TC 3-23.30

GRENADES AND PYROTECHNIC SIGNALS

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Grenades and Pyrotechnic Signals

Contents

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Preface

The purpose of this training circular (TC) is to orient Soldiers to the functions and descriptions of hand grenades and pyrotechnic signals. It also provides a guide for the proper handling and throwing of hand grenades and pyrotechnic signals, suggests methods and techniques for the tactical employment of hand grenades and pyrotechnic signals, and provides a guide for leaders conducting hand grenade and pyrotechnic signal training.

To lead the trainer through the material needed to conduct training during initial entry training (IET) and unit sustainment training, the publication provides the material divided into three main areas:

(1) Chapters 2 and 3 contain information about each munition.

(2) Chapter 4 covers training standards and qualification requirements.

(3) Chapter 5 discusses employment considerations for grenades and pyrotechnic signals.

Additional subjects include hand grenade and pyrotechnic signal capabilities, mechanical training, and the fundamentals and principles of employing hand grenades and pyrotechnic signals.

This publication revision incorporates the deletion of references to obsolete material and the inclusion of references to new material. Additional changes consist of—

- Changes and updates to technical information, as reflected in the appropriate munition reference.
- Replacement of common terms with their accepted modifications.
- Changes to the hand grenade qualification scorecard.
- A training program that ensures live-fire applications are scheduled after the Soldier has demonstrated preliminary skills.

This publication prescribes DA Form 3517-R (*Hand Grenade Qualification Scorecard*).

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

Terms that have joint or Army definitions are identified in both the glossary and the text. Terms for which TC 3-23.30 is the proponent TC are indicated with an asterisk in the glossary.

The proponent for this publication is the United States Army Training and Doctrine Command (TRADOC). The preparing agency is the Maneuver Center of Excellence. You may send comments and recommendations by any means (U.S. mail, e-mail, fax, or telephone) as long as you use DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) or follow its format. Point of contact information is as follows:

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This manual depicts uniforms without camouflage for clarity of illustrations. For identification and ease of understanding, function steps, images may show individual actions without the use of gloves.

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

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Chapter 1
Introduction

Hand grenades and pyrotechnic signals rapidly degrade the enemy's detection, observation, and engagement capabilities, enhancing the maneuver and firepower capabilities of ground forces conducting dismounted operations inside restrictive terrain. They also provide the commander a nonlethal capability that contributes to increased protection.

This manual covers general purpose (GP) grenades and pyrotechnic signals. Soldiers employing hand grenades and pyrotechnic signals not covered in this manual should adhere to the storage, handling, and employment considerations set forth in this manual and in all associated technical manuals (TMs).

HAND GRENADES

1-1. Hand grenades play an instrumental role in increasing combat effectiveness and survivability. They can be used in all types of terrain and employed in most combat situations to—

- Eliminate the threat of enemy soldiers in the open and entrenched within fortified positions.
- Mark positions.
- Conceal operations.
- Surprise the enemy.
- Equalize the threat.
- Destroy or disable enemy equipment, when other weapons or munitions are not available or are in short supply.

1-2. The six types of hand grenades are:

- Fragmentation.
- Chemical.
- Offensive.
- Nonlethal.
- Smoke.
- Practice and training.

NOTE: The smoke grenade series of munitions meet both the definitions and the classification requirements for hand grenades and pyrotechnics devices. Refer to Chapter 3 for additional information on smoke grenades.

1-3. Each grenade offers a unique capability that provides the Soldier with various options to complete any given mission.

FRAGMENTATION GRENADES

1-4. Historically, the most important type of hand grenade is the fragmentation grenade. When used these grenades produce casualties by the high-velocity projection of fragments.

CHEMICAL GRENADES

1-5. Uses for chemical grenades include: incendiary purposes, screening, signaling, training, or riot control.

OFFENSIVE GRENADES

1-6. Offensive hand grenades (for example, concussion grenades) are much less lethal than fragmentation grenades on an enemy in the open, but they are effective against an enemy within a confined space.

NONLETHAL GRENADES

1-7. Uses for nonlethal grenades include diversionary purposes and nonlethal force. The design of nonlethal munitions is to incapacitate personnel while minimizing fatalities, permanent injury to personnel, and collateral damage to property and the environment.

