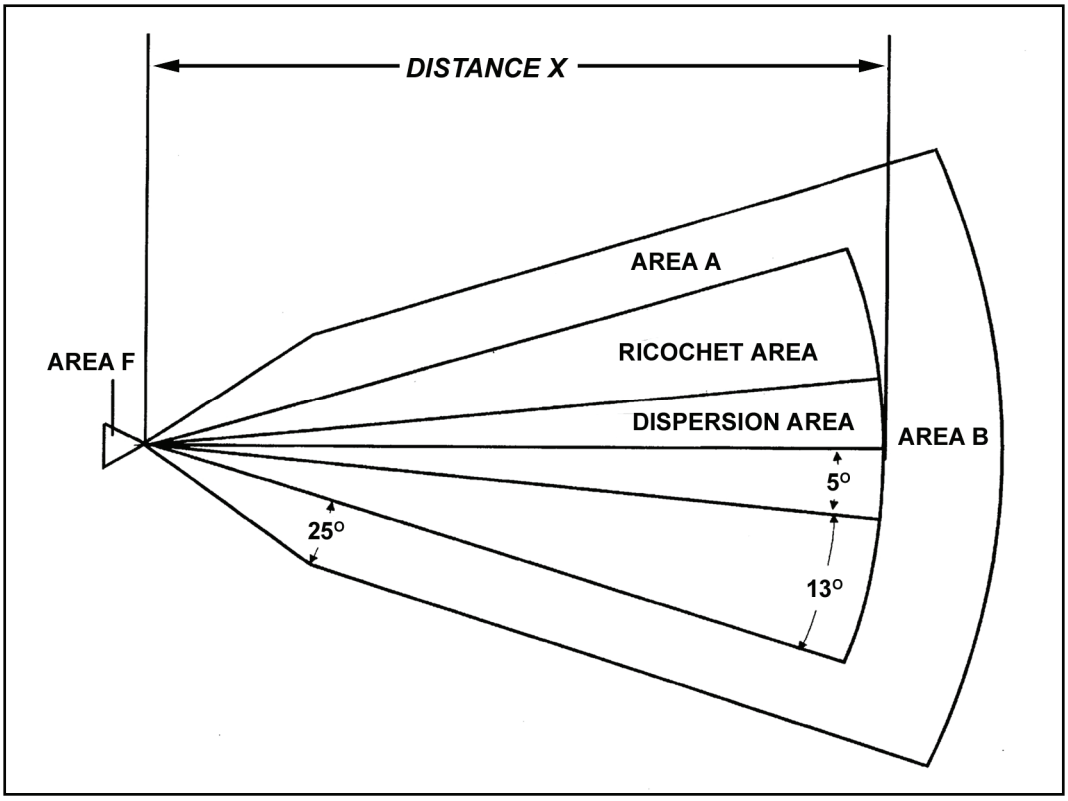

Figure A-2. SDZ for firing M136 AT4.

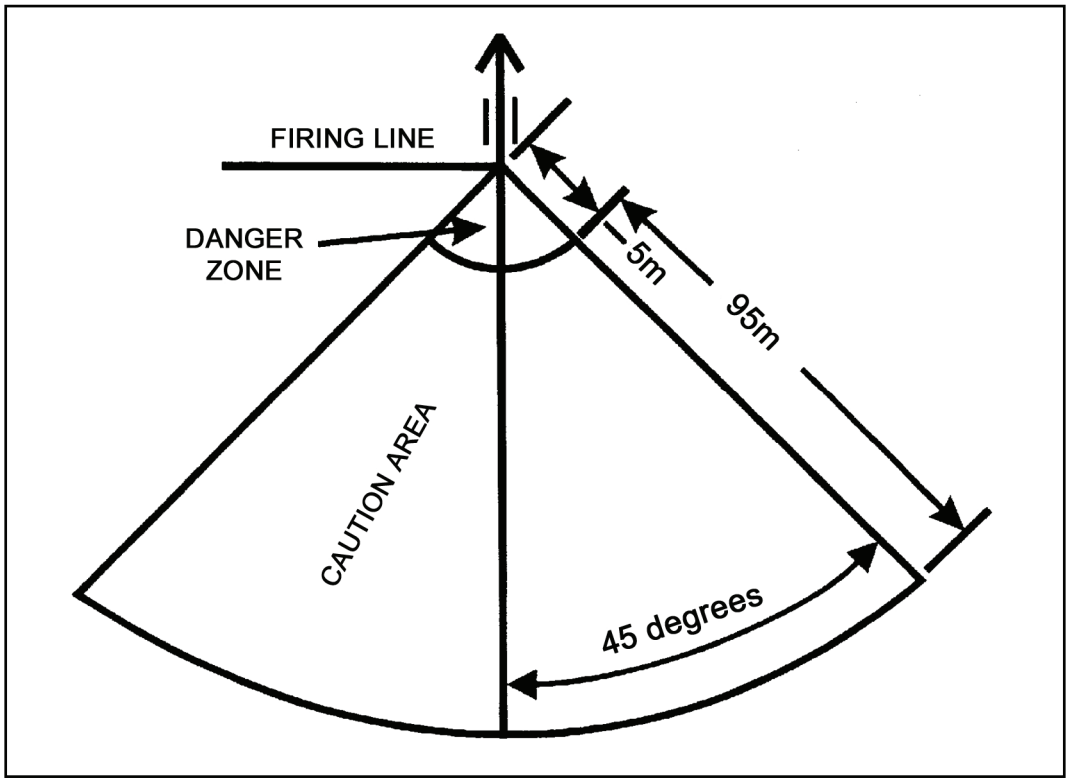

Figure A-3. SDZ, area F, for firing M136 AT4.

MINIMUM TARGET ENGAGEMENT RANGE

A-6. Fragments formed by the detonation of the tactical warhead can be hazardous to the gunner and other personnel who are on, or close to, the firing line. The velocity of these fragments increases with target hardness.

Training

A-7. For safety reasons, the minimum safe engagement range for training is 50 meters.

Combat

A-8. In combat, no targets will be engaged within the 15-meter minimum arming range.

OPERATING TEMPERATURE LIMITATIONS (TRAINING AND COMBAT)

A-9. No shoulder-launched munition should be fired when its temperature exceeds its operating limit range.

Minimum Operating Temperature

A-10. When a weapon temperature is below freezing (0 degrees centigrade or 32 degrees Fahrenheit), overpressure increases and may prevent some of the propellant from burning during the firing sequence. This could cause portions of the remaining propellant to be directed onto the firer's face or upper body as the projectile leaves the launch tube. Therefore, in cold weather, the firer should wear a protective mask. The M136 AT4 must not be fired when its temperature is below its minimum operating temperature of -40 degrees centigrade (-40 degrees Fahrenheit).

Maximum Operating Temperature

A-11. When the weapon temperature is above 60 degrees centigrade (140 degrees Fahrenheit), propellants and warhead compounds can destabilize. In hot weather, weapons should be stored in a shaded area, whether they are located at training sites or at fighting positions. The M136 AT4 must not be fired when the temperature exceeds its operating limits of 60 degrees centigrade (140 degrees Fahrenheit).

FIRING LIMITATIONS

A-12. The extreme overpressure and noise created when the M136 AT4 is fired requires special precautions during training. To reduce these hazards, firers must observe the range firing limitations shown in Table A 2.

Table A-2. M136 AT4 daily individual training firing limitations.

Within a 24-hour period, a Soldier may only fire, observe fire, or act as safety NCO for the M136 AT4 one to three times, depending upon the firing position used.	Three times (total) if the M136 AT4 is fired from either the standing or kneeling position. ----------OR---------- One time (total) if the M136 AT4 is fired from the sitting position.

M72-SERIES LIGHT ANTIARMOR WEAPONS

A-13. The M72-series LAW has the same safety procedures and considerations as the M136 AT4 except for the following:

BACKBLAST

A-14. M72-series LAWs are open-chambered weapons, so they have no recoil.

M72A2 and M72A3 LAW

A-15. The total backblast area extends 40 meters (44 yards) to the rear of the launcher (Figure A-4, page A-6) and is divided into two zones. During training, both zones should be marked "off limits."

- *Danger Zone.* All personnel, equipment, and flammable material must be clear of this area.
- *Caution Zone.* The weapon's backblast may throw loose objects to the rear. Therefore, personnel must also stay clear of this area.

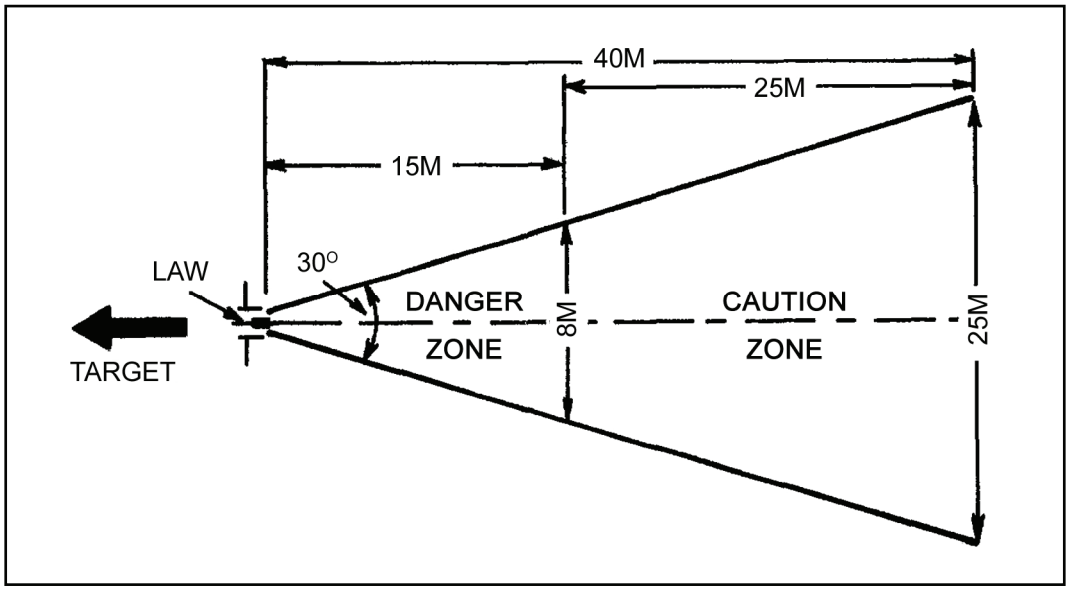

Figure A-4. M72A2 and M72A3 LAW backblast area.

M72A4/A5/A6/A7 Light Antiarmor Weapons

A-16. The total backblast area for these weapons extends 70 meters to the rear of the launcher (Figure A-5)

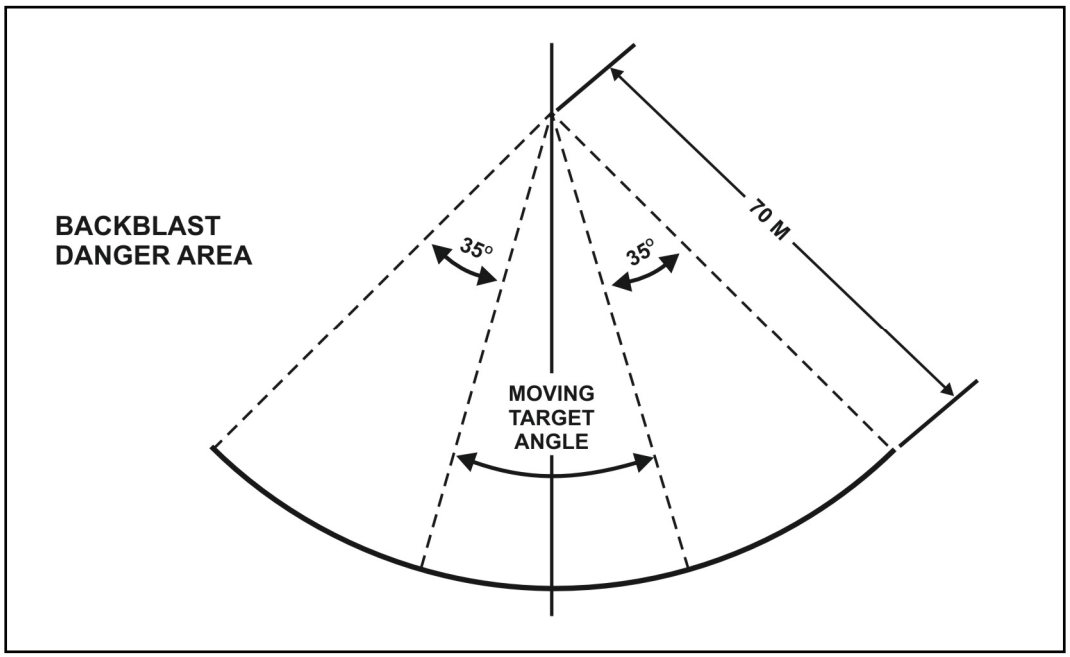

Figure A-5. M72A4/A5/A6/A7 light antiarmor weapons backblast area.

Note. The total backblast area is greater for the M72A4/A5/A6/A7 light antiarmor weapons than for the M72A2/A3 LAW.

MINIMUM TARGET ENGAGEMENT RANGE

A-17. The minimum target engagement range for the M72-series LAW is 30 meters. In combat, the minimum arming range is 10 meters.

SURFACE DANGER ZONE

A-18. Figure A-6 shows the SDZ requirements for the M72A4/A5/A6/A7 light antiarmor weapon.

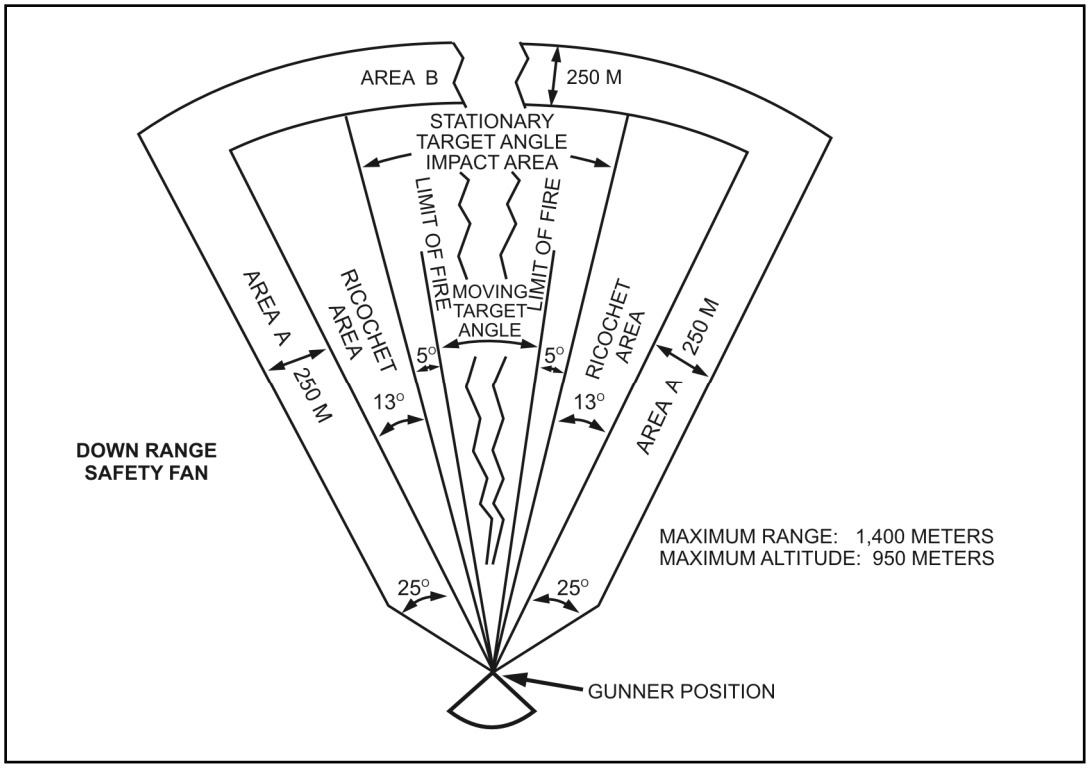

Figure A-6. SDZ for firing M72A4/A5/A6/A7 light antiarmor weapon.

M141 BUNKER DEFEAT MUNITION

A-19. The M141 BDM has the same safety procedures and considerations as the M136 AT4 except for the following.

BACKBLAST

A-20. The backblast danger area for the M141 BDM is similar in size, composition, and characteristics to the M136 AT4 for both training and combat, but contains an expanded ear protection caution area (TM 9-1340-228-10). When the M141 BDM is fired, it is essential that hearing protection is worn in the ear protection caution area. Dangerous noise levels exist within 445 meters of a fired weapon (Figure A-7, page A-8). The weapon produces sound pressure levels that may exceed 140 dB.

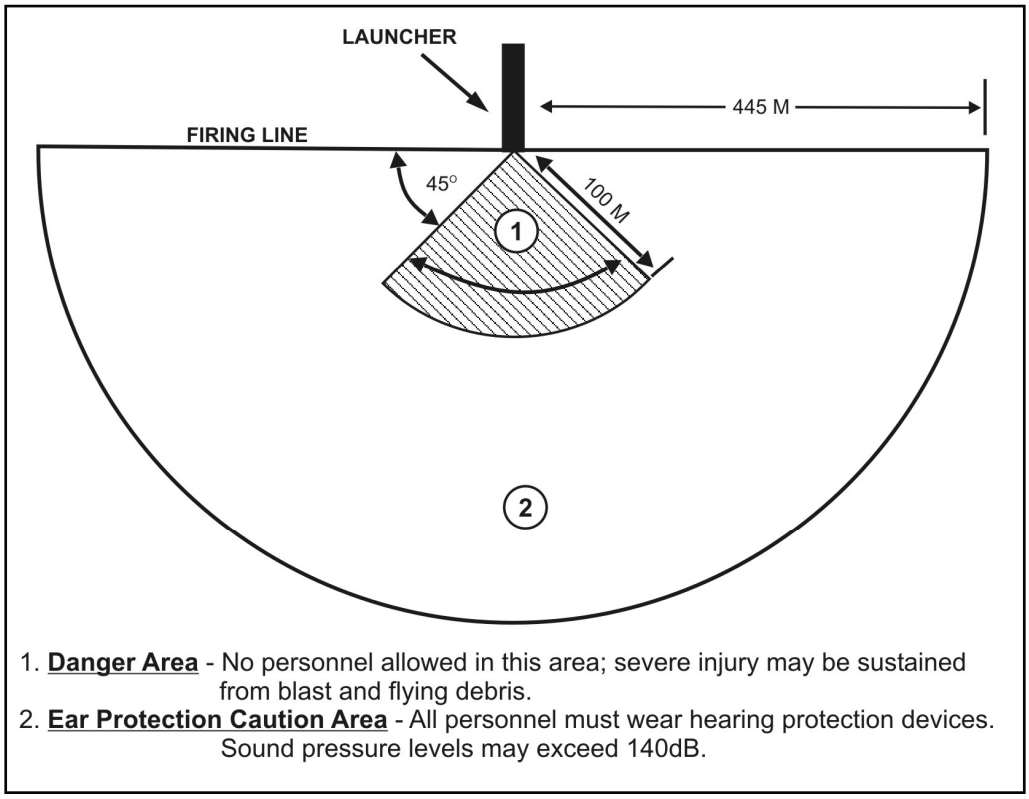

Figure A-7. M141 BDM backblast and ear protection caution area.

DANGER

PERMANENT EAR DAMAGE MAY RESULT IF YOU FIRE THE M141 BDM WITHOUT EAR PROTECTION OR YOU ARE WITHIN 445 METERS LEFT, RIGHT, OR TO THE REAR OF THE FIRED LAUNCHER WITHOUT EAR PROTECTION.

SURFACE DANGER ZONE

A-21. The SDZ requirements for the M141 BDM are illustrated in Figure A-8.

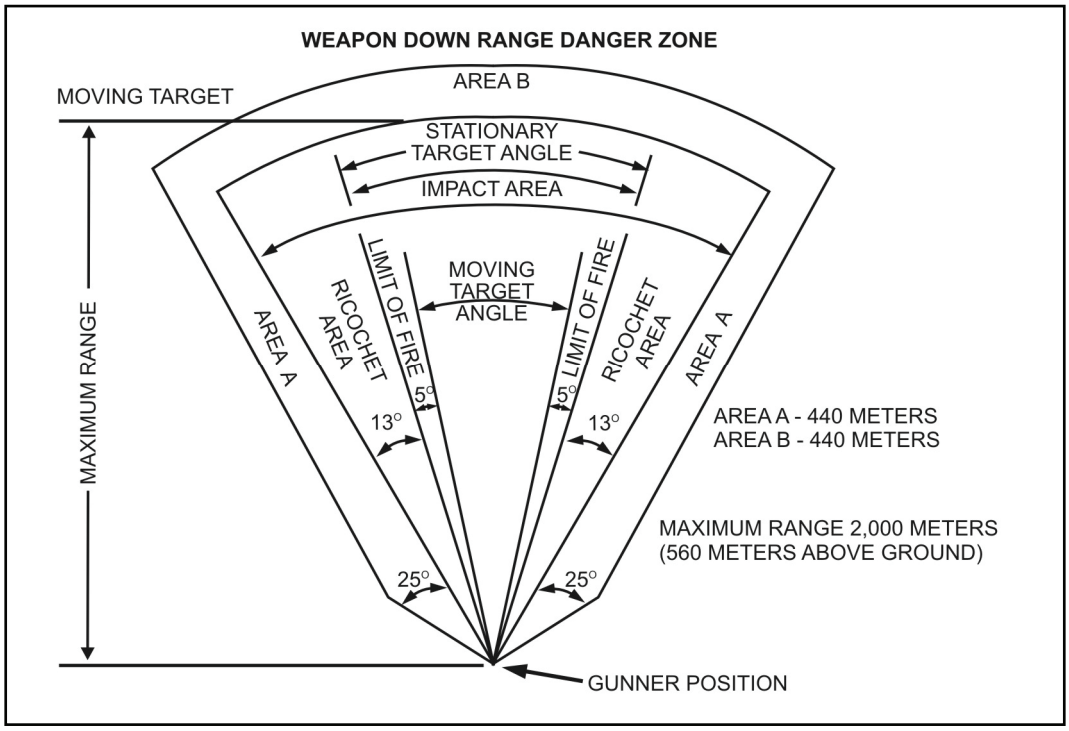

Figure A-8. SDZ for firing M141 BDM.

MINIMUM TARGET ENGAGEMENT RANGE

A-22. The minimum target engagement ranges are:

- ***Training***—100 meters for a brick, cement, or sandbagged target; 150 meters for a steel or metal target.
- ***Combat***—15-meter minimum arming distance.

OPERATING TEMPERATURE LIMITATIONS

A-23. The operating temperature limitations for the M141 BDM are -32 degrees centigrade to 49 degrees centigrade (-25 degrees Fahrenheit to 120 degrees Fahrenheit).

Note. Be aware that when operating in cold weather, bringing the M141 BDM into a warm enclosure may cause damage. The change in temperature will make metal components sweat and the moisture can cause rust or corrosion. Do not use sharp instruments to chip off snow or ice. Do not thaw a weapon near a direct flame.

FIRING RESTRICTIONS

A-24. Table A-3 (page A-10) shows the maximum number of rounds that may be fired in training by an individual Soldier.

Table A-3. M141 BDM daily individual training firing restrictions.

FIRING POSITION	NUMBER OF DAILY FIRINGS
Prone	1
Sitting	0
Kneeling	3
Standing	6

DANGER

DO NOT FIRE SHOULDER-LAUNCHED MUNITIONS FROM ANY ENCLOSURE OR FROM BEHIND ANY BARRIER DURING TRAINING.

COMBAT SAFETY FOR ALL SHOULDER-LAUNCHED MUNITIONS

A-25. Combat safety rules and procedures include all those that apply to training with the following modifications:

FIGHTING POSITION

A-26. The M72-series LAW, M136 AT4, and M141 BDM can be fired from the standard infantry fighting position (*restricted to combat use only for the M136 AT4 and M141 BDM*). However, to increase accuracy and reduce the danger to friendly Soldiers, the area to the rear of the firing position must have no walls, large trees, or other obstructions within 5 meters (5 1/2 yards) to deflect the backblast onto the firer or into the position.