SMOKE GRENADES

1-8. Ground smoke grenades/smoke signals are self-contained units used by ground Soldiers to signal aircraft, to convey information through a prearranged signal, or for screening the movement/activities of small units.

PRACTICE AND TRAINING GRENADES

1-9. Practice and training grenades are for training personnel in use, care, and handling of service grenades.

PYROTECHNIC SIGNALS

1-10. Pyrotechnics range from flares to signals to simulators. Pyrotechnic signals supplement or replace normal communication means, mark locations, chart enemy courses, and provide illumination for search and rescue missions.

1-11. The four types of pyrotechnic signals are:

- Communication signals.
- Trip flares.
- Simulated signals.
- Illumination ground signal kits.

COMMUNICATION SIGNALS

1-12. The two classifications of pyrotechnic communication signals are handheld signals and ground smoke signals. Both types of signals come in varied color patterns. Soldiers can use these patterns to coordinate troop movements and, in the case of an emergency, designate pick-up points.

TRIP FLARES

1-13. Use surface trip flares to—

- Provide early warning of infiltration of enemy troops or signaling.
- Illuminate an immediate area.
- Ignite fires.
- Force the enemy to withdraw.

SIMULATED SIGNALS

1-14. Some uses for pyrotechnic simulators are to provide early warning signals and to illuminate the immediate areas; however, the primary design is to imitate the sounds and effects of combat detonations during field training exercises.

ILLUMINATION GROUND SIGNAL KITS

1-15. The pen gun flare supports the small-unit leader in fire control, maneuver, and initiating operations such as ambushes. These signals are also a component of air crewmen's survival vest and used for distress signaling or to identify ground locations for aircraft.

PLANS AND PREPARATIONS FOR TRAINING AND COMBAT

1-16. The commander establishes basic and combat loads of hand grenades and pyrotechnic signals. The combat load is not a fixed quantity the situation dictates if the load requires alteration. Units vary the combat load depending upon the commander's analysis of the mission, enemy, terrain and weather, troops and support available, time available, civil considerations (METT-TC).

1-17. The factors for determining the combat load are—

- Unit's mission.
- Weight.
- Weapons tradeoff.
- Distribution.

UNIT'S MISSION

1-18. The most important factor in determining the combat load is the unit's mission, which influences the type and quantity of hand grenades or pyrotechnic signals needed.

WEIGHT

1-19. A hand grenade weighs close to one pound. Consequently, each grenade the Soldier carries adds a pound to his total load.

WEAPONS TRADEOFF

1-20. Soldiers cannot carry everything commanders would like them to take into battle. Commanders must consider the value of various weapons and munitions to determine which contribute the most to mission accomplishment.

DISTRIBUTION

1-21. Different types of hand grenades or pyrotechnic signals are required on all missions. Leaders should distribute the hand grenades and pyrotechnic signals selected for a mission among several Soldiers if not all of them. Further, leaders should distribute to each Soldier the hand grenades or pyrotechnic signals that are required for his assigned tasks.

EMPLOYMENT RULES

1-22. Before employing hand grenades or pyrotechnic signals, or when in areas where they are in use—

- Inspect all grenades and pyrotechnic signals for serviceability before use.
- Know where all friendly forces are located.
- Know the sector of fire.
- Ensure the projected arc of the grenade or pyrotechnic signal is clear of obstacles.

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Chapter 2

Hand Grenades

Hand grenades supplement the use of small arms against an enemy in close combat, and for nonlethal operations to temporarily stun enemy personnel. Proper control and safety procedures allow for safe employment of hand grenades.

NOTE: 1. Images may show individual actions without the use of gloves for identification and ease of understanding function steps.

2. In some locations leaders have used composite risk management (CRM) to determine, IET trainees are not required to use gloves due to the added risk in that environment. Units should make their determination based on their own METT-TC and CRM development.

2-1. The six types of hand grenades are fragmentation, chemical, offensive, nonlethal, smoke, and practice.

2-2. The smoke grenade series of munitions meet the definition of both hand grenades and as pyrotechnics. To limit duplication of information refer to Chapter 3 for smoke grenades.