DANGER

ENSURE THE AREA TO THE REAR OF THE FIRING POSITION HAS NO WALLS, LARGE TREES, OR OTHER OBSTRUCTIONS WITIN 5 METERS (5 1/2 YARDS). OBSTRUCTIONS DEFLECT BACKBLAST ONTO THE FIRER OR INTO THE FIRING POSITION, INJURING OR KILLING THE FIRER AND ANY OTHER SOLDIER OCCUPYING THE POSITION.

A-27. In the *individual infantry fighting position*, the Soldier must lean against the rear wall and ensure that the venturi or the rear of the weapon protrudes past the rear of the position. The firer's elbows are not supported.

A-28. In the *two-Soldier infantry fighting position*, nonfiring personnel must remain clear of the backblast area. These positions should be constructed and sited so that none are located in another position's backblast danger zone.

A-29. A *modified firing position* may be constructed to the side of the two-Soldier fighting position. Firing from a modified position reduces the possibility of injury to the firer or the other Soldier in the fighting position, while still offering the firer protection from enemy return fire.

OVERHEAD FIRE

A-30. Shoulder-launched munitions must not be fired over the heads of friendly Soldiers, unless the Soldiers have adequate protection against direct impact or other hazards.

M72AS TRAINER SYSTEM

A-31. Even though the M72AS Trainer System does not contain a high-explosive warhead, specific safety precautions must be followed when firing the trainer.

BACKBLAST

A-32. Although the M72AS does not contain a high-explosive warhead, the trainer rocket does contain propellant and powder. Caution must be exercised to ensure that all firers and observers remain clear of the backblast danger area when the trainer is fired (Figure A-9).

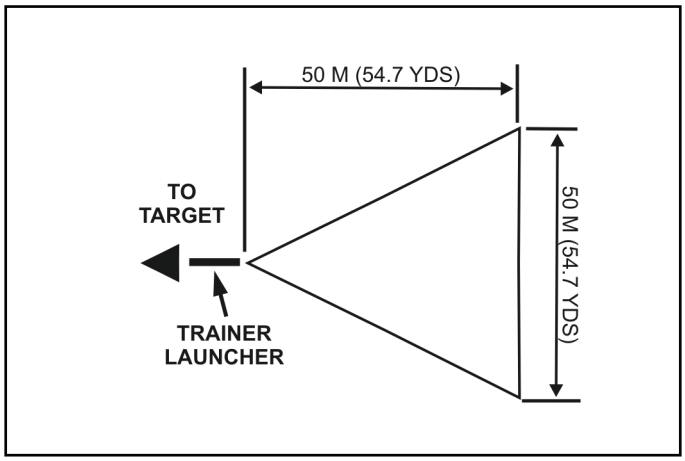

Figure A-9. M72AS backblast danger area.

HAZARD AND SAFETY AWARENESS

A-33. The following hazard and safety rules apply when using the M7A2S Trainer System:

- Always keep the loaded trainer launcher pointed downrange. Do not stand to the rear of the trainer launcher.
- Load, unload, and fire the trainer launcher at the firing line only.
- Do not extend the trainer launcher to the cocked position until after the M72AS trainer rocket is completely installed.
- Insert the M72AS trainer rocket all the way into the trainer launcher before inserting the primer block.
- Do not fire the trainer launcher if the barrel assembly has a cracked, split, or damaged condition at the rear end—a blown tube incident might occur.
- Loose primer block cover screws or excessive carbon buildup in the primer block cavity can cause a misfire.
- To prevent electrostatic discharge, a bare M72AS trainer rocket should never be handed from one person to another. The trainer rocket should remain in the aluminum storage tube until just prior to loading in the trainer launcher.

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Appendix B

TRAINING DEVICES AND AIDS

Training devices and training aids enable Soldiers to learn as much as they can about a weapon before they try the real thing. This procedure saves money and time, and it prevents injuries. **Training devices** both look and behave like the real weapon, but are cheaper and safer to practice with. **Training aids** include anything else used to help Soldiers learn to use a weapon. Trainers should use their imaginations and invent or adapt other training aids from available resources.

M190 LAW SUBCALIBER TRAINING DEVICE

B-1. The M190 subcaliber launcher (Figure B-1) is made by adding an M190 subcaliber conversion kit (NSN 1340-00-420-7999) (Figure B-2, page B-2) to an expended M72A2 LAW launcher. It is used to fire the M73 subcaliber (35-mm) rocket. This 35-mm rocket is shorter and lighter than the LAW's 66-mm tactical rocket. It simulates the tactical rocket's smoke and flight trajectory, but with less noise and backblast. The expended launcher is likely to wear out before the subcaliber inner tube does. When this happens, the inner tube can be transferred to another expended launcher. The M190 subcaliber launcher can be used in all training phases, from a fixed firing line to simulated tactical situations such as a squad live-fire exercise.

Note. The local Training Support Center (TSC) can install the conversion kits, but DOD Regulation 5100.76-M requires that all sensitive conventional arms, ammunitions, and explosives, including expended launchers, be carefully controlled.

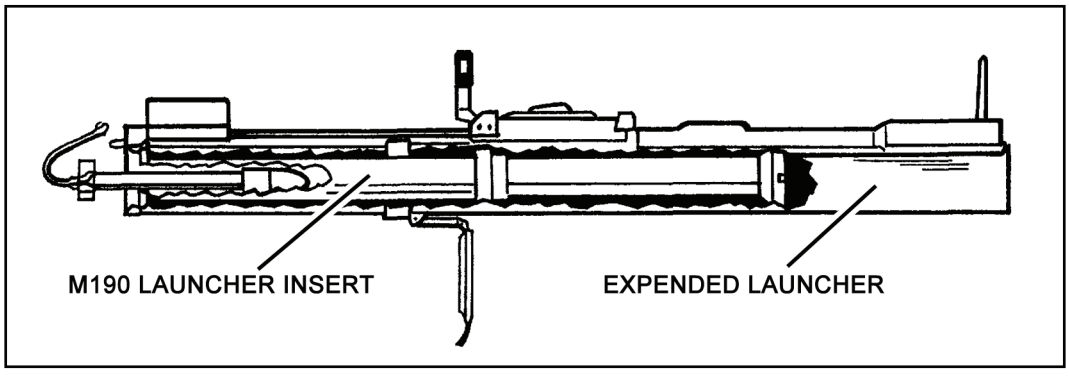


Figure B-1. LAW subcaliber trainer.

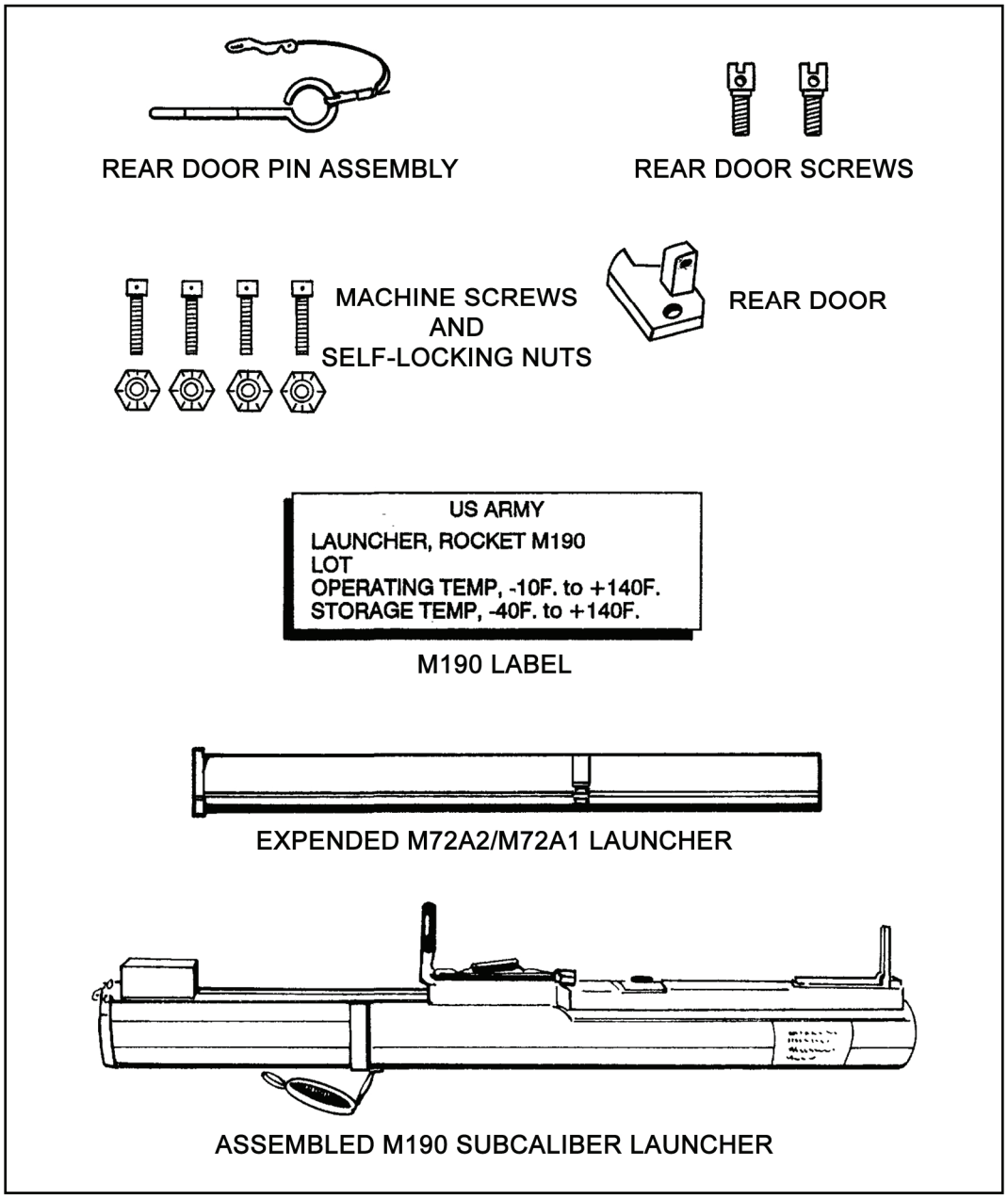


Figure B-2. M190 subcaliber conversion kit.

TECHNICAL DATA

B-2. Technical data for the M73 35-mm subcaliber practice rocket are:

- Length: 22.48 centimeters (8.86 inches).
- Diameter: 3.51 centimeters (1.38 inches).
- Weight: 154 grams (5.39 ounces).
- Range: 10 to 250 meters (9.14 to 228.5 yards).
- Propellant charge: three tubular grains of M7.
- Spotting head charge: 05 ounce (1.5 grams) of composition mix M80.

B-3. Technical data for the assembled M190 practice rocket launcher are:

- Diameter of launcher: 12.45 centimeters (4.9 inches).
- Diameter of rocket tube: 3.56 centimeters (1.4 inches).
- Weight (with rocket): 2.26 kilograms (5.02 pounds).
- Length of launcher:
  - Extended: 89.9 centimeters (35.4 inches).
  - Collapsed: 64.26 centimeters (25.32 inches).
  -
- Sights: open, temperature compensating.

TRIGGER

B-4. This is the same as for the M72-series LAW.

SIGHTS

B-5. These are the same as for the M72A2/A3 LAW.

OPERATION

B-6. The LAW subcaliber training device operates the same as an M72A2/A3 LAW. After the M190 has been loaded, it may remain closed, or it can be extended and fired. Either way, the procedures are the same as those for the LAW.

CAUTION

When loading the M190 LAW subcaliber trainer, ensure the rear cover is open, the sling assembly is off, and the launcher is collapsed.

LOADING

B-7. To load the M73 rocket into the M190 launcher (Figure B-3, page B-4)—

- Twist and remove the primer housing lockpin and open the primer housing door.
- Remove the fired primer block (if present) from the primer block cavity of the launcher.
- Inspect the primer block cavity for obstructions such as primer case stuck on the firing pin.
- Pivot and remove the safety clip from the rocket.
- Insert the M73 rocket into the launcher with the primer face up and toward the firing pin housing.
- Guide the primer block into the primer block cavity with the primer toward the front of the launcher. Close the primer housing door, insert the lockpin across the primer housing door, and twist to ensure a spring-tight fit. Ensure the primer housing door fits snugly.

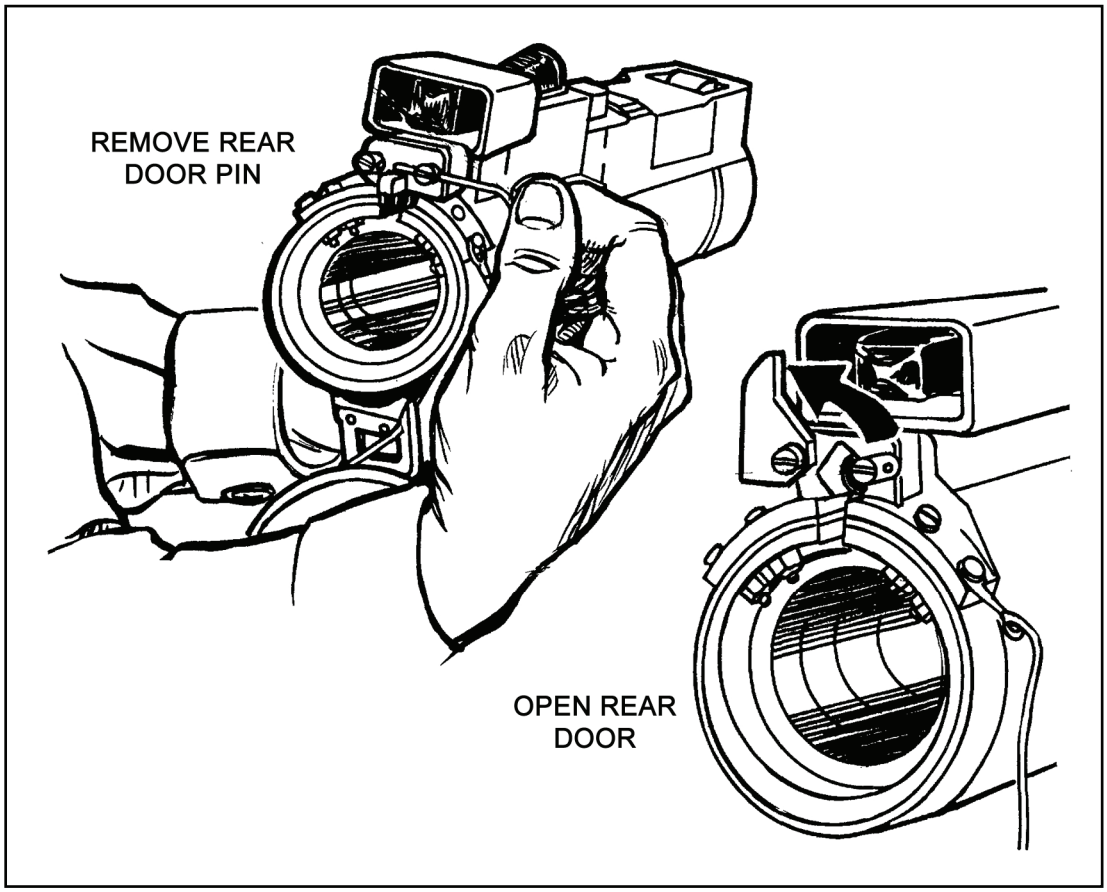


Figure B-3. Loading the LAW subcaliber launcher.

UNLOADING

B-8. To unload the M73 rocket from the M190 launcher—

- Return the arming handle to SAFE.
- Remove the weapon from your shoulder, keeping the weapon pointed downrange.
- Partly collapse the launcher, and remove the primer housing lockpin.
- Open the primary housing door, and remove the primer from its housing.
- Remove the rocket.
- Replace the safety clip on the rocket.
- Place the rocket in its original container.

FUNCTION

B-9. The M73 rocket launches the same as the tactical rocket, but when the rocket head strikes the target, it sets off the spotting head that produces a flash, noise, and white smoke.

CAUTION

The M73 subcaliber rocket operates between –23 degrees and 60 degrees centigrade (-10 degrees and 140 degrees Fahrenheit). Fire it only within this temperature range.

MISFIRE PROCEDURES

B-10. These are the same as for the M72A2/A3 LAW.

RANGE PROCEDURES AND SAFETY

B-11. These procedures are the same as for the M72-series LAW. The training device can be used against all solid stationary or moving targets. However, because the subcaliber rocket can penetrate 0.124 inches (0.315 centimeters) of steel plate or 8 inches (20.32 centimeters) of soft wood, the target should be constructed of 3/16-inch steel plate backed by 3/4-inch plywood.

COMBAT TECHNIQUES

B-12. These are the same as for the M72-series LAW.

M72AS 21-MM TRAINER SYSTEM

B-13. The M72AS Trainer System consists of a trainer launcher and a 21-mm trainer rocket (Figure B-4). Only expended M72A5 and M72A7 tactical light antiarmor weapons are to be converted to M72AS trainer launchers. Requisitions for trainer launchers may be made by requesting, "Launcher, Practice, part number 51670-7 NSN 1055-01-495-0009."

Note. M72A1, M72A2, and M72A3 tactical launchers are NOT to be used for converting to trainer launchers for the M72AS Trainer System.

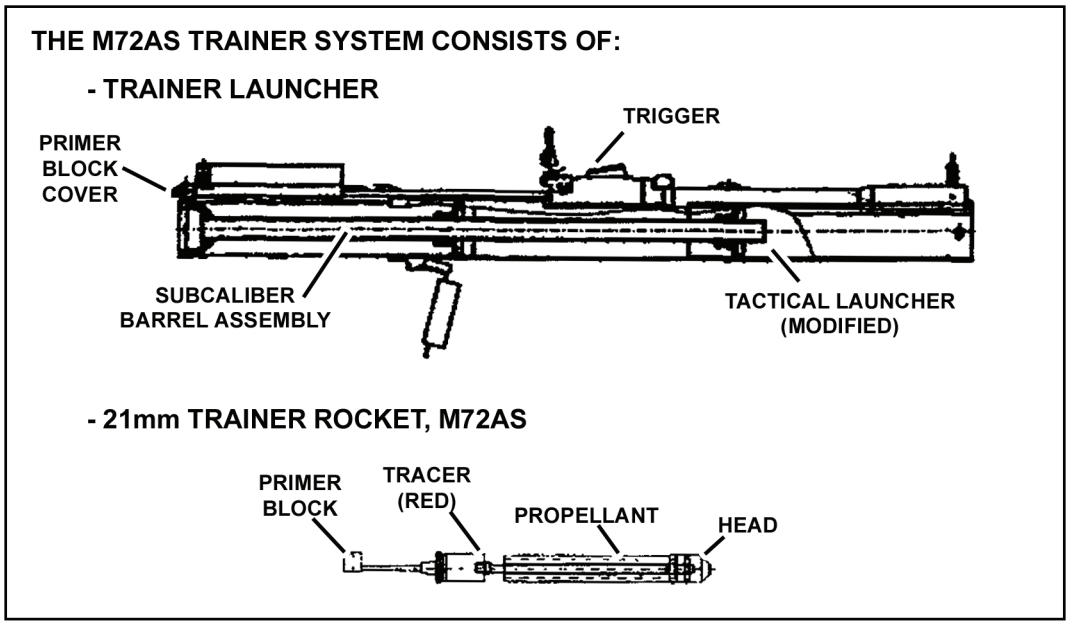
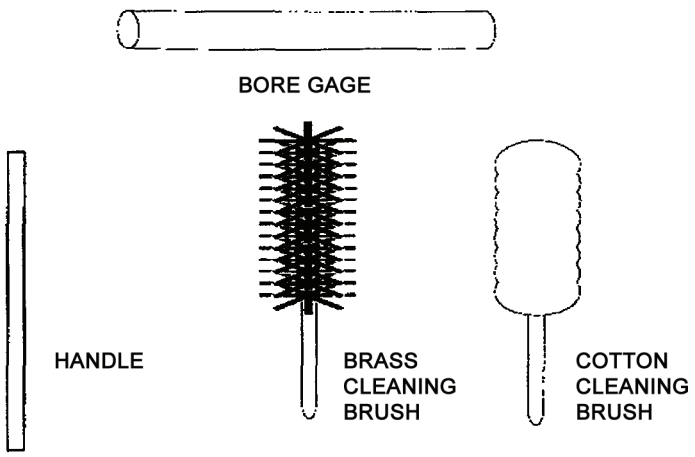


Figure B-4. The M72AS trainer launcher and 21-mm M72AS trainer rocket.

BASIC ISSUE ITEMS

B-14. Basic issue items are used for the M72AS Trainer System for cleaning and maintaining the launcher (Figure B-5). This is necessary to prevent carbon buildup and cracking, pitting, or damage to the subcaliber rear end; build up of carbon may restrict firing pin movement.



National Stock Number	Description, Part No., & CAGE	Quantity
6D 1055-01-495-0009	Trainer Launcher - 51670-7 (12116)	5
1H 0099-LL-H58-1149	Cleaning Kit - 51699-3 (12116)	1
1H M0099-LL-H55-9030	Gage,, Bore (21mm) - 51695-1 (12116)	1
0910-LP-101-1980	Operator's Manual, M72AS 21mm Trainer System - TM 58970-AA-TRN-010	5

Figure B-5. Basic issue items.

TECHNICAL DATA

B-15. Technical data for the M72AS Trainer System are:

M72AS Trainer Launcher:

- Diameter: 66 millimeters (2.6 inches).
- Diameter of barrel insert: 21 millimeters (0.83 inches).
- Weight/with trainer rocket: 3.72 kilograms (8.2 pounds).
- Trigger load minimum: 1.36 kilograms (3 pounds).
- Length collapsed: 78.7 centimeters (31.0 inches).
- Length extended: 98.3 centimeters (38.7 inches).
- Sights: Rifle type rear peep and front post.

M72AS Trainer Rocket:

- Diameter: 21 millimeters (0.83 inches).
- Weight: 0.15 kilograms (0.34 pounds).
- Trigger load minimum: 1.36 kilograms (3 pounds).
- Length: 22.5 centimeters (8.87 inches).

- Effective range: 250 meters (273.4 yards).
- Operating temperature: -40 to +60 degrees centigrade (-40 to +140 degrees Fahrenheit).
- Storage temperature: -46 to +71 degrees centigrade (-51 to +160 degrees Fahrenheit).

TRIGGER

B-16. This is the same as for all M72-series LAWs.

SIGHTS

B-17. The rear sight has a range setting knob, range indicator in meters, low light aperture, and day light aperture. The front sight is a lead post sight (Figure B-6).

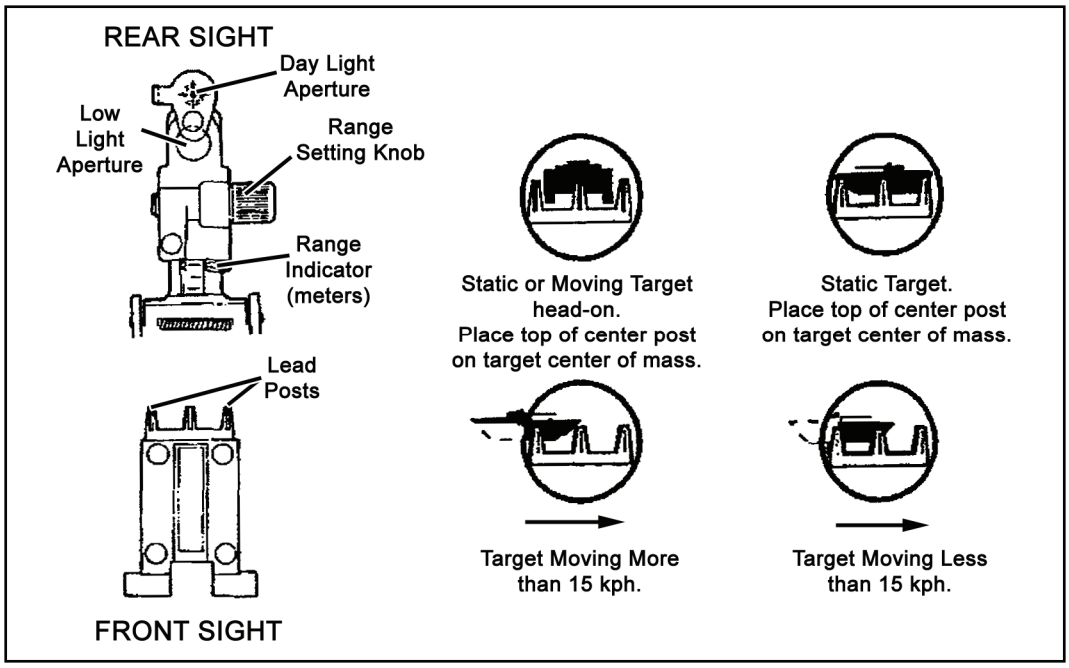


Figure B-6. Front and rear sights.

WARNINGS

Point the M72AS trainer launcher downrange at all times.

Load, unload, or fire the trainer launcher at the firing line only, unless the trainer launcher is transferred to authorized personnel.

Do not extend the trainer launcher to the cocked position until after the M72AS trainer rocket is completely installed.

Insert the M72AS trainer rocket all the way into the trainer launcher before inserting the primer block.

Do not fire the trainer launcher if the barrel assembly has a cracked, split, or damaged condition at the rear end—a blown tube incident may occur.

Loose primer block cover screws or excessive carbon buildup in the primer block cavity can cause a misfire.

Wear ear plugs when firing the trainer launcher. (Double hearing protection is required for the tactical round.)

To prevent electrostatic discharge, a bare M72AS trainer rocket should never be handed from one person to another. It should remain in the aluminum storage tube until just prior to loading in the trainer launcher.

LOADING

B-18. Follow these steps in sequence to load the M72AS for firing (Figure B-7).

- Swing the primer block cover open to expose the primer housing cavity on the partially collapsed trainer launcher.
- Grasp the M72AS trainer rocket metallic case and separate the two halves.
- Carefully remove the M72AS trainer rocket from the metallic case.
- Check the M72AS trainer rocket for—
  - Broken or missing propellant sticks.
  - Broken igniter/transfer line.
  - Damaged or missing O-ring.
  - Dirt and debris.
- Keep the trainer launcher pointed downrange toward the target.
- Turn your back to the target and place the trainer launcher under your arm.
- Insert the trainer rocket fully into the inner tube until the flange is against the trainer launcher tube.
- Line up the primer block on the M72AS trainer rocket with the M72AS trainer launcher primer housing. *The trainer rocket must be fully inserted in the trainer launcher tube before placing primer in the primer housing.*
- Guide the primer block into the primer housing and then close the primer block cover.

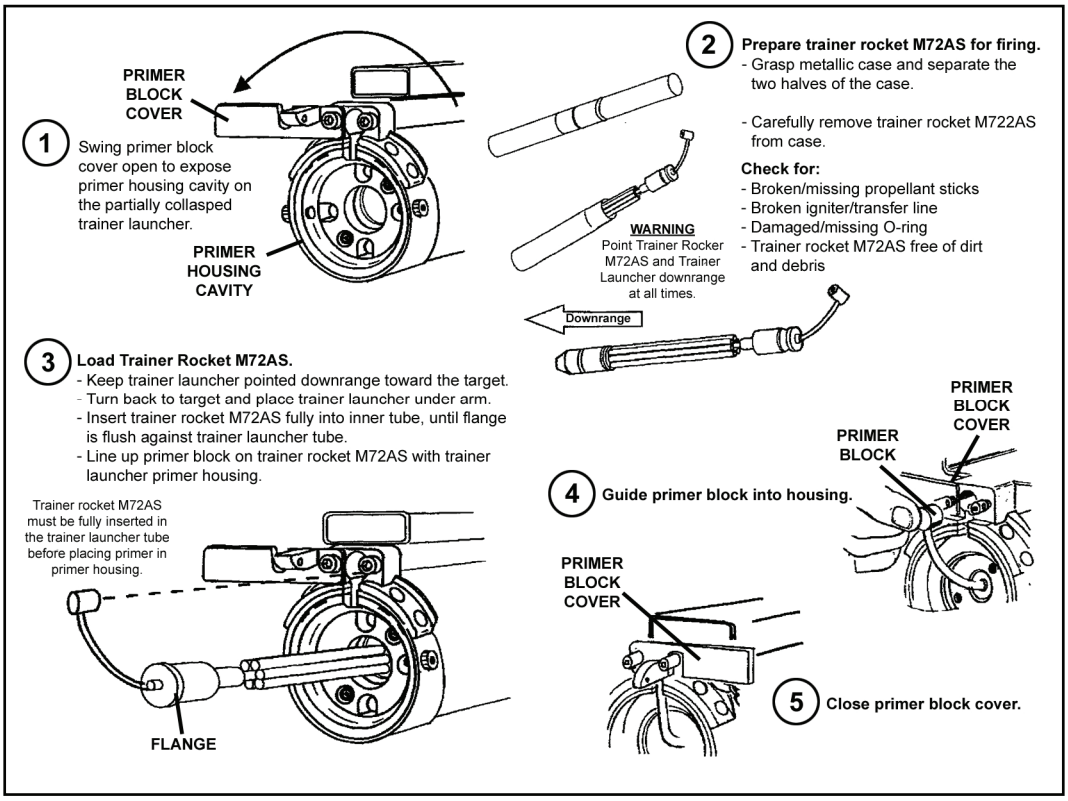


Figure B-7. Loading the M72AS trainer rocket.

UNLOADING

B-19. To unload an unexpended trainer rocket from the M72AS trainer launcher follow the sequence below (shown in Figure B-8, page B-10).

- Return the arming handle to SAFE.
- Remove the trainer launcher from the shoulder.
- Grasp the trainer launcher by the rear sight housing.
- Squeeze the detent boot with the thumb.
- Remove the thumb from the boot once the detent has released.
- Slide the inner tube into the outer tube.
- Keeping the trainer launcher pointed downrange, put the partially collapsed trainer launcher under your arm.
- Open the primer block cover to expose the rocket primer block.
- Carefully grasp the flash tube and pull it rearward, removing the primer block and then the unexpended trainer rocket.
- Return the trainer rocket to its aluminum case, and return it to the ammunition supply point.

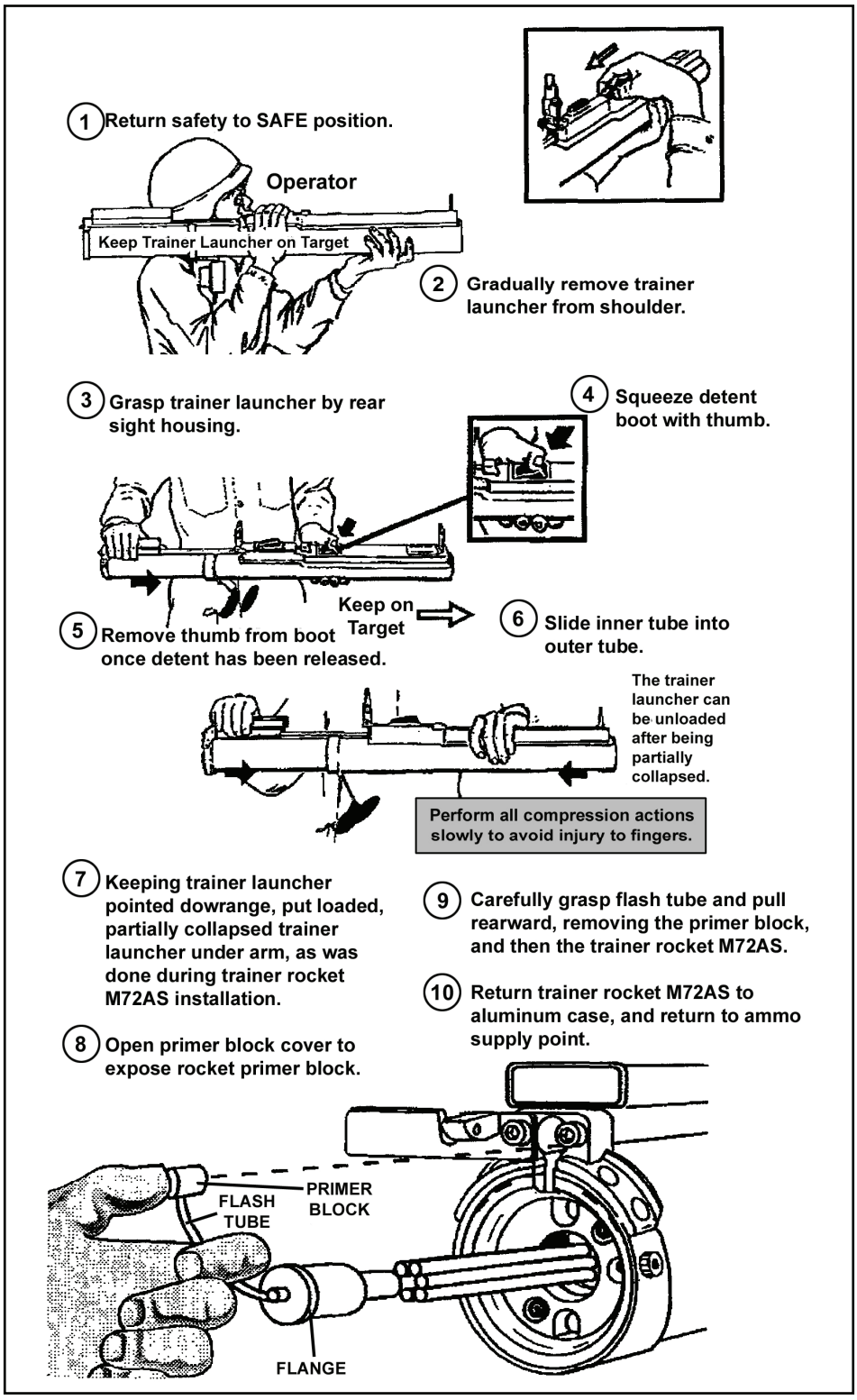


Figure B-8. Unloading unexpended M72AS trainer rocket.

CAUTION

The trainer rocket only operates between –40 and +140 degrees centigrade (-40 and +60 degrees Fahrenheit). Fire it only within this temperature range.

MISFIRE PROCEDURES, RANGE PROCEDURES, AND SAFETY COMBAT TECHNIQUES

B-20. These are the same as for the M72-series LAW.

Note. This label is attached to the M72AS trainer launcher to distinguish it from the tactical round:

Rocket, Practice 21-mm
M72A-SERIES
TDS PART NO 51670-7
LOT NO XXXXXX
OPERATING AND STORAGE
TEMP
-40° c TO + 140° C

M136 AT4 FRONT SIGHT TEMPLATE AND TARGET SILHOUETTE SHEET

B-21. This graphic training aid (GTA 7-2-5, Sight Engagement Trainer, M136 AT4) consists of two parts: a front sight template and a target silhouette sheet. These are used together to train Soldiers to obtain a correct sight picture. (The local TSC can provide GTA 7-2-5.)

- To obtain the correct sight picture for the target speed and range, the front sight template is placed on the target silhouette sheet as shown in Figure B-9.
- For each of the six targets, the reference number sheet shows the number that should appear in the circle on the front sight template. The reference number sheet is also used to determine the correct answer for any unit-developed test for determining the correct sight picture for the M136, AT4.

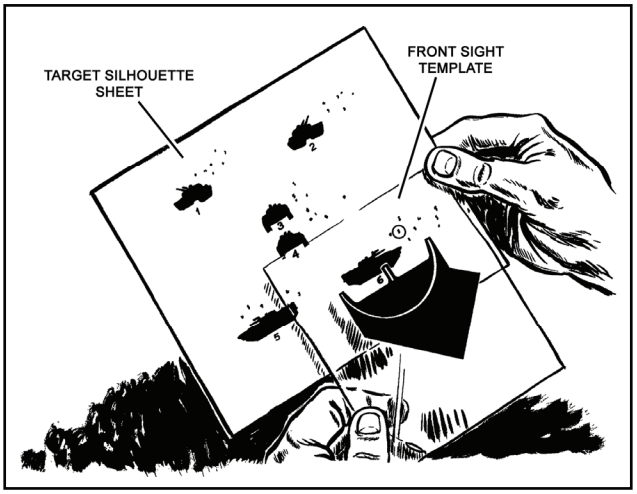


Figure B-9. Using GTA 7-2-5 with target silhouette sheet and front sight template.

M136 AT4 FIELD HANDLING TRAINER

B-22. The M136 AT4 FHT is an inert device made from an expended M136 AT4 tactical launcher. It simulates the weight, balance, characteristics, and operation of the launcher. The FHT is marked with either a gold or yellow 1-inch band between the front and rear sights, and with the word "DUMMY" in 1-inch letters on the side of the launch tube. The local TSC can convert expended launchers to training devices, but DOD Regulation 5100.76-M requires that these items be carefully controlled. The FHT is appropriate for several training situations that do not require the M287 tracer trainer, which prevents unnecessary damage to the tracer trainer. The FHT is used in marksmanship training, FTXs, and institutional training to help Soldiers learn how to—

- Inspect the M136 AT4 for serviceability.
- Prepare an M136 AT4 for firing.
- Demonstrate the correct M136 AT4 firing position.
- Perform misfire procedures.
- Return an M136 AT4 to carrying position.

M136 AT4 SUBCALIBER TRACER TRAINER

B-23. The M287 subcaliber tracer trainer (Figure B-10) uses the 9-mm M939 training practice-tracer (TP-T) cartridge. When loaded, this trainer simulates the M136 AT4 in weight, balance, and operation. The velocity and trajectory of its ammunition match that of the M136 AT4's HEAT cartridge, but the M287 produces less noise, backblast, and overpressure. The M287 subcaliber tracer trainer is used in place of the M136 AT4 in training.

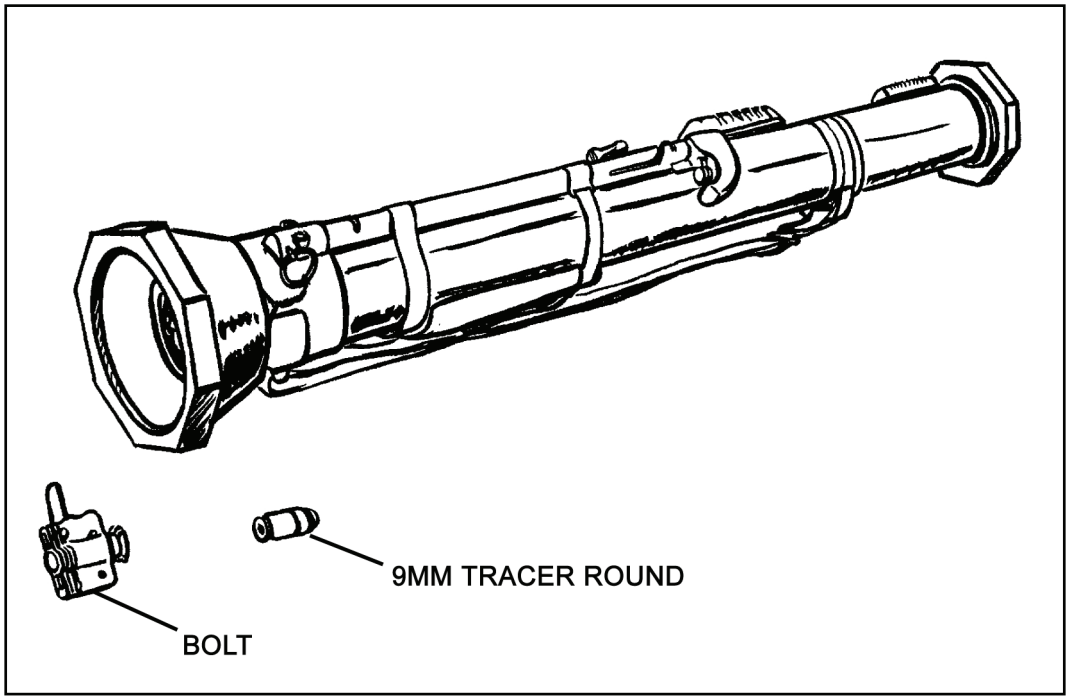


Figure B-10. M287 subcaliber tracer trainer.

DESCRIPTION

B-24. The M287 tracer trainer is a specially constructed M136 AT4. Unlike the LAW subcaliber trainer, it is *not* made from an expended launcher, so it has its own national stock number (NSN). It is designed to accept a special rifle barrel that fires a reduced-load 9-mm cartridge.

B-25. The M287 may be fired at stationary or moving targets. Before it can be fired at a target tank occupied by personnel, the parts of the tank that could suffer damage must be shielded. The local TSC can provide specifications for modifying tanks to be used as targets for the M287 tracer trainer.

B-26. Unlike the M136 AT4 itself and the FHT, the M287 has no band between the front and rear sights. The trainer has a 9-mm submachine gun barrel, a breech assembly, and a bolt (Figure B-11). The bolt is easily removed to load the 9-mm cartridges and to inspect the barrel for obstructions.

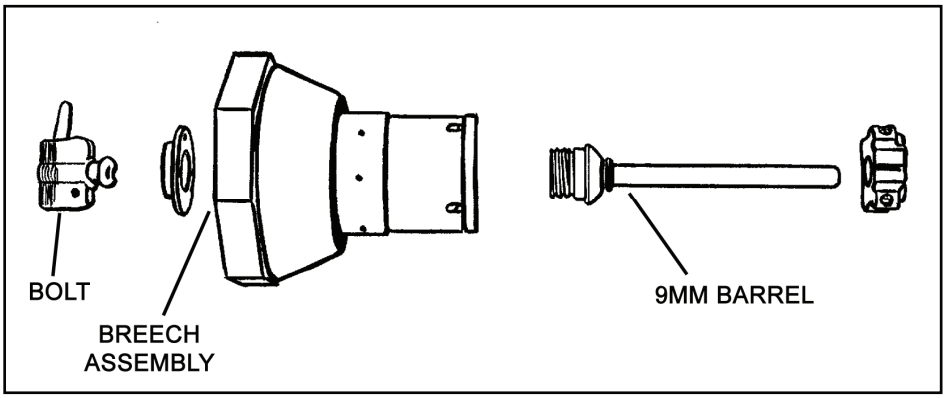


Figure B-11. M287 barrel assembly and components.

B-27. If the M287 tracer trainer is damaged, the unit armorer can replace its complete firing mechanism, firing rod, bolt, sights, sling, and 9-mm barrel assembly (Figure B-12).

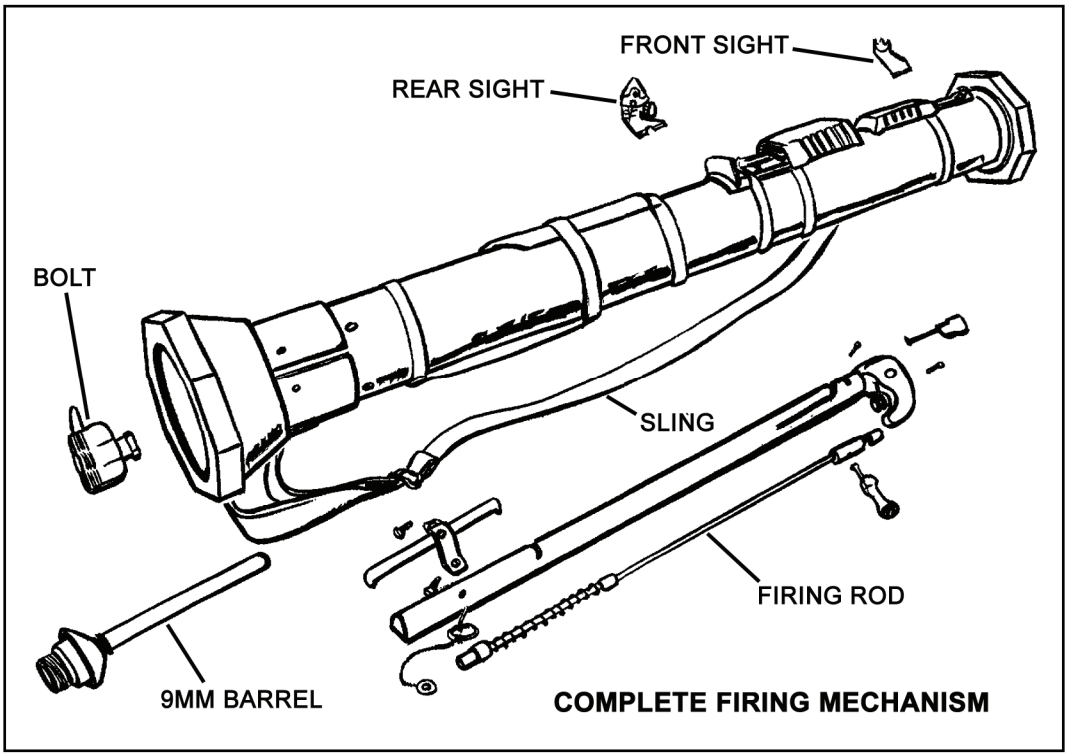


Figure B-12. Replaceable parts for the M287 tracer trainer.

TECHNICAL DATA

B-28. The following technical data apply to the M287 subcaliber tracer trainer:

- Length: 1,020 millimeters (40 inches).

- Weight: 7 kilograms (15 pounds).
- Action: mechanical.
- Sights:
  - Front: three-post system.
  - Rear: adjustable range, with two peepholes: 2-mm peephole for daylight and 7-mm peephole for limited visibility.
- Operating temperature: 10 to 27 degrees centigrade (0 to 100 degrees Fahrenheit).
- Muzzle velocity: 300 meters per second (984 feet per second).
- Caliber: 9 millimeter.

AMMUNITION

B-29. The M939 9-mm tracer cartridge has a lighter powder charge than a standard 9-mm bullet. The lighter charge enables the cartridge to closely duplicate the trajectory of the M136 AT4 tactical round at ranges out to 700 meters. The M939 cartridge also has a tracer element to enable the firer to compare the impact of the cartridge with the sight picture. The firer can see the tracer out to 550 meters. Firing the M287 tracer trainer helps the firer learn the correct sight picture for moving targets. The cartridge's red tip and half-black base (Figure B-13) distinguishes it from standard 9-mm ammunition, which should never be fired from the M287 tracer trainer.

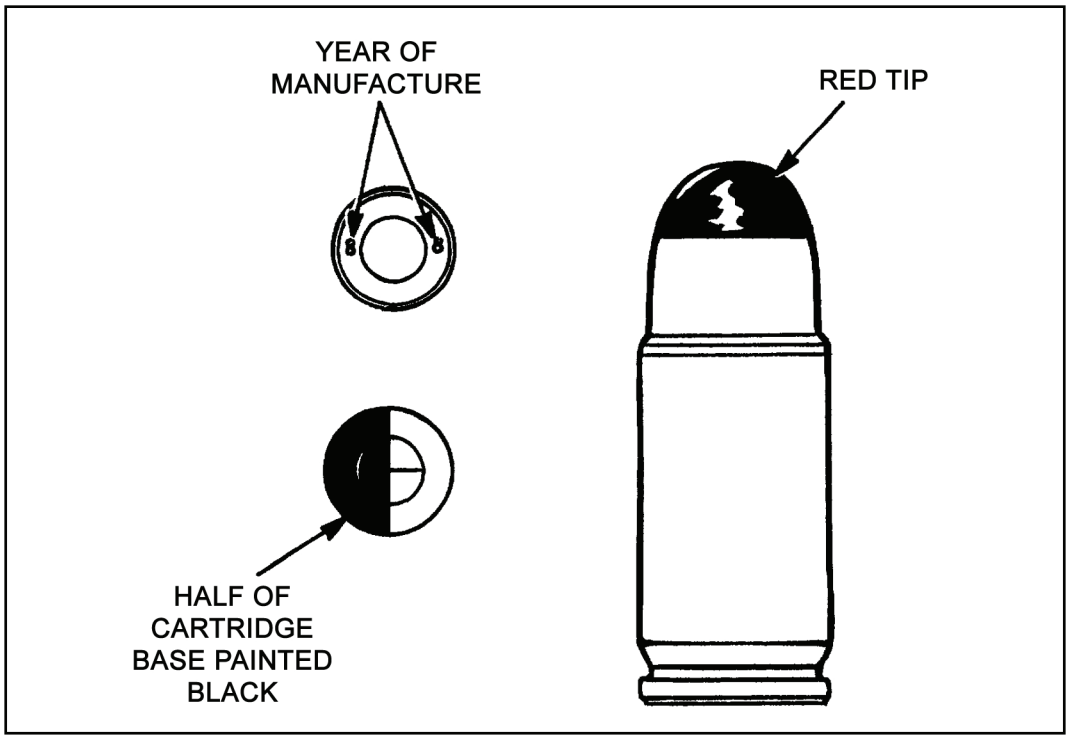


Figure B-13. M939, 9-mm tracer cartridge.

FUNCTION CHECK

B-30. Before the M287 is fired, a function check must be performed to ensure the trigger and safety mechanisms are operating properly. Function check procedures are shown in Table B-1. However, before performing a function check, ensure—

- The *cocking lever* is in the safe ("S") position.
- The *transport safety pin* is fully inserted, with the lanyard wrapped clockwise around the launcher.

- The *bolt* is removed from the breech.

Table B-1. Function check, M287 tracer trainer.

STEP	OPERATOR ACTIONS	FUNCTION CHECK	CORRECTIVE MEASURES
1	Try to cock the tracer trainer.	It should not cock.	If it cocks, turn the trainer in for repair.
2	Remove the transport safety pin and depress the forward safety.	The forward safety should spring back when released.	If it does not spring back, turn the tracer trainer in for repair.
3	Cock the firing mechanism, pressing only the red trigger button.	The firing rod should move only slightly and should be captured by the safety lever assembly. No more than half the rod should protrude through the rear of the firing assembly.	If the tracer trainer fires, turn it in for repair.
4	Recock the firing mechanism; fully depress and continue to hold down the forward safety; press the red trigger button.	The tracer trainer should fire.	If the tracer trainer *fails* to fire, turn it in for repair.
5	Return the cocking lever to the SAFE position and reinstall the transport safety pin.		

WARNING

Load live ammunition only on the firing line. Never fire the M287 tracer trainer at hard targets less than 125 meters from the firing line. Remain clear of the front of the M287, which must be pointed downrange at all times.

LOADING

B-31. The M287 tracer trainer is loaded as follows:

- The firer performs the function check and places the M287 tracer trainer on his shoulder.
- The trainer looks through the barrel from the rear to verify that it contains no obstructions. He inspects the cartridge primer to ensure it is not dented, inserts the bolt into the breech (Figure B-14, page B-16), and presses in and turns the bolt clockwise to the safe position (“S”) (Figure B-15, page B-16). He arms the tracer trainer by turning the bolt clockwise to the fire position (“F”) (Figure B-16, page B-16).
- With the launcher still on his shoulder, the firer cocks the launcher by placing the cocking lever in the cocked position.

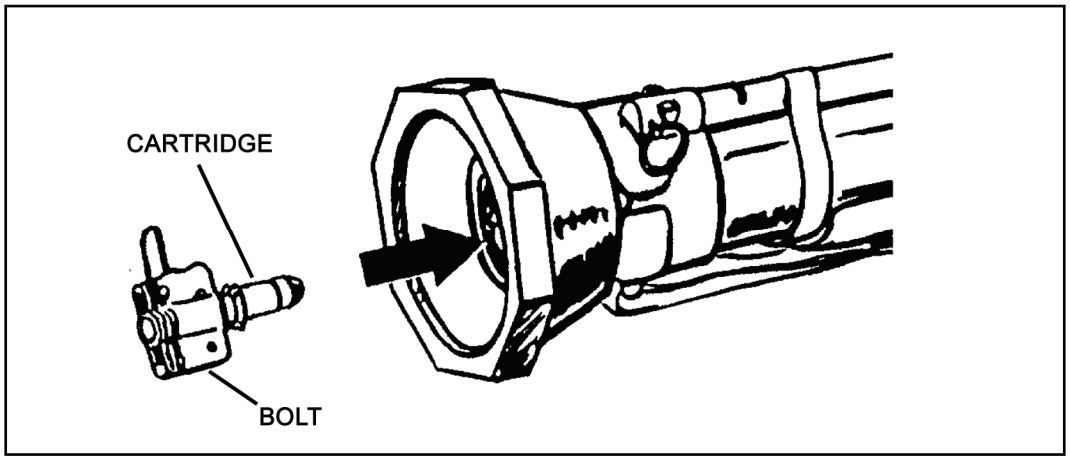


Figure B-14. Inserting the bolt with the cartridge into the breech of the M287 tracer trainer.

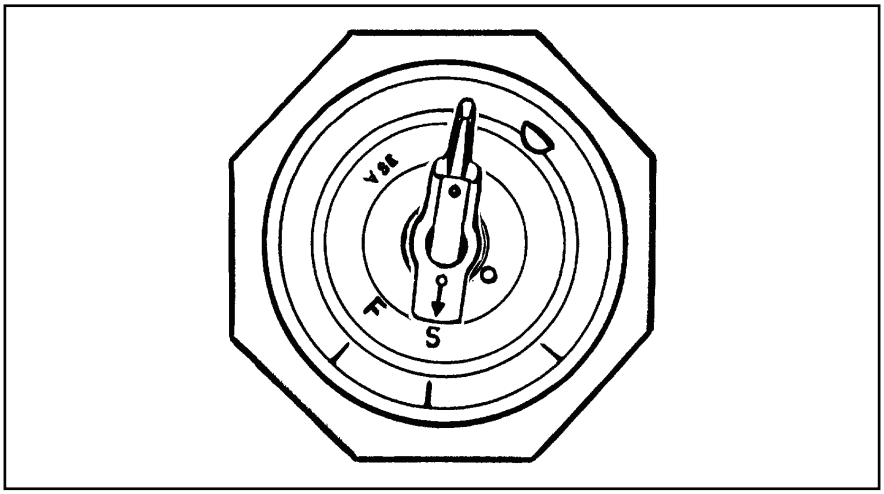


Figure B-15. Tracer trainer bolt in the safe position (“S”).

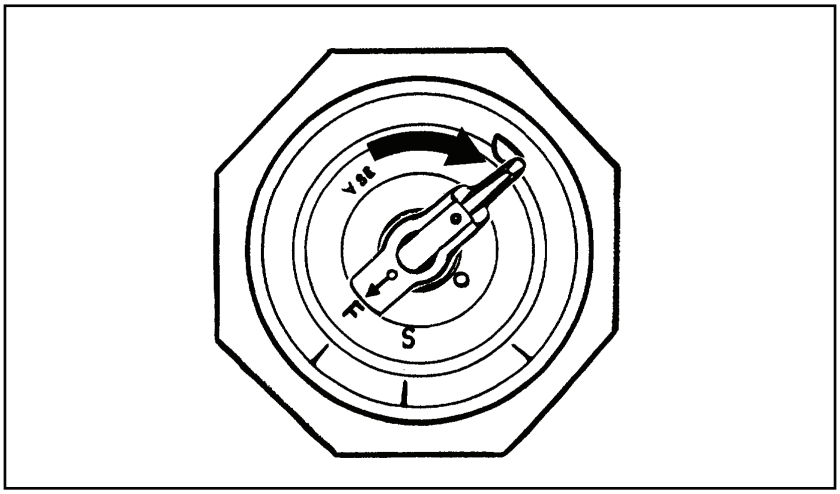


Figure B-16. Tracer trainer armed (firing position “F”).

UNLOADING

B-32. With the tracer trainer still on the firer's shoulder, the trainer or instructor removes the bolt by turning it counterclockwise past the "S," then pulling the bolt from the breech (Figure B-17). If more rounds are to be fired, he removes the expended cartridge and reloads the bolt.

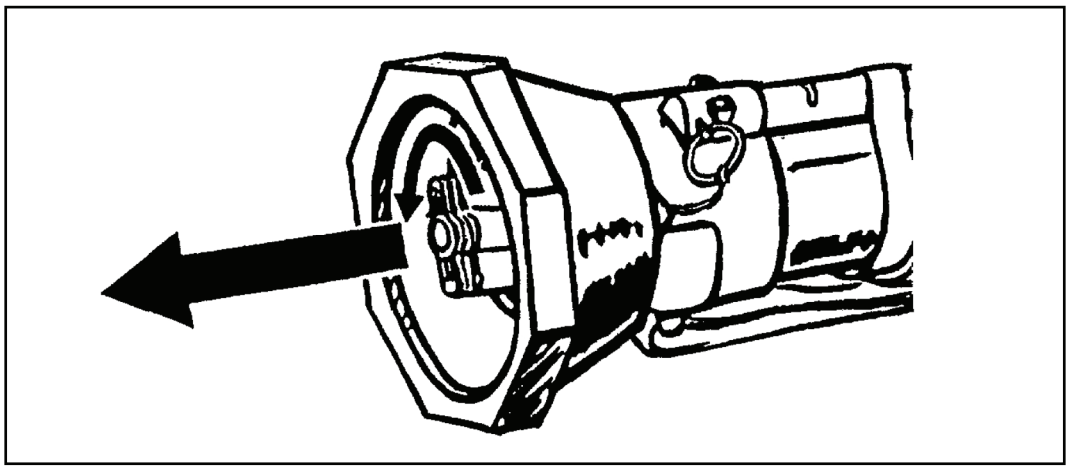


Figure B-17. Unloading the tracer trainer.

RELOADING

B-33. With the tracer trainer still on his shoulder, the firer places the cocking lever in the safe position, keeping the tracer trainer on his shoulder and pointing toward the target. The trainer reloads the tracer trainer and prepares it for firing.

DANGER
NEVER TOUCH THE TRIGGER WHILE RELOADING.

MISFIRE PROCEDURES

B-34. In the event of a misfire—

- Immediately shout "Misfire!"
- Release the forward safety, recock the launcher, and ensure the cocking lever is erect. Fully depress and hold down the forward safety, then aim and press the red trigger button.
- If the tracer trainer still fails to fire, repeat the two previous steps.
- If the launcher fails to fire again, release the forward safety, maintain your firing position, and return the cocking lever to the safe position.
- Notify the training supervisor.
- If a real misfire occurs that cannot be corrected by following the steps previously discussed, the trainer or assistant trainer on duty must ensure the cocking lever is in the safe position and that the forward safety is in the vertical position. He must then insert the transport safety pin and remove and inspect the cartridge. If the primer is dented, he replaces it, disposing of the old one IAW range safety SOP. If the primer is not dented, he notifies DS maintenance to inspect the bolt firing pin for damage. He then reloads the tracer trainer and continues the training exercise.

RANGE PROCEDURES AND SAFETY

B-35. These procedures are the same as for the M136 AT4.

M141 BDM FIELD HANDLING TRAINER

B-36. The field handling trainer (FHT) duplicates the M141 BDM in weight, length, mechanical action, and external features. It consists of an inert, reusable launcher filled with inert ballast to duplicate rocket weight and center of gravity. The firing mechanism safety button and trigger button are functional, to permit a gunner to practice firing. The firing mechanism is made of clear plastic. The FHT can be reset after functioning by using a recocking pin stored under the NVD mount protective cover.

PACKAGING

B-37. One FHT is packaged on each pallet along with the tactical munitions and a training package. The FHT has a gold band on it to identify it as a trainer (Figure B-18). Both the FHT and training package containers have their ends painted gold for easy identification while on the pallet.

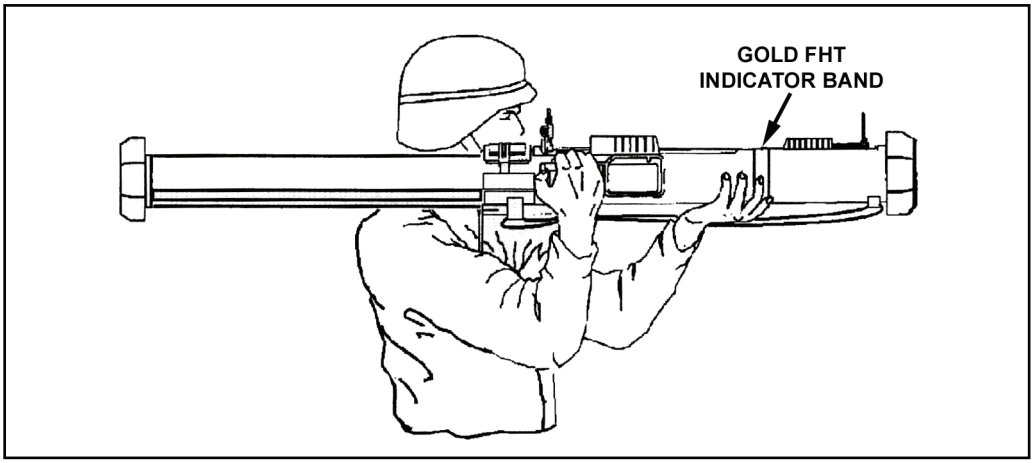


Figure B-18. M141 BDM field handling trainer.

OPERATION AND FUNCTION

B-38. The operation and function of the FHT is the same as the tactical launcher, which is discussed in depth in Appendix H, and must be referenced for instruction on how to place the weapon into the ready-to-fire mode. The FHT contains the same external features and working parts as the tactical round and differs only with the addition of a recocking mechanism, which permits the gunner to conduct multiple simulated fires.

RECOCKING PROCEDURES

B-39. These procedures must be duplicated for each successive fire. To recock the FHT—

- Remove the recocking pin from under the NVD mount protective cover.
- Insert the recocking pin into the hole just below the trigger button.
- Close the firing mechanism cover until it touches the recocking pin.
- Push the recocking pin forward until the firing mechanism snaps into the cocked position.
- Restow the recocking pin.

Appendix C

PERFORMANCE EVALUATIONS

The trainer administers performance evaluations to determine how well the Soldiers perform against established performance measures. Those who fail are retrained and retested, and those who pass help retrain and evaluate those who did not. Instructions are given for right-handed firers: the M136 AT4 may only be fired right-handed, but the M72-series LAW may be fired left-handed, if certain procedures are reversed. Tasks are generic to all shoulder-launched munitions. Conditions and standards may also be generic but, if not, are given by weapon.

TASK 1

C-1. Perform serviceability checks on a shoulder-launched munition.

CONDITIONS

C-2. Given an expended shoulder-launched munition under suitable conditions or in an appropriate location.

STANDARDS

C-3. The firer performs the following actions:

M72-Series LAW

PERFORMANCE MEASURES	GO	NO-GO
1. Inspects the launcher to ensure it has no cracks, dents, or bulges.		
2. Ensures the trigger arming handle is present and in the SAFE position.		
3. Checks the rubber boots around the trigger bar and detent for cracks, tears, and deterioration.		
4. Inspects the data plate on the right forward side of the launcher to ensure the words “with coupler” appear on the first line *(M72A2 only)*. If not, informs the trainer.		

M136 AT4

PERFORMANCE MEASURES	GO	NO-GO
1. Ensures the launcher has no cracks, dents, or bulges, or reports these defects to the instructor.		
2. Ensures the transport safety pin is in place, or reports this defect to the instructor.		
3. Ensures the cocking lever is in the SAFE (uncocked) position, or reports this defect to the instructor.		
4. Ensures the muzzle cover is intact, or reports this defect to the instructor.		
5. Ensures the color-coded band is correct, or reports this defect to the instructor.		
6. Ensures the sights function properly, or reports this defect to the instructor.		
7. Ensures the venturi has no foreign objects, or reports this defect to the instructor.		
8. Ensures the forward safety functions properly, or reports this defect to the instructor.		
9. Ensures the red trigger button is not broken or missing, or reports this defect to the instructor.		
10. Ensures the shoulder stop is not broken or damaged, or reports this defect to the instructor.		
11. Ensures the carrying sling is not frayed and is firmly attached to the launch tube, or reports this defect to the instructor.		

TASK 2

C-4. Place a shoulder-launched munition into operation.

CONDITIONS

C-5. Given an expended shoulder-launched munition (FHT) on a range or in garrison.

STANDARDS

C-6. The firer performs the following actions, in sequence:

M72-Series LAW

PERFORMANCE MEASURES	GO	NO-GO
1. Removes the rear cover pull pin.		
2. Releases the rear cover and sling assembly.		
3. Extends the launcher vigorously and ensures it is fully extended.		
4. Places the launcher on his firing shoulder.		
5. Checks the backblast area.		
6. Pulls the arming handle out.		
7. Sights.		

M136 AT4

PERFORMANCE MEASURES	GO	NO-GO
1. Cradles the M136 AT-4 in his arms.		
2. Removes the transport safety pin.		
3. Unsnaps and unfolds the shoulder stop.		
4. Places the M136 AT4 on his right shoulder.		
5. Releases the sights.		

6. Checks the backblast area.		
7. Places cocking lever in the ARMED (cocked) position.		
8. Fully depresses and holds down the forward safety.		

TASK 3

C-7. Demonstrate the standing position used to fire a shoulder-launched munition.

CONDITIONS

C-8. Given a target and an expended shoulder-launched munition in any suitable location.

STANDARDS

C-9. The firer demonstrates the standing position as follows:

M72-Series LAW

PERFORMANCE MEASURES	GO	NO-GO
1. Faces the target by executing a half-left face turn and spreading feet a comfortable distance apart.		
2. Places the launcher on the shoulder with the left hand directly under the forward portion of the launcher.		
3. Places the right elbow against the body for stability.		

M136 AT4

PERFORMANCE MEASURES	GO	NO-GO
1. Faces the target by executing a half-left face turn and spreads the feet a comfortable distance apart.		
2. Places the launcher on the shoulder and grasps the sling near the launcher's muzzle with the left hand.		
3. Places the right elbow against the body for stability.		

TASK 4

C-10. Demonstrate the kneeling position used to fire a shoulder-launched munition.

CONDITIONS

C-11. Given a target and an expended shoulder-launched munition in a suitable location, with the soldier in the standing position.

STANDARDS

C-12. The firer demonstrates the kneeling position as follows:

PERFORMANCE MEASURES	GO	NO-GO
1. Kneels on the right knee with the right thigh at a 90-degree angle to the line of aim.		
2. Sits back on the right heel and shifts weight forward.		
3. Rests the upper left arm forward of the left knee.		
4. Places the right arm against the body.		

TASK 5

C-13. Demonstrate the sitting position used to fire a shoulder-launched munition.

CONDITIONS

C-14. Given a shoulder-launched munition training device or expended launcher in a suitable location, with the Soldier in the standing position.

STANDARDS

C-15. Each firer demonstrates the sitting position as follows:

PERFORMANCE MEASURES	GO	NO-GO
1. Keeps the launcher pointed toward the target.		
2. Executes a half-left face turn and sits with the legs crossed.		
3. Places the launcher on the right shoulder.		

4. Leans slightly forward from the hips. 5. Rests the elbows forward of the knees to avoid bone-to-bone contact.		

TASK 6

C-16. Demonstrate the prone position used to fire a shoulder-launched munition.

CONDITIONS

C-17. Given a target and an expended shoulder-launched munition (FHT) in a suitable location.

STANDARDS

C-18. The firer demonstrates the prone position as follows:

PERFORMANCE MEASURES	GO	NO-GO
1. To keep clear of the backblast area, lies down at an angle of not less than 90 degrees from the line of fire (Not less than 45 degrees for the M72A4/5/6/7). 2. Keeps back straight and right leg directly on line with the right hip and right shoulder. 3. Moves left leg as far as possible to ensure comfort. 4. Holds both elbows well below the launcher. 5. Checks the backblast area to ensure that no part of the body is in it. 6. Holds head as steady as possible, with the firing eye lined up with the sights.		

TASK 7

C-19. Identify enemy vehicles and weapons.

CONDITIONS

C-20. Given ten vehicle identification cards (GTA 17-2-13).

STANDARDS

C-21. The soldier correctly identifies eight out of ten vehicles or weapons by nomenclature.

PERFORMANCE MEASURE	GO	NO-GO
1. The soldier correctly identifies eight out of ten vehicles or weapons by nomenclature.		

TASK 8

C-22. Estimate range.

CONDITIONS

C-23. Given stationary, partly exposed, or fully exposed targets at ranges between 50 and 250 meters, during daylight, in weather conditions where all targets are visible. Targets include personnel, equipment, silhouettes, and vehicles.

STANDARDS

C-24. The soldier states the distance to each target with no more than 20 percent error.

PERFORMANCE MEASURE	GO	NO-GO
1. Soldier states the distance to each target with no more than 20 percent error.		

TASK 9

C-25. Apply the correct lead for a target.

CONDITIONS

C-26. Given a sight template; a series of ten flank, frontal, and oblique silhouettes of armored targets; rates of movement; and ranges. (At least three different views, speeds, and ranges are given.)

STANDARDS

C-27. The soldier uses correct sighting procedures and correctly applies the lead eight out of ten times.

PERFORMANCE MEASURE	GO	NO-GO
1. Soldier uses correct sighting procedures and correctly applies the lead eight out of ten times.		

TASK 10

C-28. Perform misfire procedures on a shoulder-launched munition.

CONDITIONS

C-29. Given a previously fired shoulder-launched munitionor FHT and instructions that the weapon has misfired, on a suitable firing range, under simulated combat conditions, in any lighting conditions.

STANDARDS (M72-SERIES LAW)

C-30. The soldier applies misfire procedures and tries to fire the M72-series LAW. If the weapon still fails to fire, he disposes of it IAW unit SOP.

M72-series LAW

PERFORMANCE MEASURES	GO	NO-GO
1. Immediately squeezes the trigger bar again.		
2. If the LAW still does not fire, tries to place the trigger arming handle on SAFE.		
3. Removes the launcher from the shoulder and partly collapses it (10 to 15 centimeters or 4 to 6 inches), keeping the launcher pointed upward and downrange.		
4. Extends the launcher.		
5. If the LAW fails to fire again, squeezes the trigger, tries to return the weapon to SAFE, partly collapses the launcher, and sets the weapon aside.		

STANDARDS (M136 AT4)

C-31. The soldier performs combat misfire procedures on the M136 AT4.

M136 AT4

PERFORMANCE MEASURES	GO	NO-GO
1. Releases the forward safety with the right hand.		
2. Recocks the firing mechanism using the cocking lever.		
3. Presses and holds down the forward safety, takes aim, and presses the trigger.		
4. If launcher still fails to fire, repeats Steps 1 and 2.		

5. If the launcher again fails to fire, returns the cocking lever to the SAFE (uncocked) position.		
6. Removes the weapon from the shoulder, keeping it pointed toward the target.		
7. Replaces the transport safety pin.		
8. Informs the instructor that the firer broke the sights off to indicate a misfired weapon when in combat.		
9. Places the launcher on the ground, pointing toward the target.		

TASK 11

C-32. Return the shoulder-launched munition to its carrying configuration.

CONDITIONS

C-33. Given an expended shoulder-launched munition in a suitable location.

STANDARDS

C-34. The soldier performs the following actions, in sequence:

M72-series LAW

PERFORMANCE MEASURES	GO	NO-GO
1. Pushes in the trigger arming handle.		
2. Removes the launcher from the shoulder.		
3. Depresses the barrel detent and collapses the launch tube, guiding the front and rear sights into position.		
4. Replaces the sling assembly.		
5. Replaces the rear cover pull pin.		

M136 AT4

PERFORMANCE MEASURES	GO	NO-GO
1. Releases the forward safety with the right hand.		
2. Returns the cocking lever to the SAFE (uncocked) position by pushing forward and upward on it, then letting it spring back into position.		
3. Removes the launcher from the shoulder, ensuring the muzzle is pointed in the direction of fire.		
4. Replaces the transport safety pin, fully seating it in the retainer hole.		
5. When closing the rear sight, resets the range indicator to the 200-meter setting. (If this step is not accomplished, the rear sight may break off when the sight cover is closed).		
6. Restores the sights by laying them down and closing their covers.		
7. Snaps the shoulder stop into the closed position.		
8. Moves to another location; slings the launcher over either shoulder and moves out.		

Appendix D

Suggested Design for Combined Shoulder-Launched Munition Range

This appendix provides basic guidance for units to establish a range complex for shoulder-launched munitions. The complex described may be used for multilevel training and firing of shoulder-launched munitions; both subcaliber trainers and live HE ammunition may be used on the same range. Training areas should be near, but not adjacent to, the firing line. The firing line should be designed to allow personnel to observe firing from the side. The target array should include stationary targets composed of F-type targets or the hulls of hard targets (APCs or tanks), a moving target (a target on track or a manned moving target tank [MMTT]), and bunkers. This allows the firer to engage a variety of targets and to develop his skills in the various types of engagements.

FIRING LINE

D-1. The firing line should be organized to allow for the 100-meter M136 AT4 backblast (Figure D-1). Also, at least 20 meters must be allowed between firing points. The backblast area must be fenced, roped, or marked in some way, so Soldiers know not to enter it when firing is being conducted. A range that meets the requirements of the M136 AT4 will also meet the requirements of the M72-series LAW and the M141 BDM.

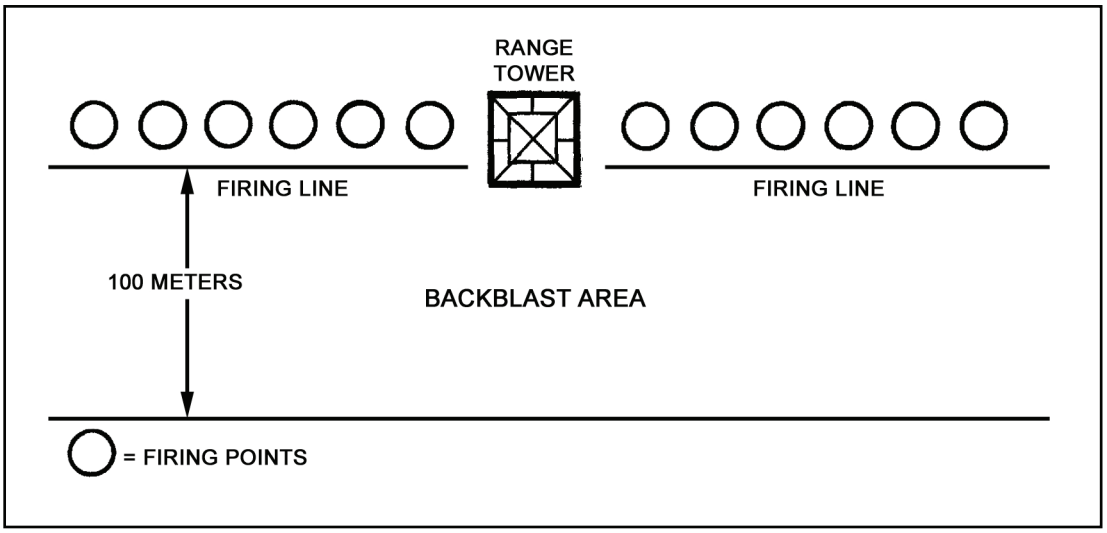


Figure D-1. Firing line.

TARGET ARRAY

D-2. The target array should include targets at ranges of 100 to 700 meters (Figure D-2, page D-2) to enable the unit to conduct advanced instructional fire on targets located beyond the weapons' maximum

effective ranges. Firers may only use HE weapons to engage hard targets. This reduces the damage to other targets the unit must maintain such as F-type silhouettes and bunkers.

D-3. Standard vehicle silhouettes or tank hulls should be used for stationary targets. Selected targets should be positioned behind —

- Mounds of earth to simulate vehicles in defilade.
- Buildings, homes, churches, or hospitals to simulate an urban environment.
- Trees or other natural objects.

D-4. Firers adjust their points of aim accordingly. Targets should also be positioned to allow firers to engage flank, frontal, and oblique targets.

D-5. Bunker targets should be placed within the target array at ranges of 100 to 400 meters. They should be no more than 1 meter high or 2 1/2 to 3 meters wide.

D-6. Moving target silhouettes should travel along a track or road so the firers can engage fast moving targets from both flank and oblique angles. The moving targets should be placed at ranges of 150 to 600 meters and should enter and exit from the flanks outside the range fan.

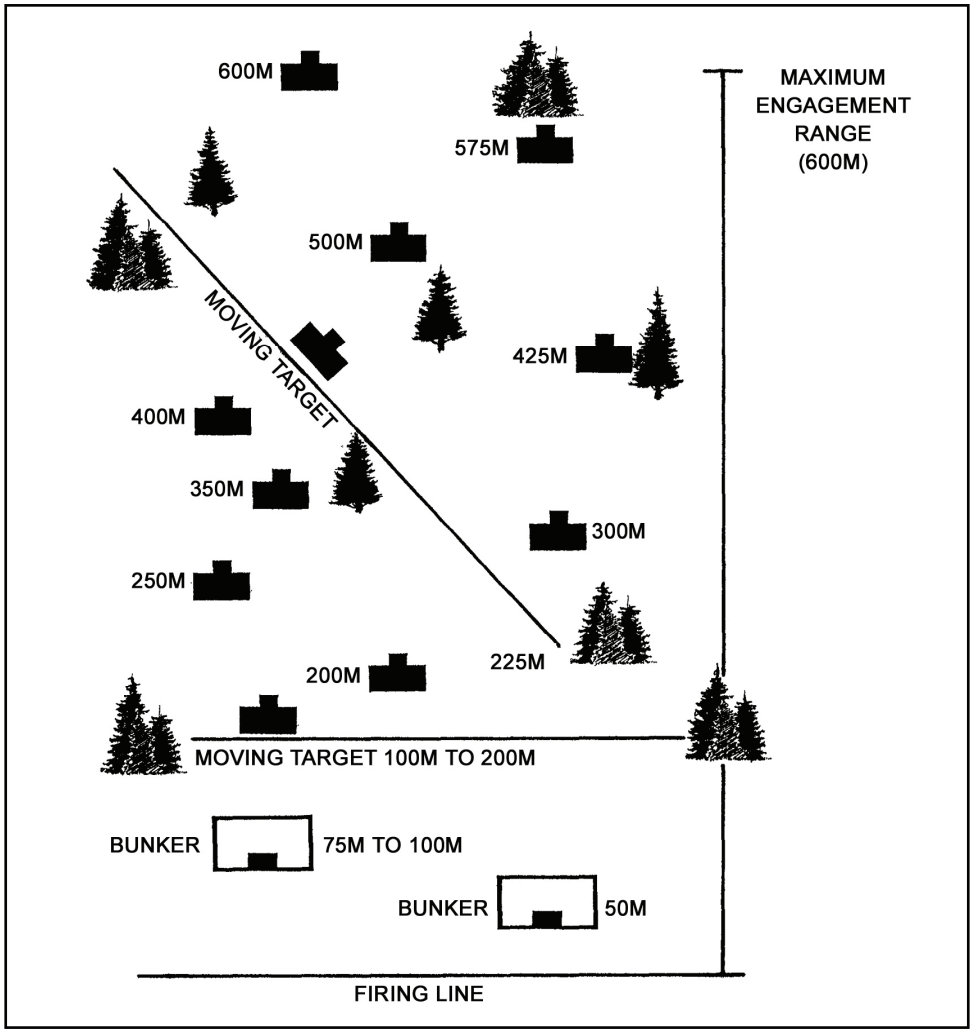


Figure D-2. Target array.

Appendix E

INSTRUCTIONAL AND QUALIFICATION FIRING TABLES AND EXAMPLE SCORECARDS

This appendix provides firing tables for the subcaliber gunnery trainers discussed in this manual. It also includes an example of a completed scorecard for the M136 AT4 and M72-series LAW. All instructional and qualification firing tables are conducted on suitable ranges with ammunition designated in the firing tables. Some tables are fired in daylight, others in limited visibility, but all tables have some CBRN firing (Table E-1).

Table E-1. Firing tables for light antiarmor weapons.

M72-Series LAW	Instructional day fire, stationary targets
	Instructional day fire, moving targets
	Instructional night fire
M136 AT4	Instructional day fire
	Instructional night fire
	Qualification day fire
	Qualification night fire
	Advanced instructional day fire

M72-SERIES LAW

E-1. The M190 35-mm subcaliber device is used to fire the instructional firing tables for the M72-series LAW, and DA Form 7323-R (M72-Series LAW Scorecard) is used to score them. Figure E-1 (page E-2) shows an example of the completed form. The instructional day and night firing tables for the LAW are provided in Tables E-2 and E-3 (page E-3).

Note. A blank copy of the form is located at the end of this publication for local reproduction on 8 1/2-by 11-inch paper.

M72-SERIES LAW SCORECARD

For use of this form, see FM 3-23.25; the proponent agency is TRADOC.

NAME: THIELE, STEPHEN DATE: 15 AUG 05

GRADE: E-5 RATING: 1ST CLASS UNIT: HHC 2/29TH INF REGT

WEATHER (Check one): ☐ CLEAR ☑ RAIN ☐ FOG ☐ SNOW

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
I	Instructional DAY	Stationary	1	125 to 150	Standing	✓	
			2	150 to 175	Kneeling	✓	
			* 3	150 to 200	Sitting	✓	
			* 4	125 to 150	Prone	✓	
					Table Subtotals	4	0
II	Instructional DAY	Moving	1	100 to 200	Standing	✓	
			2	100 to 200	Sitting	✓	
			* 3	100 to 200	Kneeling		✓
					Table Subtotals	2	1
III	Instructional NIGHT	Stationary	1	100 to 150	Kneeling		✓
			2	100 to 150	Sitting	✓	
			* 3	100 to 150	Sitting	✓	
					Table Subtotals	2	1

FIRER'S SIGNATURE: Stephen Thiele DATE: 15 AUG 05 SCORER'S SIGNATURE: Benny C. Martin DATE: 15 AUG 05

FIRER'S SIGNATURE: Stephen Thiele DATE: 16 AUG 05 SCORER'S SIGNATURE: Benny C. Martin DATE: 16 AUG 05

FIRER'S SIGNATURE: Stephen Thiele DATE: 17 AUG 05 SCORER'S SIGNATURE: Benny C. Martin DATE: 17 AUG 05

* Firer must wear a protective mask when firing this round.

CONSOLIDATED SCORES

FIRER'S SIGNATURE: Stephen Thiele DATE: 17 AUG 05 TOTAL MISSES: 2

SCORER'S SIGNATURE: Benny C. Martin DATE: 17 AUG 05 RANK: SFC

RANGE OIC'S SIGNATURE: Tommy Anderson DATE: 17 AUG 05 RANK: CPT

INSTRUCTOR NOTES

ALL FIRING TABLES
- Do not announce the ranges to targets.
- Fire all engagements in sequence.

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Figure E-1. Example completed DA Form 7323-R.

Table E-2. Instructional day firing tables for the M72-series LAW.

TABLE I M72-Series LAW Instructional Day Fire, Stationary Targets	
TASK	Each Soldier engages stationary armored targets with the M190 subcaliber device.
CONDITIONS	Given one M190 subcaliber device and four M73 rockets, on a suitable firing range with stationary targets at a range of 125 to 200 meters. Two targets are engaged in MOPP4.
STANDARD	The Soldier fires four rockets at stationary targets and achieves at least three hits.
TABLE II **M72-Series LAW Instructional Day Fire,** **Moving Targets**	
TASK	Each Soldier engages moving armored targets with the M190 subcaliber device.
CONDITIONS	Given one M190 subcaliber device, three M73 rockets, and targets moving at a rate of 8 to 24 kmph at a range of 100 to 200 meters. Frontal and oblique-moving targets may be used when a manned, moving tank is available. One target is engaged in MOPP4.
STANDARD	The Soldier fires three rockets at moving targets and achieves at least two hits.

Table E-3. Instructional night firing table for the M72-series LAW.

TABLE III M72-Series LAW Instructional Night Firing Before you can use the AN/PVS-4, you must install an M72A1 sight reticle on it and boresight it to an expended M72-series LAW launcher.	
TASK	Each Soldier engages stationary targets at night with the M190 subcaliber device.
CONDITIONS	Given one M190 subcaliber device and three M73 rockets, on a suitable firing range with stationary targets at a range of 125 to 200 meters, at night, and either an AN/PVS-4 or illumination provided by indirect fire.
STANDARD	The Soldier fires three rockets at stationary targets and achieves at least one hit. He engages one of those targets in MOPP4.

M136 AT4

E-2. The M287 9-mm tracer bullet trainer is used to fire the instructional, qualification, and advanced instructional firing tables for the M136 AT4, and DA Form 7324-R (M136 AT4 Scorecard) is used to score them. Figures E-2 and E-3 show an example of the completed form (pages E-4 and E-5). Tables E-4 through E-6 (pages E-6, E-7, and E-8) provide the instructional, qualification, and advanced instructional firing tables for the M136 AT4. The latter must be fired on a separate, more specialized range.

Note. A copy of this form is located at the end of this publication for local reproduction on 8 1/2-by 11-inch paper.

M136 AT4 SCORECARD

For use of this form, see FM 3-23.25; the proponent agency is TRADOC.

NAME: DINKENS, DAVID DATE: 15 AUG 05

GRADE: E-3 RATING: UNIT: HHC 2/29 INF REGT

WEATHER (Check one) ☐ CLEAR ☑ RAIN ☐ FOG ☐ SNOW

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
I	Instructional Day	Stationary	1	150 to 200	Kneeling	✓	
		Stationary	* 2	150 to 200	Kneeling	✓	
		Stationary	3	250 to 300	Sitting	✓	
		Stationary	4	250 to 300	Sitting	✓	
		Stationary	5	125 to 150	Prone	✓	
		Stationary	6	125 to 150	Prone	✓	
		MMTT/MAS	7	150 to 200	Kneeling	✓	
		MMTT/MAS	* 8	150 to 200	Kneeling	✓	
		MMTT/MAS	9	200 to 250	Standing	✓	
		MMTT/MAS	*10	200 to 250	Fighting position, unsupported		✓
		MMTT/MAS	11	250 to 300	Kneeling	✓	
		MMTT/MAS	12	250 to 300	Kneeling		✓
					Table Subtotals	9	3

FIRER'S SIGNATURE David Dinkens DATE 15 AUG 05 SCORER'S SIGNATURE Dan Seal DATE 15 AUG 05

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
II	Instructional Night	Stationary	1	125 to 150	Prone		✓
		Stationary	2	125 to 150	Prone	✓	
		Stationary	* 3	150 to 200	Sitting	✓	
		Stationary	4	150 to 200	Sitting	✓	
		Stationary	5	250 to 300	Kneeling		✓
		Stationary	6	250 to 300	Kneeling	✓	
		MMTT/MAS	7	125 to 150	Standing	✓	
		MMTT/MAS	8	125 to 150	Standing	✓	
		MMTT/MAS	* 9	200 to 250	Kneeling	✓	
		MMTT/MAS	10	200 to 250	Kneeling		
		MMTT/MAS	11	150 to 200	Standing	✓	
		MMTT/MAS	12	150 to 200	Fighting position, unsupported		✓
					Table Subtotals	9	3

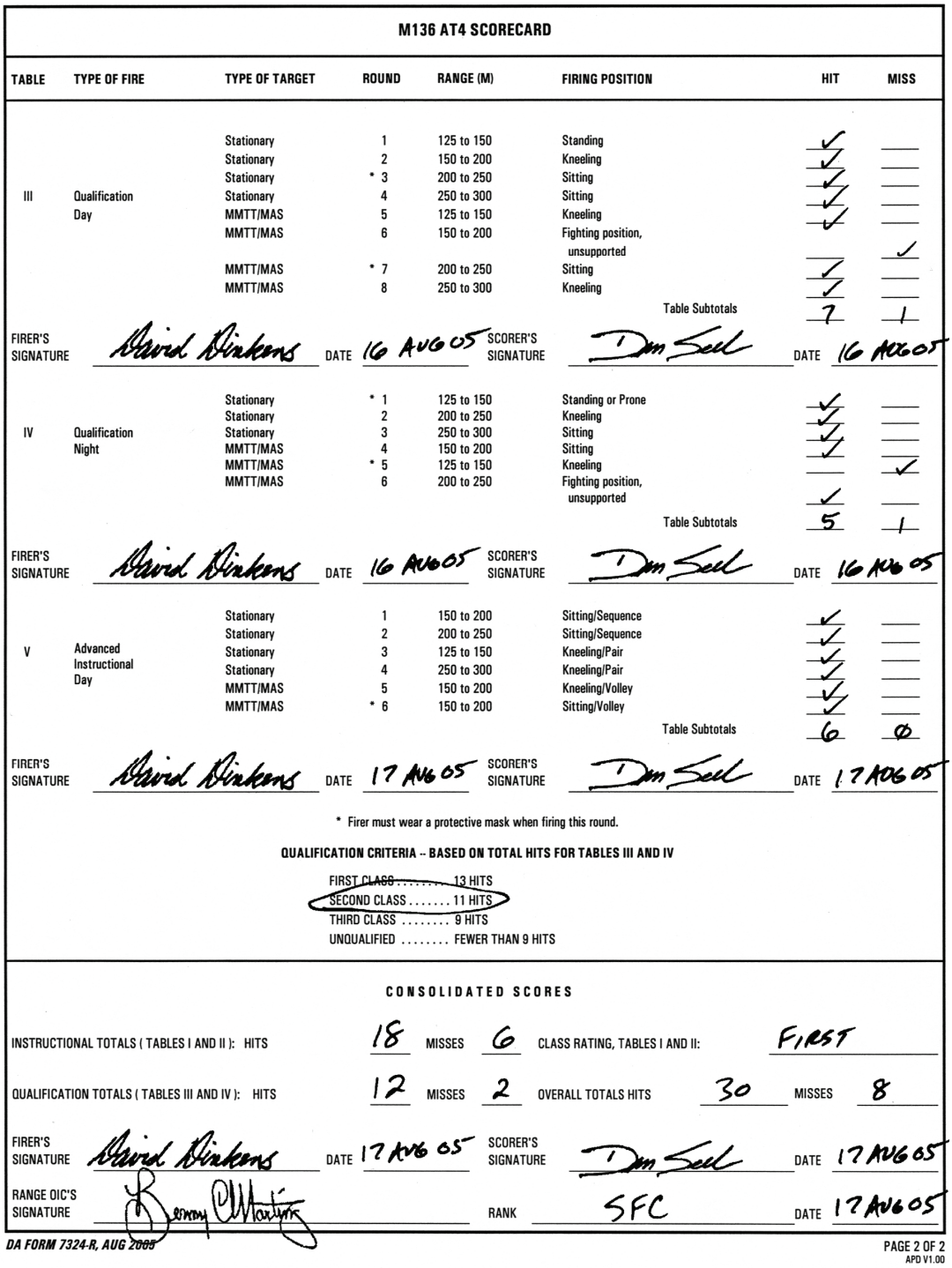
FIRER'S SIGNATURE David Dinkens DATE 15 AUG 05 SCORER'S SIGNATURE Dan Seal DATE 15 AUG 05

* Firer must wear a protective mask when firing this round.

INSTRUCTOR NOTES	
ALL FIRING TABLES	• Do not announce the ranges to targets. • Fire all engagements in sequence. • Fire Table I before Table III; fire Table II before Table IV.
FIRING TABLES III AND IV	• Ensure no one fires at front or rear of a manned moving tank target. • Total hits and misses, and enter results in the consolidated scores block on the back of this scorecard.

DA FORM 7324-R, AUG 2005 EDITION OF JUL 1994 IS OBSOLETE. PAGE 1 OF 2 APD V1.00

Figure E-2. Example completed DA Form 7324-R (front).



M136 AT4 SCORECARD

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
III	Qualification Day	Stationary	1	125 to 150	Standing	✓	
		Stationary	2	150 to 200	Kneeling	✓	
		Stationary	* 3	200 to 250	Sitting	✓	
		Stationary	4	250 to 300	Sitting	✓	
		MMTT/MAS	5	125 to 150	Kneeling	✓	
		MMTT/MAS	6	150 to 200	Fighting position, unsupported		✓
		MMTT/MAS	* 7	200 to 250	Sitting	✓	
		MMTT/MAS	8	250 to 300	Kneeling	✓	
					Table Subtotals	7	1

FIRER'S SIGNATURE: David Dirkens DATE: 16 AUG 05 SCORER'S SIGNATURE: Dan Seal DATE: 16 AUG 05

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
IV	Qualification Night	Stationary	* 1	125 to 150	Standing or Prone	✓	
		Stationary	2	200 to 250	Kneeling	✓	
		Stationary	3	250 to 300	Sitting	✓	
		MMTT/MAS	4	150 to 200	Sitting	✓	
		MMTT/MAS	* 5	125 to 150	Kneeling		✓
		MMTT/MAS	6	200 to 250	Fighting position, unsupported	✓	
					Table Subtotals	5	1

FIRER'S SIGNATURE: David Dirkens DATE: 16 AUG 05 SCORER'S SIGNATURE: Dan Seal DATE: 16 AUG 05

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
V	Advanced Instructional Day	Stationary	1	150 to 200	Sitting/Sequence	✓	
		Stationary	2	200 to 250	Sitting/Sequence	✓	
		Stationary	3	125 to 150	Kneeling/Pair	✓	
		Stationary	4	250 to 300	Kneeling/Pair	✓	
		MMTT/MAS	5	150 to 200	Kneeling/Volley	✓	
		MMTT/MAS	* 6	150 to 200	Sitting/Volley	✓	
					Table Subtotals	6	Ø

FIRER'S SIGNATURE: David Dirkens DATE: 17 AUG 05 SCORER'S SIGNATURE: Dan Seal DATE: 17 AUG 05

* Firer must wear a protective mask when firing this round.

QUALIFICATION CRITERIA -- BASED ON TOTAL HITS FOR TABLES III AND IV

FIRST CLASS ..... 13 HITS
SECOND CLASS ..... 11 HITS
THIRD CLASS ..... 9 HITS
UNQUALIFIED ..... FEWER THAN 9 HITS

CONSOLIDATED SCORES

INSTRUCTIONAL TOTALS (TABLES I AND II): HITS 18 MISSES 6 CLASS RATING, TABLES I AND II: FIRST

QUALIFICATION TOTALS (TABLES III AND IV): HITS 12 MISSES 2 OVERALL TOTALS HITS 30 MISSES 8

FIRER'S SIGNATURE: David Dirkens DATE: 17 AUG 05 SCORER'S SIGNATURE: Dan Seal DATE: 17 AUG 05

RANGE OIC'S SIGNATURE: Jeremy C Martin RANK: SFC DATE: 17 AUG 05

DA FORM 7324-R, AUG 2005

PAGE 2 OF 2
APD V1.00

Figure E-3. Example completed DA Form 7324-R (back).

NIGHT COURSE OF FIRE TABLES AND QUALIFICATION FOR M136 AT4

E-3. Each Soldier is given preliminary marksmanship instruction (PMI) before the instructional and qualification tables are fired. Once the Soldier completes Tables I and III (day tables), he is given additional instruction on the use of the aided vision devices for the night operations.

QUALIFICATION TABLES FOR THE M287 TRACER TRAINER

E-4. Qualification tables for the M287 tracer trainer are as follows:

- Table I (Instructional Day). This scenario consists of 12 targets from 125 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged.
- Table II (Instructional Night). This scenario consists of 12 targets from 125 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged at night.
- Table III (Qualification Day). This scenario consists of 8 targets from 125 to 300 meters. The standard to proceed to the next table is 6 out of 8 targets successfully engaged.
- Table IV (Qualification Night). This scenario consists of 6 targets from 125 to 300 meters. The standard to proceed to the advanced firing tables is 4 out of 6 targets successfully engaged.
- Table V (Advance Instructional Fire Day). This scenario consists of 6 targets from 125 to 300 meters, both stationary and moving. The standards are 3 out of 6 targets successfully engaged.

Note. All references to the M136 AT4 launcher and cartridge refer to the M287 9-mm tracer bullet training device.

DAY STANDARDS

E-5. Commanders can achieve the current day standard at night with the M136 AT4 using the training strategy found in this field manual. A gunner who is qualified on the day standard and has executed preliminary marksmanship training with the appropriate NVD can achieve the current day standard at night.

Table E-4. Instructional firing tables for the M136 AT4.

TABLE I M136 AT4 Instructional Day Fire	
TASK	Each Soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	Given one M287 9-mm subcaliber device and 12 rounds of 9-mm tracer ammunition, a suitable firing range, stationary targets at a range of 150 to 300 meters, and other targets moving 8 to 24 kmph at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique moving targets may be used.
STANDARD	The Soldier fires 12 tracer bullets at stationary and moving targets and achieves at least six hits. He engages three of those targets in MOPP4.

Table E-4. Instructional firing tables for the M136 AT4 (continued).

TABLE II M136 AT4 Instructional Night Fire	
TASK	Each Soldier engages an armored target with the M287 tracer bullet trainer at night.
CONDITIONS	At night, given one M287 9-mm subcaliber device and 12 rounds of 9-mm tracer ammunition, artificial illumination, a suitable firing range, stationary targets at a range of 125 to 300 meters, and other targets moving from 8 to 24 kmph (5 to 15 mph) at a range of 150 to 200 meters. When a manned, moving tank is available, frontal and oblique moving targets may be used.
STANDARD	The Soldier fires 12 tracer bullets at stationary and moving targets and achieves at least six hits. He engages two of those targets in MOPP4.

Table E-5. Qualification firing tables for the M136 AT4.

TABLE III M136 AT4 Qualification Day Fire	
TASK	Each Soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	Given one M287 9-mm subcaliber device and eight rounds of 9-mm tracer ammunition, a suitable firing range, stationary targets at a range of 125 to 300 meters, and other targets moving at a rate of 8 to 24 kmph (5 to 15 mph) at a range of 125 to 300 meters. When a manned, moving tank is available, frontal and oblique moving targets may be used.
STANDARD	The Soldier fires eight tracer bullets at stationary and moving targets and achieves at least six hits. He engages two of these targets in MOPP4.
TABLE IV M136 AT4 Qualification Night Fire	
TASK	Each Soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	At night, given one M287 9-mm subcaliber device and six rounds of 9-mm tracer ammunition, artificial illumination, a suitable firing range, stationary targets at a range of 125 to 300 meters, and other targets moving 8 to 24 kmph (5 to 15 mph) at a range of 150 to 250 meters. When a manned, moving tank is available, frontal and oblique moving targets may be used.
STANDARD	The Soldier fires six tracer bullets at stationary and moving targets and achieves at least four hits. He engages two of those targets in MOPP4.

Table E-6. Advanced instructional firing table for the M136 AT4.

TABLE V M136 AT4 Advanced Instructional Day Fire Fire this table on an appropriate separate, specialized range.	
TASK	Each Soldier engages an armored target with the M287 tracer bullet trainer.
CONDITIONS	Given one M287 9-mm subcaliber device and six rounds of 9-mm tracer ammunition, a suitable firing range, stationary targets at a range of 125 to 300 meters, and other targets moving 8 to 24 kmph (5 to 15 mph) at a range of 150 to 250 meters. When a manned, moving tank is available, frontal and oblique moving targets may be used.
STANDARD	The Soldier must fire six tracer bullets at stationary and moving targets and achieve at least three hits. He must engage two of the targets with sequence firing, two with pair firing, and two with volley firing. He must engage one of the six targets in MOPP4.

Appendix F

INFRARED LASER AIMING DEVICES

The newest infrared laser pointers increase the night firing accuracy of infantry weapons. The new family of weapon mounts (some fielded with the thermal weapon sight) and helmet brackets are more stable and reliable for continued accurate firing under field conditions. Their effectiveness is limited by the capability of the image-intensifying (I^2) sight with which they are used. Normally, this is a night vision goggle or monocular, with or without the 3X magnifier. They primarily enhance the gunner's ability to align his sights on the target, and usually have dramatic affect on his firing positions and scanning technique.

Unlike I^2 sights mounted on the weapon, the gunner can somewhat reduce the adverse effects of muzzle flash by rising up higher off the sight with his helmet-mounted goggle or monocular. With the AN/PEQ-2A, the range of these devices is greatly improved, allowing great effectiveness for crew-served weapons out to 2,200 meters. However, trainers and leaders must adopt new safety procedures to ensure these lasers, which are not safe for the eyes, are treated like loaded weapons any time the batteries are issued. The bore light is effective to boresight these pointers. Generally, weapons do not require zeroing with live ammunition to confirm alignment after Soldiers and leaders are qualified in the boresighting techniques. The M136 AT4 cannot be conventionally boresighted; therefore, a sight alignment method is used to zero the aided vision device.

AN/PAQ-4C, AIMING LIGHT

F-1. The AN/PAQ-4C, aiming light (Figure F-1, page F-2) projects an infrared laser beam that cannot be seen with the eye but can be seen with NVDs. This aiming light works with the AN/PVS-7B/C/D-series goggles and AN/PVS-14. The AN/PAQ-4C mounts on various weapons with mounting brackets and adapters.

TECHNICAL DATA

F-2. The following technical data apply to the AN/PAQ-4C:

- Optics: 100% parallax free, anti-reflective coated lens system.
- Length (sight): 14 centimeters (5.5 inches).
- Weight: 164 grams (5.78 ounces).
- Height: 3 centimeters (1.2 inches).
- Width: 6.5 centimeters (2.5 inches).
- Range: Beyond 600 meters (actual range depends on light level and NVD used for observation).
- Battery life: 100-hour operating (ON) time for AA batteries in temperatures above 0° Centigrade (32° Fahrenheit); 36 hours for temperatures below 0° Centigrade (32° Fahrenheit).

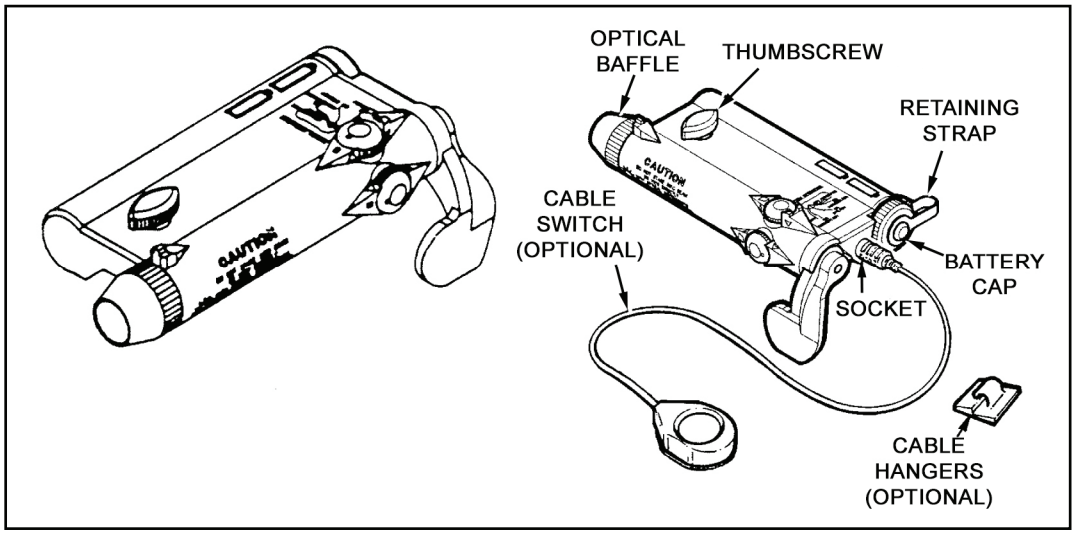


Figure F-1. AN/PAQ-4C, aiming light.

OPERATION

F-3. Activate the AN/PAQ-4C aiming light by rotating the ON/OFF switch lever or the button on the optional cable switch. Either switch connects power from two AA batteries to an internal electronic circuit, which produces the infrared laser. Internal lenses focus the infrared light into a narrow beam. Control the direction of the beam by rotating the mechanical adjusters with click detents. These adjusters are used to zero the aiming light to the weapon. Once zeroed to the weapon, the aiming light projects the beam along the weapon's line of fire. The optical baffle prevents off-axis viewing of the aiming light beam by the enemy.

M136 AT4 Launcher and Cartridge Mounting Procedures

F-4. The aiming light is attached to the M136 AT4 launcher and cartridge by first attaching an AN/PVS-4 mounting bracket to the weapon and then attaching the aiming light to the mounting bracket (Figures F-2 and F-3).

WARNING

Only M136 AT4 qualified personnel should install and use the mounting bracket assembly. Conduct all M136 AT4 operator preventive maintenance checks and services before installation of mounting bracket assembly.

Note. All references to the M136 AT4 launcher and cartridge are also applicable to the M287 9-mm tracer bullet training device.

- **STEP 1:** Install the mounting bracket.
  - Cradle the M136 AT4 in the left arm.
  - Position the support bracket with the mounting rail on the left side and the marking FRONT over the rear sight.

- With the pivot bracket spread open, place the support bracket against the base of the rear sight housing and the bottom on the shoulder strap boss.
- Swing the pivot bracket around the M136 AT4 and secure it by rotating the locking latch clockwise to engage the latch shaft.
- The lever screw assembly must be located in the rear threaded screw hole when mounting the aiming light. Lever screw assembly may require relocation from the front to the rear threaded screw hole.
- Place the bracket adapter (Figure F-2) in the groove of the mounting rail so that the threaded screw hole in the base of the adapter is aligned with the lever screw assembly. Tighten the lever screw.

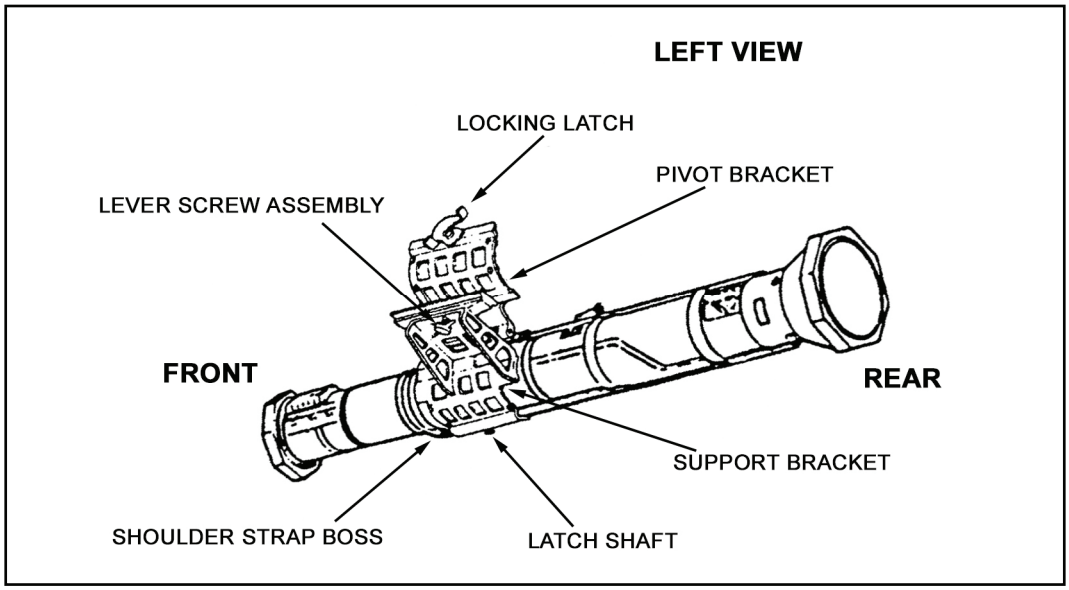


Figure F-2. M136 AT4 installation (mounting bracket).

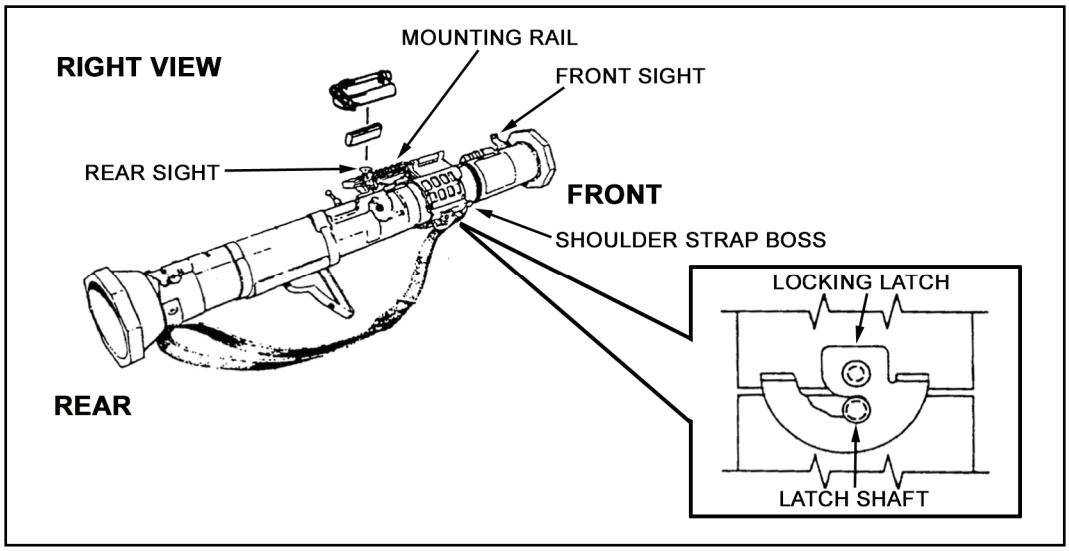


Figure F-3. M136 AT4 installation (locking latch and shaft).

- **STEP 2:** Install the bracket adapter (Figure F-4, page F-4). The bracket adapter provides compatibility between the aiming light and the mounting brackets used on the M2, M60, and M136 AT4 weapons.

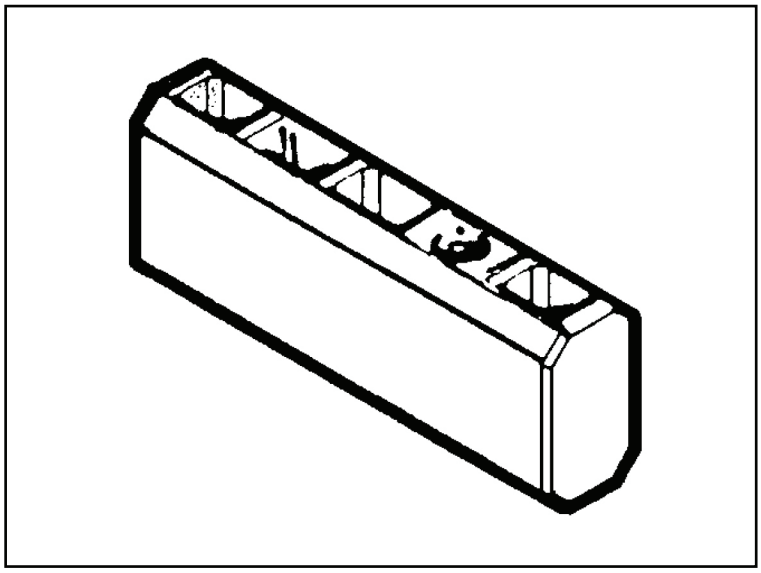


Figure F-4. Bracket adapter.

- **STEP 3:** Attach the AN/PAQ-4 onto the bracket adapter (Figure F-5).

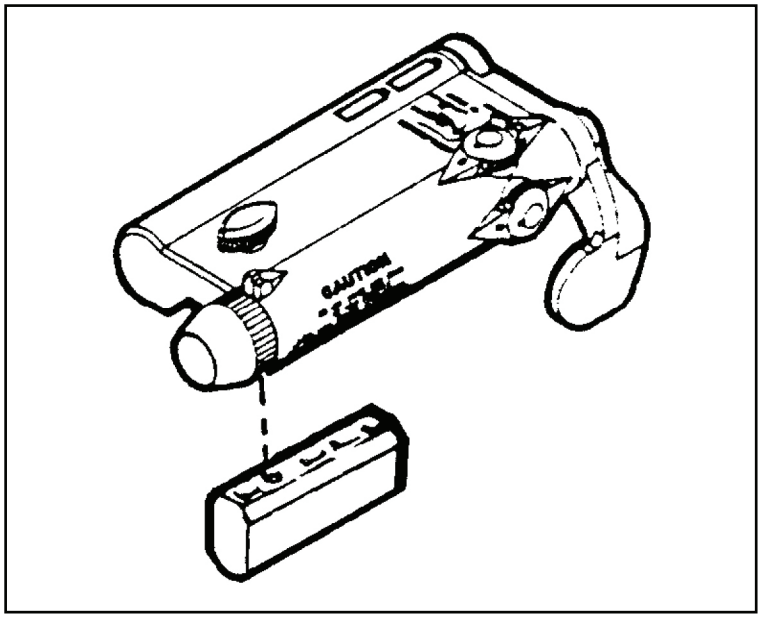


Figure F-5. Attaching bracket adapter to aiming light.

- **STEP 4:** Attach the AN/PAQ-4 to the AN/PVS-4 mounting bracket.
  - Position the AN/PAQ-4 on top of the bracket so that the spacer of the AN/PAQ-4 is aligned with the mounting knob of the bracket.
  - Turn the mounting knob clockwise until the AN/PAQ-4 is tight.

WARNING

Do not store the AN/PAQ-4 with batteries installed.

M136 AT4 Launcher and Cartridge Dismounting Procedures

- **STEP 1:** Detach the AN/PAQ-4 from the AN/PVS-4 mounting bracket.
  - Turn the mounting knob counterclockwise until the AN/PAQ-4 is loose.
  - Remove the AN/PAQ-4 from the bracket adapter.
- **STEP 2:** Remove the adapter from the AN/PAQ-4.
- **STEP 3:** Remove the mounting bracket.
  - Rotate the locking latch counterclockwise to disengage the latch shaft.
  - Swing the pivot bracket away from around the M136 AT4.

AN/PEQ-2A TARGET POINTER/ILLUMINATOR/AIMING LIGHT

F-5. The AN/PEQ-2A target pointer/illuminator/aiming light (TPIAL) (Figure F-6) is a Class IIIb laser that emits a collimated beam of infrared light for precise aiming of the weapon as well as a separate infrared illuminating beam with adjustable focus. A safety block is provided for training purposes (blue side), which limits the operator from selecting the high power modes (black side). The TPIAL projects an infrared laser beam that cannot be seen with the eye but can be seen with NVDs. It is also capable of projecting a much wider infrared illuminating beam from an integral illuminator. The TPIAL works with night vision goggles and mounts on various weapons with mounting brackets and adapters. The AN/PEQ-2A can also be used in the hand-held mode to illuminate and designate targets by leaders.

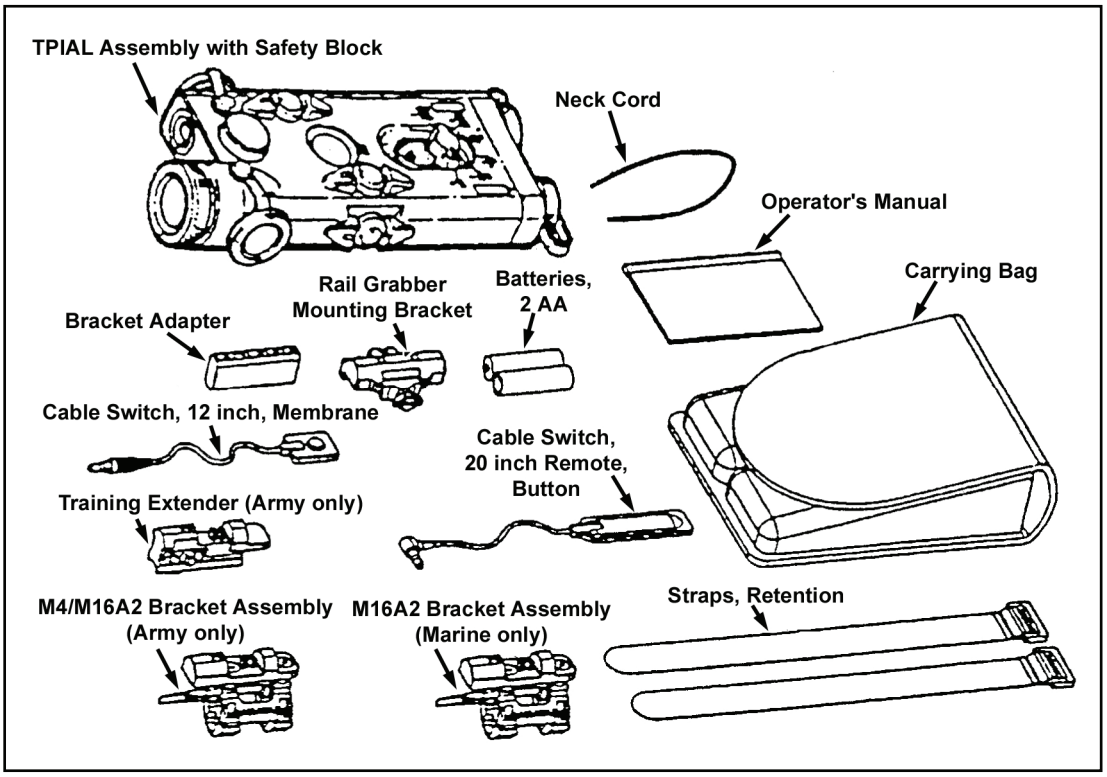


Figure F-6. AN/PEQ-2A with accessories.

TECHNICAL DATA

F-6. The following technical data apply to the AN/PEQ-2A:

- Weight: 7.5 ounce (with 2 AA batteries).
- Length: 16.26 centimeters (6.4 inches).
- Width: 7.12 centimeters (2.8 inches).

- Height: 3.05 centimeters (1.2 inches).
- Range: 600 meters in low power (eye safe); 2,000 meters in high power (non-eye safe).
- Output power:
  - Aiming laser: 25 meters W (+ - 10%).
  - Illuminator 30 meters W (+50,-20%).
- Beam divergence:
  - Aiming laser: .5 meter radius.
  - Illuminator: 1.0 to 115 meters radius.
- Batteries: 2 1.5V AA batteries.

OPERATION

F-7. This paragraph describes battery and safety block installation, the mode switch, the button switch, the cable switch, the focus switch, the lens cap, and the boresight adjusters.

Battery Installation

F-8. Install the battery in the AN/PEQ-2A as follows (Figure F-7):

- Unscrew the battery caps and install two AA batteries.
- Orient the batteries as indicated by the markings on the AN/PEQ-2A body.

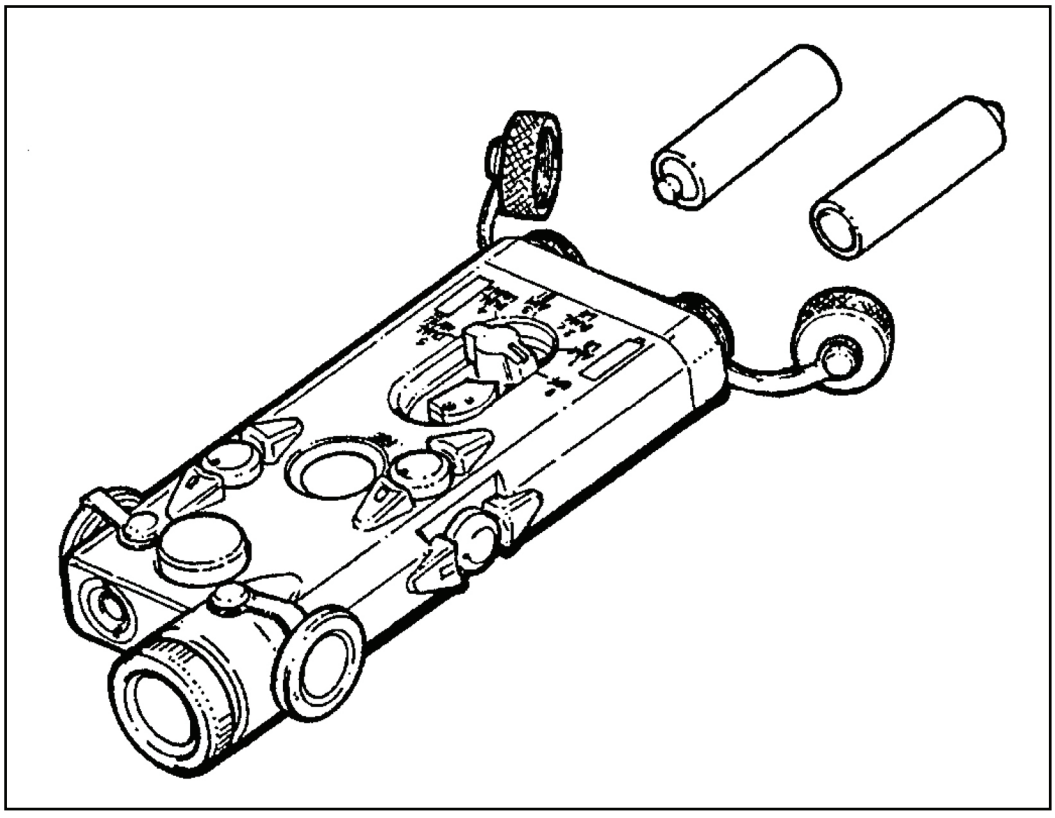


Figure F-7. AN/PEQ-2A battery installation.

Safety Block Installation

F-9. The safety block installed in the training mode (blue side up) prevents the operator from accessing the non-eye safe modes (AIM HI, DUAL LO/HI, DUAL HI/HI) (Figure F-8). A .050 hex head Allen wrench is needed to unscrew the block from the body and reinstall it in the tactical mode (black side up).

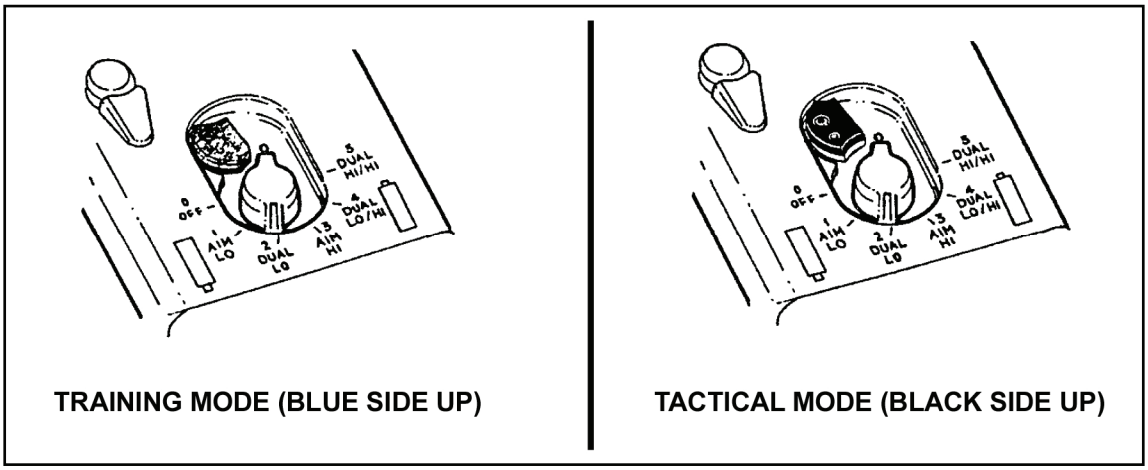


Figure F-8. Safety block installation.

Mode Selector

F-10. The mode selector is used to set the mode in which the AN/PEQ-2A operates when the cable switch button or push buttons are depressed. The mode selector has six positions (Table F-1).

Table F-1. Mode selector positions.

KNOB POSITION	OPERATION
0 OFF	The AN/PEQ-2A will not operate.
1 AIM LO	The aiming beam operates at low power.
2 DUAL LO	The aiming beam operates at low power and the illuminating beam operates at low power.
3 AIM HI	The aiming beam operates at high power.
4 DUAL LO/HI	The aiming beam operates at low power and the illuminating beam operates at full power.
5 DUAL HI/HI	The aiming beam operates at high power and the illuminating beam operates at full power.

Button Switch

F-11. The button switch is used when the AN/PEQ-2A is hand held. Pressing the button switch operates the AN/PEQ-2A in the operational mode set by the mode selector (Figure F-9, page F-8). When the button is released, the AN/PEQ-2A turns off.

F-12. A green light emitting diode (LED) is incorporated into the body of the AN/PEQ-2A to indicate that the AN/PEQ-2A is ON. Whenever the AN/PEQ-2A is activated, the green LED will light and stay lit until the unit is turned OFF.

F-13. If continuous operation of the AN/PEQ-2A is desired, pressing the button switch twice in rapid succession will latch the AN/PEQ-2A ON. The AN/PEQ-2A will remain on until the push button is pressed a third time.

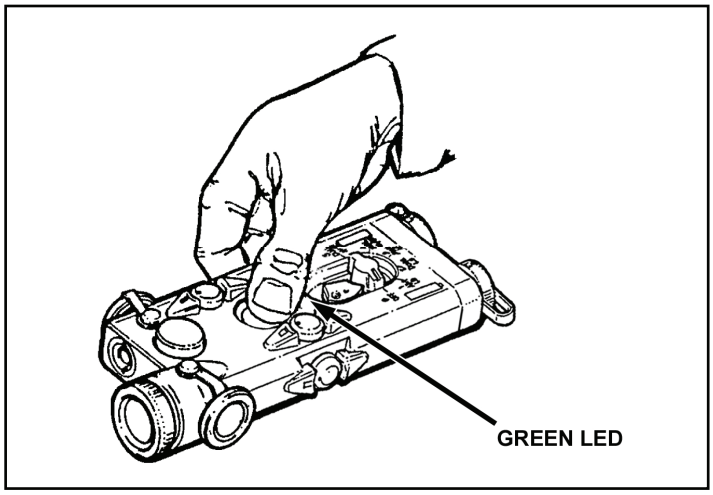


Figure F-9. Operation of the button switch.

Cable Switch

F-14. The cable switch is used when the AN/PEQ-2A is mounted on a weapon. The cable switch plugs into the back of the AN/PEQ-2A assembly (Figure F-10). Pressing the button or pad at the end of the cable switch causes the AN/PEQ-2A to turn on in the operational mode selected by the mode select switch. When the button is released, the AN/PEQ-2A turns off.

F-15. If continuous operation of the AN/PEQ-2A is desired, pressing the cable switch twice in rapid succession will latch the AN/PEQ-2A ON. The AN/PEQ-2A will remain on until the push button is pressed a third time.

F-16. When the cable switch plug is installed in the AN/PEQ-2A, it automatically locks into place. To remove the switch, pull back on the plug sleeve and pull the plug out. DO NOT TRY TO REMOVE THE PLUG BY PULLING ON THE CABLE.

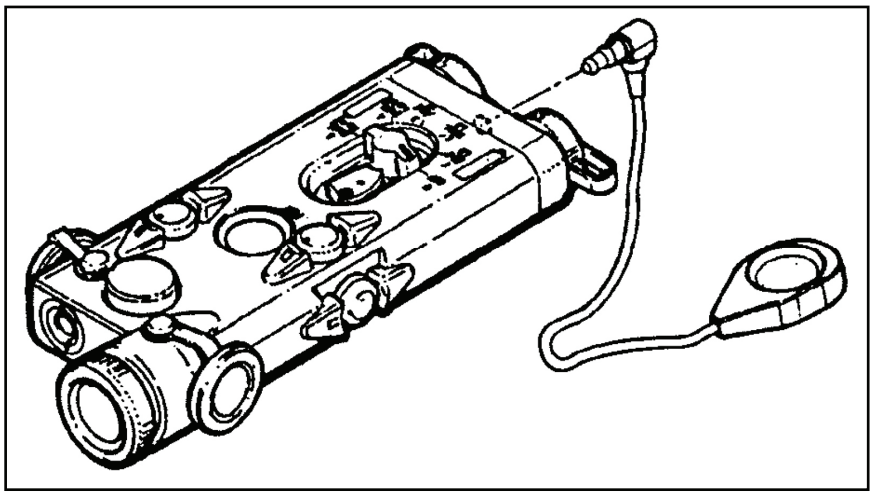


Figure F-10. Installation of the cable switch.

Focus Knob

F-17. The focus knob is used to vary the spread of the illumination beam based on the range and size of the area to be illuminated (Figure F-11).

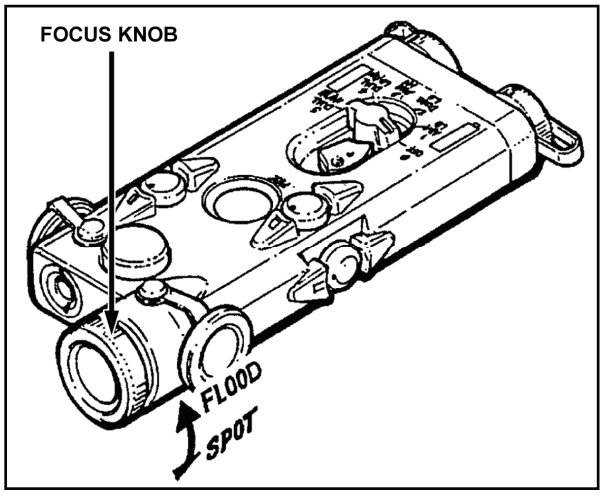


Figure F-11. Using the focus knob.

Lens Cap

F-18. The *black lens cap* (Figure F-12) blocks the AN/PEQ-2A illuminator or aiming laser beam should the device be activated. To use the black lens cap, pull it from its stored location on the side of the AN/PEQ-2A and stretch it over the front of the focus knob or aiming beam so that it fits snugly in place.

F-19. The *diffuser lens cap* enables the illuminator or aiming laser to emit in a 45-degree cone (10 feet at 10 feet). To use the diffuser lens cap, pull it from its stored location on the side of the AN/PEQ-2A and stretch it over the front of the focus knob or aiming beam so that it fits snugly in place.

F-20. The *neutral density lens cap* enables the AN/PEQ-2A illuminator or aiming laser to be operated in low power. To use the neutral density lens cap, pull it from its stored location on the side of the AN/PEQ-2A and stretch it over the front of the focus knob or aiming beam so that it fits snugly in place.

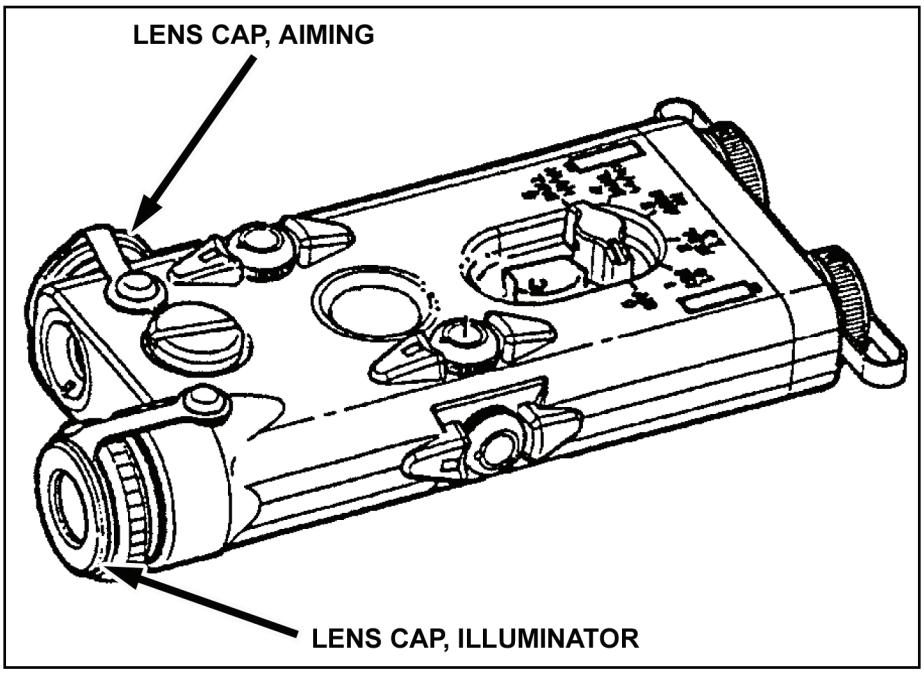


Figure F-12. Installing the lens caps.

Boresight Adjusters

F-21. The AN/PEQ-2A is equipped with boresight adjusters for zeroing the aiming beam and illumination beam (Figure F-13). The AN/PEQ-2A adjusters move the beams in true horizontal and vertical directions. When zeroing the AN/PEQ-2A, it is best to zero the aiming beam to the weapon and then align the illumination beam to the aiming beam.

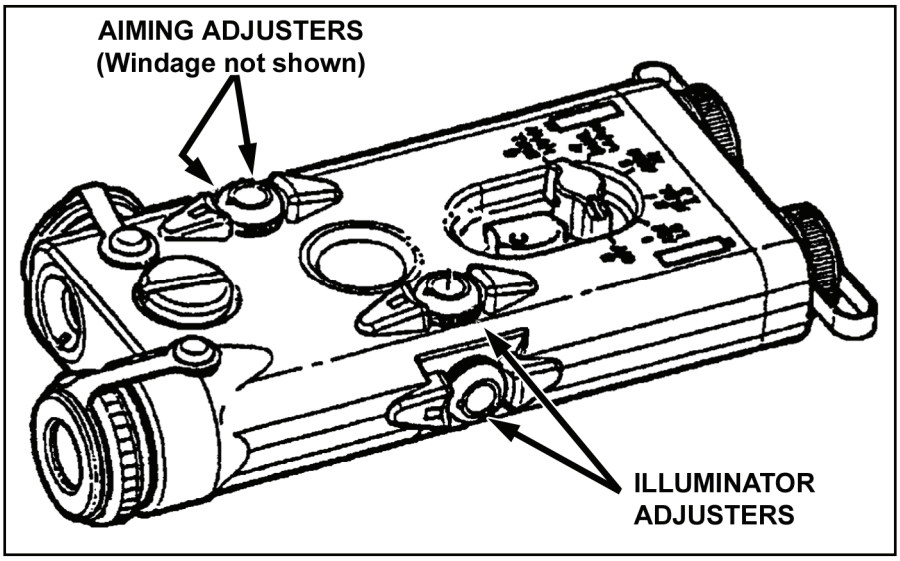


Figure F-13. Boresight adjusters.

AN/PAS-13A (V2) MEDIUM WEAPON THERMAL SIGHT

F-22. The AN/PAS-13A (V2) medium weapon thermal sight (MWTS) (Figure F-14) are silent, lightweight, compact, and durable battery-powered infrared imaging sensors that operate with low battery consumption.

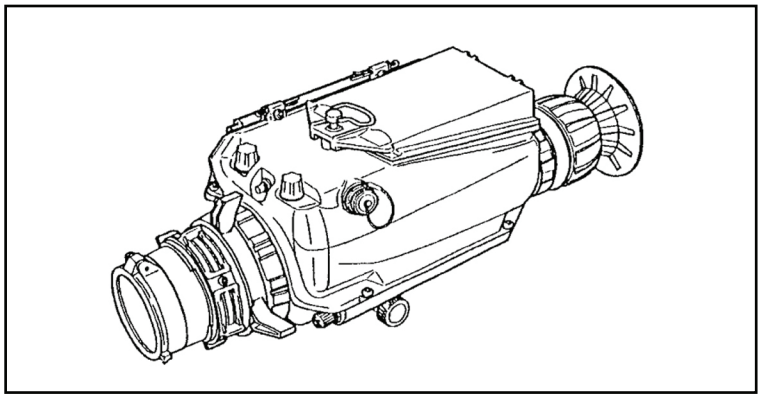


Figure F-14. AN/PAS-13A (V2) MWTS.

DESCRIPTION

F-23. The MWTS is referred to as singular thermal weapon sight (TWS). The TWS is capable of target acquisition under conditions of limited visibility such as darkness, smoke, fog, dust, and haze. It operates effectively at night and can also be used during the daytime. Infrared light is received through the telescope, detected by an IR sensor, converted to digital data, processed, and then displayed for the user. The MWTS fits the M4 carbine, the M4 modular weapon system, the M16A2, the M16A4 (not shown), the

M249, the M60 machine gun, the M240B machine gun (not shown), and the M136 grenade launcher (Figure F-15). The TWS is composed of two functional groups: the telescope and the basic sensor.

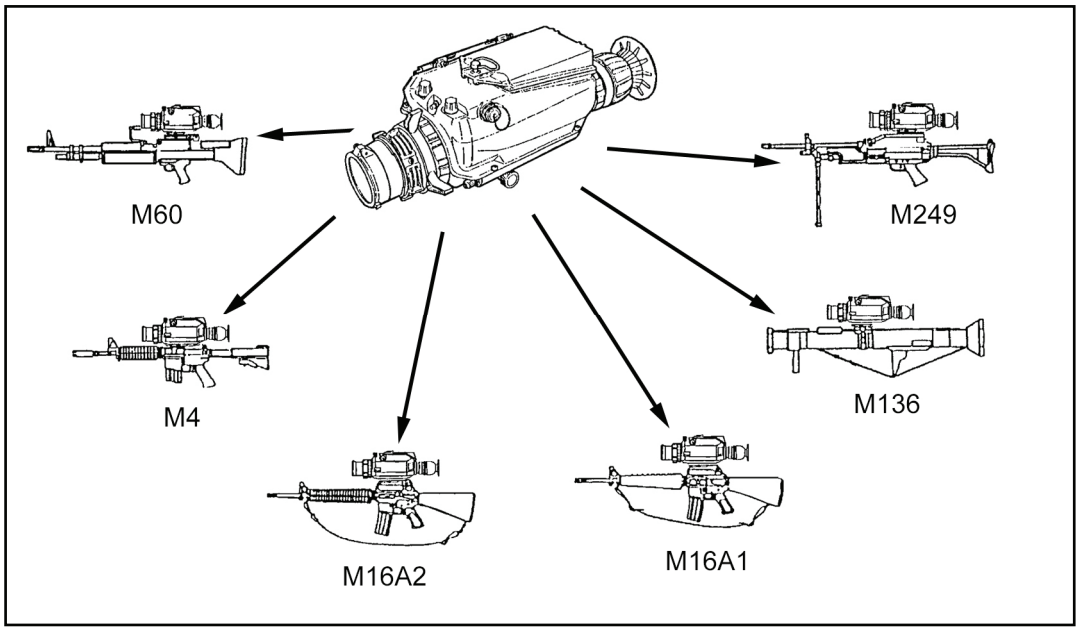


Figure F-15. MWTS.

Telescope

F-24. The telescope receives IR light emitting from an intended target and its surroundings. The telescope magnifies and projects the IR light onto the scanner on the basic sensor (Figure F-16).

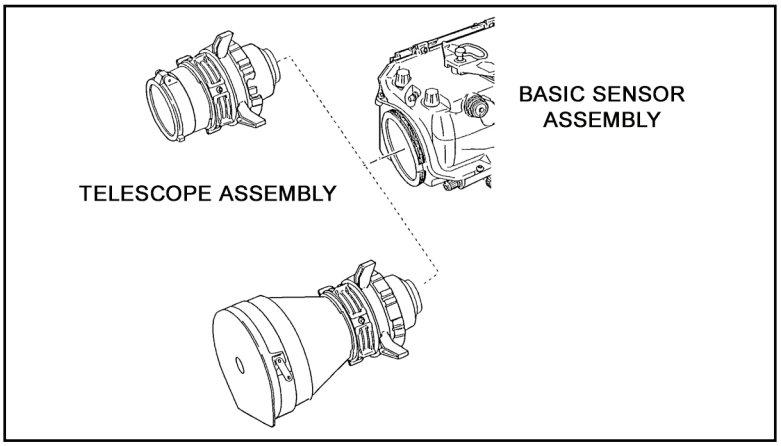


Figure F-16. TWS configurations.

Basic Sensor

F-25. The scanner reflects the IR light received from the telescope onto the detective assembly. The detective assembly senses the IR light and converts it to video. The sensor's electronics condition the video for display on the LED array. The LED array illuminates the IR image along with the reticle. The light from the LED array is reflected off the scanner to form an image at the eyepiece.

TECHNICAL DATA

F-26. The technical data for the MWTS are as follows:

- Field of view (FOV) (FOV is halved in zoom mode):
  - Narrow: 9 degrees.
  - Wide: 15 degrees.
- Telescope magnification (Telescope magnification is doubled in zoom mode):
  - Narrow FOV: 3.3X.
  - Wide FOV: 2.0X.
- Dimensions:
  - Length: 15.5 inches.
  - Width: 6.25 inches.
  - Height: 6.25 inches.
  - Weight: 4.1 pounds.
- Power consumption:
  - ON mode: 12.0 watts.
  - STANDBY mode: 5.5 watts.
- Battery life (BA 5347 at 62 degrees F):
  - 71% STANDBY mode: 12 hours.
  - EMERGENCY mode: 6.5 hours.

OPERATION

F-27. The TWS has three modes of operation: STANDBY, ON, and EMERGENCY.

STANDBY Mode

F-28. When the system is first turned on, the TWS begins a cool down period of approximately two minutes. After the cool down period, the TWS enters the STANDBY mode. During the STANDBY mode, power is not applied to the scanner or display in order to extend the life of the battery.

ON Mode

F-29. When the TWS is in the STANDBY mode and pressure is applied to the eyecup, the TWS switches to the ON mode, and a switch engages to provide power to the scanner and display. After a three-second delay, the system is fully operational.

EMERGENCY Mode

F-30. When switched to the EMERGENCY mode, the TWS continuously applies power to the entire system. This allows the operator to bypass the three-second delay experienced when switching from the STANDBY to the ON mode. Since power is applied to the entire system while in the emergency mode, battery life is greatly reduced.

Controls and Indicators

F-31. Controls and indicators are as shown in Figure F-17.

- The BRIGHTNESS CONTROL is a nine-position rotary switch with an off detent position (turned fully counterclockwise). The purpose is to turn the system on or off and adjust the brightness of the eyepiece display.
- The CONTRAST CONTROL adjusts the contrast of the thermal image displayed on the raster. It has an automatic and a manual mode.

- The FOCUS RING adjusts the telescope focus from 20 meters to infinity. It requires a manual adjustment and affects both the wide and narrow FOV.
- The FIELD OF VIEW RING is located on the telescope. It has a wide and a narrow FOV. The wide FOV is for using low magnification during target detection, and the narrow FOV is for using high magnification during recognition and engagement.
- The RETICLE SELECT SWITCH selects one of the available reticles depending on the TWS model (medium or heavy). It must be held for two seconds to enable reticle changes. After two seconds, release the switch to cycle to the next reticle. This control is disabled after ten seconds of inactivity.
- The RETICLE ADJUST SWITCH adjusts the reticle aiming features in azimuth and elevation. It is used during zeroing, and it must be held for two seconds to allow changes to be made. After two seconds, each press moves the reticle aiming features one increment. This control is also disabled after ten seconds of inactivity.
- The BLACK/WHITE POLARITY SWITCH selects the polarity of the thermal image displayed on the raster. The initial setting is "white hot." The polarity switch affects the appearance of the target.
- The DIOPTER FOCUS RING adjusts the focus of the raster and indicators to the operator's eye. It ranges from +2 to -6 diopters.

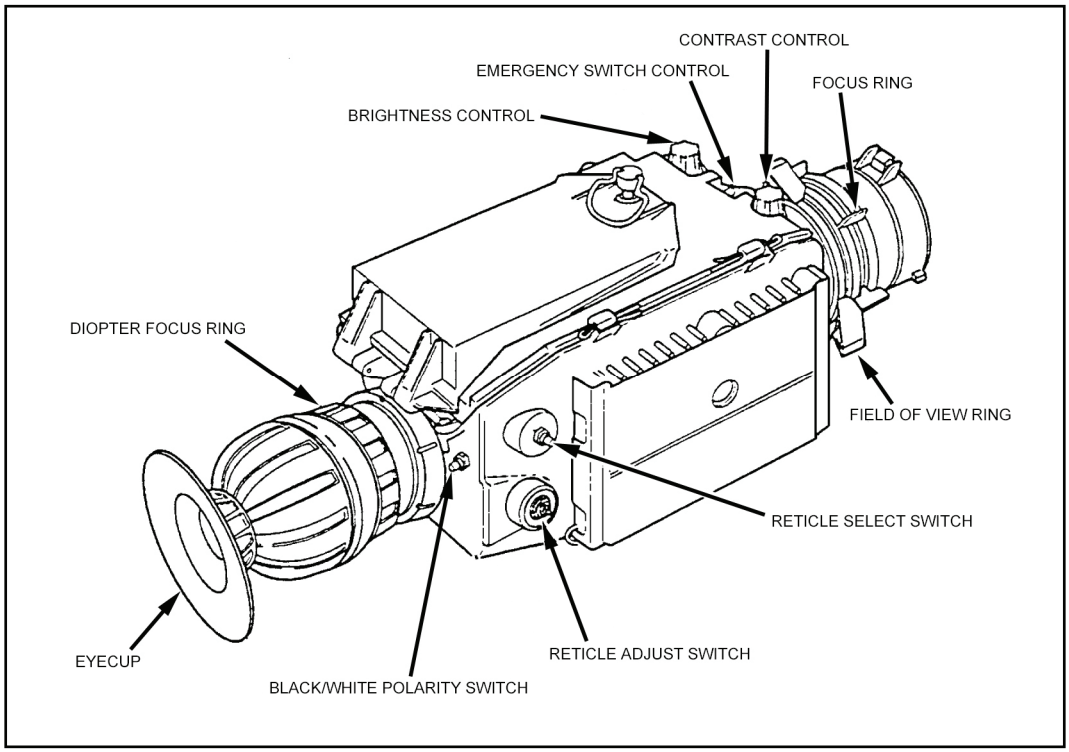


Figure F-17. TWS controls and indicators.

- The display of the TWS (Figure F-18, page F-14) is divided into two portions: the status indicator and the raster. The status indicator indicates low battery, polarity of raster (black hot or white hot), emergency mode selection, system not cooled, zoom, and FOV selected. Displayed on the raster are the thermal scene, reticle zeroing position, and reticle identifier. The TWS provides various reticles corresponding to the systems it is used with. It also provides a reticle for WFV and NFOV.

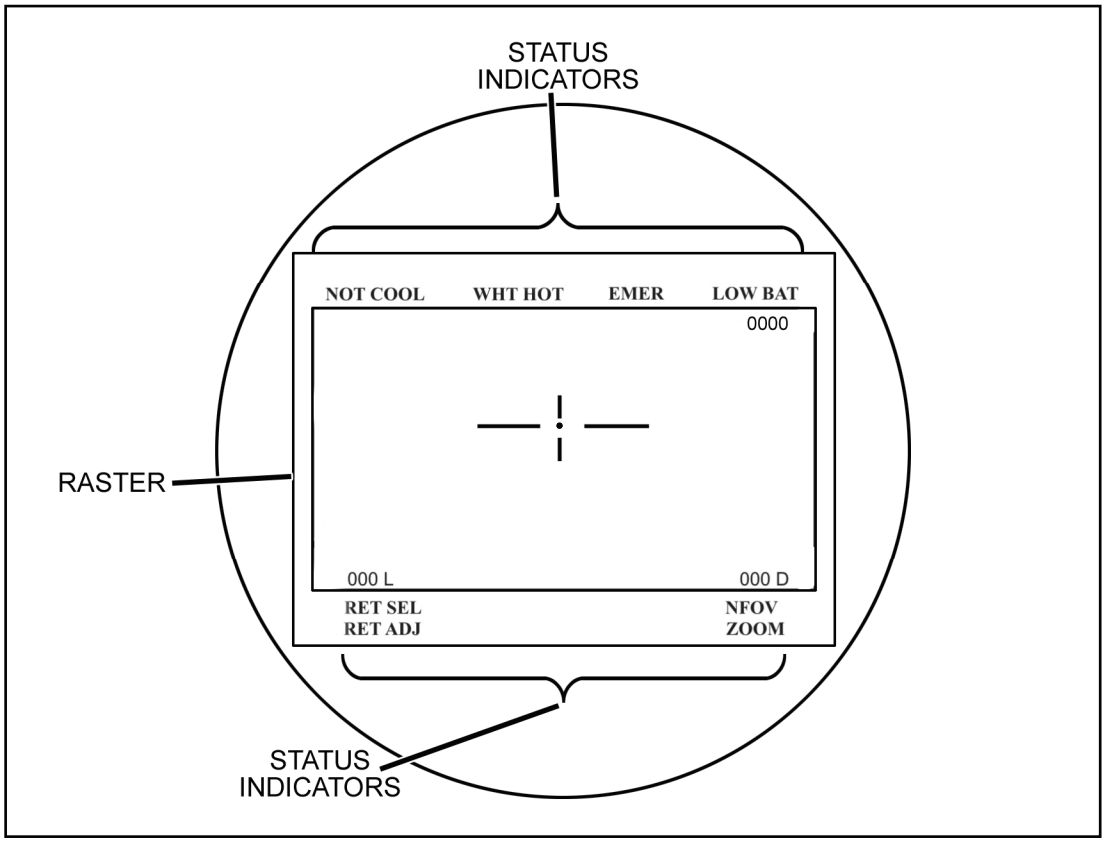


Figure F-18. TWS display.

- Figure F-19 shows the MWTS reticles with respect to weapon application and FOV.

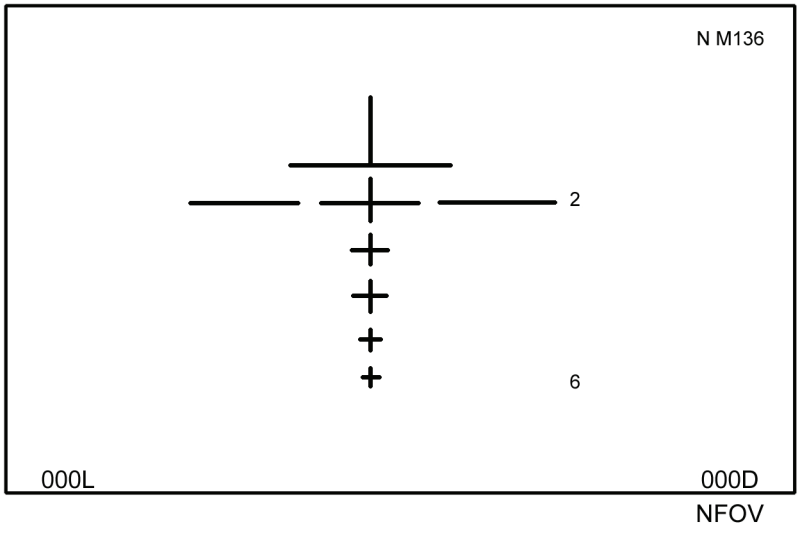
Weapon	FOV	Reticle
M1362 Rocket Launcher	Narrow	

Figure F-19. MWTS reticles.

- The M136 reticles provide multiple aim points used for range estimation and target firing (Figure F-20). Each aim point is used at a different range. The range for specific aim points is indicated at the side of the aim point (the number represents 100-meter increments: for example, 3=300 meters). Each aim point is separated by a range of 100 meters. The vertical line of an aim point reflects the width of a 10-foot tank at the specified range. The firing point of each aim line is the point of intersection of the vertical and horizontal lines.

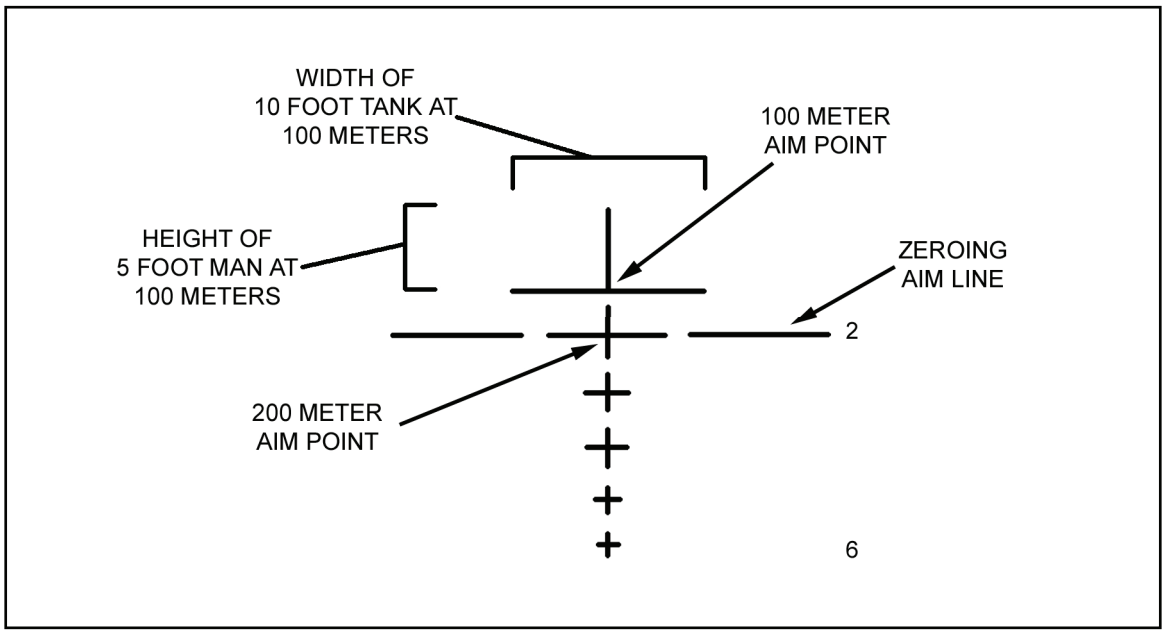


Figure F-20. M136 aim point.

M136 AT4, M287 SUBCALIBER TRACER TRAINER SIGHT ALIGNMENT PROCEDURES, LIMITED VISIBILITY

F-32. The fundamentals of marksmanship are the same as during the daytime with two exceptions. When using aided vision devices, the firer should hold the mounting bracket with the left hand. This method provides greater stability and helps to balance the M136 AT4 against the added weight of the sight. When aiming the M136 AT4, remember to aim by placing the infrared aiming light center mass on the target.

WARNING

When firing the M136 AT4, do not place your face within 3 inches of the mounted sight. The recoil of the M136 AT4 could cause injury to you or damage to the equipment.

- Select a stable position for the weapon.
- Open the M136 AT4 front and rear sight covers. During limited visibility conditions, the 7-millimeter peephole may be necessary for zeroing.
- Set the rear sight for 200 meters and choose the appropriate scenario.
  - Place a 25-meter zero target with a predetermined offset at 10 meters and align the weapon's fixed sight to coincide with the 4-centimeter aiming point of the zero target.
  - Select a suitable target at 200 meters and align the weapon's fixed sight center mass of the target.

- Turn on the infrared aiming light. Use the AN/PVS-7B or AN/PVS-14 to observe the infrared aiming light (without moving the weapon).
- Adjust the infrared aiming light so that it coincides with the 2-centimeter offset aiming point of the 25-meter zero target. If the 200-meter method is used, adjust the aiming point of the mounted sight to coincide center mass on the 200-meter target.
- Repeat the procedure until the aiming light is sight aligned to the weapon by adjusting the controls on the AN/PAQ-4C.

Note. Use the same procedures to conduct sight alignment of the AN/PEQ-2.

F-33. Conduct a preventive maintenance inspection before the instructional and qualification tables are fired. Once the Soldiers have completed Tables I and III (day tables), they receive additional instruction on the use of aided vision devices for night operations.

- ***Table I (Instructional Day)***. This scenario consists of 12 targets from 100 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged.
- ***Table II (Instructional Night)***. This scenario consists of 12 targets from 150 to 300 meters. The standard to proceed to the next table is 6 out of 12 targets successfully engaged at night.
- ***Table III (Qualification Day)***. This scenario consists of 8 targets from 125 to 300 meters. The standard to proceed to the next table is 6 out of 8 targets successfully engaged.
- ***Table IV (Qualification Night)***. This scenario consists of 6 targets from 125 to 300 meters. The standard to proceed to the next table is 4 out of 6 targets successfully engaged.

F-34. The night sustainment training strategy should be conducted over a one-day time frame and consists of the following:

- ***Night Vision Goggles Familiarization Training***. Soldiers receive instruction on the proper use and fit of night vision goggles, to include characteristics and capabilities, maintenance, and mounting procedures.
- ***Infrared Aiming Light Familiarization Training***. Soldiers boresight the weapon and aided vision device at a range of 10 meters.
- ***Fundamentals of Firing (Body Position with Head Harness and NVD, Foxhole and Prone)***. Soldiers review and practice firing positions and fundamentals of marksmanship and any changes that may occur by use of the infrared aiming device.
- ***Weapon and Equipment Pre-combat Inspection***. The weapon and infrared aiming device is inspected and properly mounted. Inspect to ensure that the infrared aiming device is mounted securely to the mount and that the mount is tightly secured to the weapon. A review of clearing or misfire procedures is important.
- ***Infrared Aiming Light Boresight to Weapon***. Each Soldier must boresight the weapon and infrared aiming device at a range of 10 meters. If a bore light is not available, then zero the weapon and sight by using the specified zeroing procedure for that weapon/sight combination.

Glossary

AC	Active Component
ANCOC	Advanced Noncommissioned Officer Course
AN/PVS	Army Navy passive vision sight
appliqué	to affix to a larger surface; to put to or adapt for special use
ARTEP	Army Training and Evaluation Program
backblast	the backward blast created by igniting the propellant in a weapon designed to be as recoilless as possible
blast	an explosive or violent detonation that produces a direct effect on its target in addition to radiant heat and overpressure at its point of origin
BMP	a type of non-U.S. tracked fighting vehicle built by the former Soviet Union
BNCOC	Basic Noncommissioned Officer Course
BRDM	a type of non-U.S. scout car built by the former Soviet Union
BTR	a type of non-U.S. wheeled personnel carrier built by the former Soviet Union
C	Centigrade
CBRN	chemical, biological, radiological, and nuclear
CS	combat support
CSS	combat service support
DA	Department of the Army
dB	decibel
DKIE	decontamination kit individual equipment
DOD	Department of Defense
DS	direct support
F	Fahrenheit
FHT	field handling trainer
fps	feet per second
FTX	field training exercise
HE	high-explosive
HEAT	high-explosive antiarmor
HELLFIRE	heliborne laser fire and forget (a missile system)
HWTS	heavy weapon thermal sight
IAW	in accordance with
IET	initial entry training
IR	infrared

kmph	kilometers per hour
LAW	light antiarmor weapon
LED	light-emitting diode
m	meter(s)
METL	mission-essential task list
MILES	Multiple Integrated Laser Engagement System
mm	millimeter(s)
MMTT	manned moving target tank
MOPP	mission-oriented protective posture
MOUT	military operations on urbanized terrain
mph	miles per hour
mps	meters per second
MTP	mission training plan
MWTS	medium weapon thermal sight
NA	not applicable
NATO	North Atlantic Treaty Organization
NCO	noncommissioned officer
NSN	national stock number
NVD	night vision device
OIC	officer in charge
overpressure	increased atmospheric pressure (positive overpressure), followed by a wave of decreased atmospheric pressure (negative overpressure), produced around the origin of an explosive or violent detonation
PLDC	Primary Leadership Development Course
PMI	preliminary marksmanship instruction
POI	program of instruction
promethium	a radioactive metallic element of the rare-earth group used to illuminate range markings on the front sight of the M72A2/A3 LAW
RC	Reserve Component
RPG	rocket-propelled grenade (non-U.S.)
SMAW-D	shoulder-launched multipurpose assault weapon-disposable
SMCT	Soldier's Manual of Common Tasks
SOP	standing operating procedure

spall	small fragment or chip
STP	soldier training publication
STRAC	Standards in Training Commission
STX	situational training exercise
TOC	tactical operations center
TP	training-practice
TPIAL	target pointer/illuminator/aiming light, AN/PEQ-2A
TRADOC	(U.S. Army) Training and Doctrine Command
TRC	track (as used in STRAC manual)
TRP	target reference point
TSC	Training Support Center
TWS	thermal weapon sight

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References

REFERENCE SOURCES USED

These are the sources quoted or paraphrased in this manual.

TM 9-1055-886-12&P, Operator and Unit Maintenance Manual for M287 9-mm Tracer Bullet Training Device. 25 October 1989.

TM 9-1315-886-12, Operator's and Unit Maintenance Manual for Launcher and Cartridge, 84 Millimeter: M136 (AT4). 15 May 1990.

TM 9-1340-214-10, Operator's Manual for 66-mm Light Antitank Weapon (LAW) System M72A1, M72A2 with Coupler, M72A3, and Practice Rocket Launcher M190 with M73 Practice Rocket. 31 May 1991.

TM 9-1340-228-10, Operator's Manual for Rocket and Launcher Assembly, 83 Millimeter: HEDP (SMAW-D), SM141. 1 September 2002.

TM 11-5855-213-10, Operator's Manual for Night Vision Sight, Individual-Served Weapon AN/PVS-4. 1 February 1993.

TM 11-5855-213-23&P, Unit and Direct Support Maintenance Manual for Night Vision Sight, Individual-Served Weapon, AN/PVS-4. 1 June 1993.

TM S8970-AA-TRN-010, Technical Manual and Operator's Manual for M72AS 21-mm Trainer System. 15 November 2002.

TM SW370-BW-WSI-010, Operator's Manual for Lightweight Antiarmor Weapon System, M72A5 and M72A7, 66mm. 30 August 2000.

DOCUMENTS NEEDED

These documents must be available to the intended users of this publication.

DA Form 7323-R, M72-Series Law Scorecard.

DA Form 7324-R, M136 AT4 Scorecard.

DA Pamphlet 350-38, Standards in Weapons Training. 01 October 2002.

DOD 5100.76-M, Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives. 03 February 1983.

GTA 7-2-5, Sight Engagement Trainer, M136 AT4 (Parts 1 and 2). 02 January 1990.

GTA 17-2-13, Armored Vehicle Recognition. 01 May 1987.

STP 7-11B1-SM-TG, Soldier's Manual and Trainer's Guide, MOS 11B, Infantry, Skill Level 1. 28 May 2004.

STP 21-1-SMCT, Soldier's Manual of Common Tasks, Skill Level 1. 31 August 2003.

TC 90-1, Training for Urban Operations. 01 April 2002.

READINGS RECOMMENDED

These readings contain relevant supplemental information.

AR 190-11, Physical Security of Arms, Ammunition, and Explosives. 12 February 1998.

AR 385-63, Range Safety. 19 May 2003.

FM 3-06.11, Combined Arms Operations in Urban Terrain. 28 February 2002.

FM 3-5, NBC Decontamination. 28 July 2000.

FM 3-21.71, Mechanized Infantry Platoon and Squad (Bradley). 20 August 2002.

FM 5-250, Explosives and Demolitions. 30 July 1998.

FM 7-1, Battle Focused Training. 15 September 2003.

FM 7-7, The Mechanized Infantry Platoon and Squad (APC). 15 March 1985.

FM 7-8, Infantry Rifle Platoon and Squad. 22 April 1992.
FM 20-3, Camouflage, Concealment, and Decoys. 30 August 1999.
FM 90-5, Jungle Operations. 16 August 1982.

INTERNET WEBSITES

Reimer Digital Library, http://www.adtdl.army.mil
Army Publishing Directorate, http://www.usapa.army.mil

Index

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M72-SERIES LAW SCORECARD

For use of this form, see FM 3-23.25; the proponent agency is TRADOC.

NAME: _____ DATE: _____

GRADE: _____ RATING: _____ UNIT: _____

WEATHER (Check one) ☐ CLEAR ☐ RAIN ☐ FOG ☐ SNOW

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
I	Instructional DAY	Stationary	1	125 to 150	Standing	___	___
			2	150 to 175	Kneeling	___	___
			* 3	150 to 200	Sitting	___	___
			* 4	125 to 150	Prone	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
II	Instructional DAY	Moving	1	100 to 200	Standing	___	___
			2	100 to 200	Sitting	___	___
			* 3	100 to 200	Kneeling	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
III	Instructional NIGHT	Stationary	1	100 to 150	Kneeling	___	___
			2	100 to 150	Sitting	___	___
			* 3	100 to 150	Sitting	___	___
					Table Subtotals	___	___

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

* Firer must wear a protective mask when firing this round.

CONSOLIDATED SCORES

FIRER'S SIGNATURE _____ DATE _____ TOTAL MISSES _____

SCORER'S SIGNATURE _____ DATE _____ RANK _____

RANGE OIC'S SIGNATURE _____ DATE _____ RANK _____

INSTRUCTOR NOTES

ALL FIRING TABLES

- Do not announce the ranges to targets.
- Fire all engagements in sequence.

M136 AT4 SCORECARD

For use of this form, see FM 3-23.25; the proponent agency is TRADOC.

NAME: _____ DATE: _____

GRADE: _____ RATING: _____ UNIT: _____

WEATHER (Check one) ☐ CLEAR ☐ RAIN ☐ FOG ☐ SNOW

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
		Stationary	1	150 to 200	Kneeling	____	____
		Stationary	* 2	150 to 200	Kneeling	____	____
		Stationary	3	250 to 300	Sitting	____	____
		Stationary	4	250 to 300	Sitting	____	____
I	Instructional Day	Stationary	5	125 to 150	Prone	____	____
		Stationary	6	125 to 150	Prone	____	____
		MMTT/MAS	7	150 to 200	Kneeling	____	____
		MMTT/MAS	* 8	150 to 200	Kneeling	____	____
		MMTT/MAS	9	200 to 250	Standing	____	____
		MMTT/MAS	*10	200 to 250	Fighting position, unsupported	____	____
		MMTT/MAS	11	250 to 300	Kneeling	____	____
		MMTT/MAS	12	250 to 300	Kneeling	____	____
					Table Subtotals	____	____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
		Stationary	1	125 to 150	Prone	____	____
		Stationary	2	125 to 150	Prone	____	____
		Stationary	* 3	150 to 200	Sitting	____	____
		Stationary	4	150 to 200	Sitting	____	____
		Stationary	5	250 to 300	Kneeling	____	____
II	Instructional Night	Stationary	6	250 to 300	Kneeling	____	____
		MMTT/MAS	7	125 to 150	Standing	____	____
		MMTT/MAS	8	125 to 150	Standing	____	____
		MMTT/MAS	* 9	200 to 250	Kneeling	____	____
		MMTT/MAS	10	200 to 250	Kneeling	____	____
		MMTT/MAS	11	150 to 200	Standing	____	____
		MMTT/MAS	12	150 to 200	Fighting position, unsupported	____	____
					Table Subtotals	____	____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

* Firer must wear a protective mask when firing this round.

INSTRUCTOR NOTES	
ALL FIRING TABLES	• Do not announce the ranges to targets. • Fire all engagements in sequence. • Fire Table I before Table III; fire Table II before Table IV.
FIRING TABLES III AND IV	• Ensure no one fires at front or rear of a manned moving tank target. • Total hits and misses, and enter results in the consolidated scores block on the back of this scorecard.

M136 AT4 SCORECARD

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
III	Qualification Day	Stationary	1	125 to 150	Standing	____	____
		Stationary	2	150 to 200	Kneeling	____	____
		Stationary	* 3	200 to 250	Sitting	____	____
		Stationary	4	250 to 300	Sitting	____	____
		MMTT/MAS	5	125 to 150	Kneeling	____	____
		MMTT/MAS	6	150 to 200	Fighting position, unsupported	____	____
		MMTT/MAS	* 7	200 to 250	Sitting	____	____
		MMTT/MAS	8	250 to 300	Kneeling	____	____
					Table Subtotals	____	____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
IV	Qualification Night	Stationary	* 1	125 to 150	Standing or Prone	____	____
		Stationary	2	200 to 250	Kneeling	____	____
		Stationary	3	250 to 300	Sitting	____	____
		MMTT/MAS	4	150 to 200	Sitting	____	____
		MMTT/MAS	* 5	125 to 150	Kneeling	____	____
		MMTT/MAS	6	200 to 250	Fighting position, unsupported	____	____
					Table Subtotals	____	____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

TABLE	TYPE OF FIRE	TYPE OF TARGET	ROUND	RANGE (M)	FIRING POSITION	HIT	MISS
V	Advanced Instructional Day	Stationary	1	150 to 200	Sitting/Sequence	____	____
		Stationary	2	200 to 250	Sitting/Sequence	____	____
		Stationary	3	125 to 150	Kneeling/Pair	____	____
		Stationary	4	250 to 300	Kneeling/Pair	____	____
		MMTT/MAS	5	150 to 200	Kneeling/Volley	____	____
		MMTT/MAS	* 6	150 to 200	Sitting/Volley	____	____
					Table Subtotals	____	____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

* Firer must wear a protective mask when firing this round.

QUALIFICATION CRITERIA -- BASED ON TOTAL HITS FOR TABLES III AND IV

FIRST CLASS . . . . . 13 HITS
SECOND CLASS . . . . . 11 HITS
THIRD CLASS . . . . . 9 HITS
UNQUALIFIED . . . . . FEWER THAN 9 HITS

CONSOLIDATED SCORES

INSTRUCTIONAL TOTALS (TABLES I AND II): HITS ____ MISSES ____ CLASS RATING, TABLES I AND II: _____

QUALIFICATION TOTALS (TABLES III AND IV): HITS ____ MISSES ____ OVERALL TOTALS HITS _____ MISSES _____

FIRER'S SIGNATURE _____ DATE _____ SCORER'S SIGNATURE _____ DATE _____

RANGE OIC'S SIGNATURE _____ RANK _____ DATE _____

FM 3-23.25
31 JANUARY 2006

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army
0601007

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