NOTE: Introduction of the confidence clip (Figure 2-1) to the M67 fragmentation grenade requires additional training and familiarization before employment. The confidence clip has also been included on the M106 screening obscuration device – visual restricted terrain (SOD-Vr) and the M228 training practice fuze (TPF).

Figure 2-1. Confidence clip

PRACTICE HAND GRENADES

2-3. Practice hand grenades simulate the effects of other hand grenades so that there is a reduced chance of injury to personnel or damage to property when conducting training.

M69 TRAINING PRACTICE HAND GRENADE

2-4. Use the M69 training practice hand grenade (TPG) for all individual and collective training tasks. The M69 TPG (Figure 2-2) provides realistic training and familiarizes the Soldier with the functioning and characteristics of the M67 fragmentation hand grenade. Units may use the M69 TPG without the M228 TPF for additional and reinforcement training. Table 2-1 and Table 2-2 outline the M69 TPG's components and characteristics.

Figure 2-2. M69 TPG

Table 2-1. Components and characteristics of M69 TPG

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Hollow steel sphere.
Filler	None.
Fuze	None. (Uses the M228 TPF, see Table 2-2 for M228 TPF.)
Safety Features	None (see Table 2-2 for M228 TPF).
Total Weight	11.4 ounces (14 ounces with the M228 TPF).
Throwing Distance of Average Soldier	40 meters.
Fuze Delay	None (see Table 2-2 for M228 TPF).
Effects	None (see Table 2-2 for M228 TPF).
Colors and Markings	Light blue with white markings.

M228 Training Practice Fuze

2-5. During practice events and for qualification, each Soldier must throw several M69 TPG armed with the M228 TPF (Figure 2-3). Although it takes only about a minute or less to install or replace a used fuze, a company-size element uses several hundred; preparing practice grenades for all participants is not feasible. Give Soldiers instruction on installing and removing a fired M228 TPF.

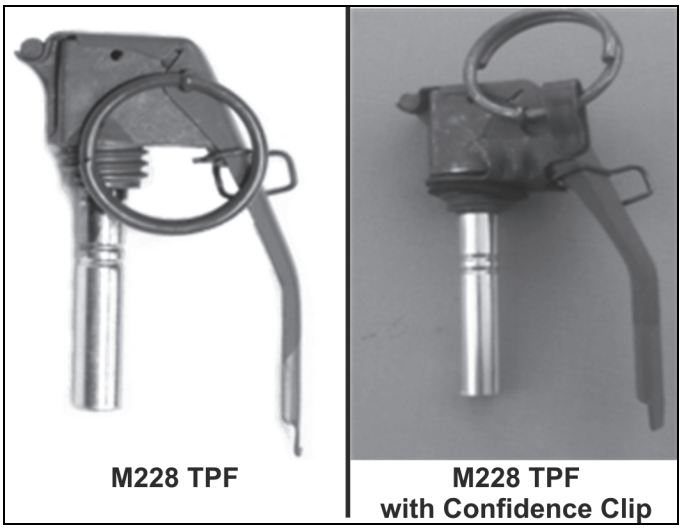

Figure 2-3. M228 TPF

NOTE: The difference between the two versions of the M228 TPF is that one has a confidence clip and the other does not.

Table 2-2. Components and characteristics of M228 TPF

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Zinc with steel safety lever.
Filler	Black Powder.
Fuze	Pyrotechnic delay-igniting fuze.
Safety Features	Safety clip. Safety pin and pull ring. Confidence clip if equipped. Safety lever.
Fuze Delay	4.0 to 5.5 seconds.
Total Weight	2.6 ounces.
Throwing Distance of Average Soldier	N/A
Effects	Small puff of white smoke and a loud popping noise.
Colors and Markings	Safety lever is blue with a brown tip and black markings.

NOTE: When using the M69 TPG, the training unit should request the M228 TPF with or without confidence clip for training. The M228 TPF to include all residues requires compliance with local ammunition guidance and turn in requirements. The M69 TPG is a reusable training device that generally does not require turn in as residue.

M69 Practice Hand Grenade Without Confidence Clip

M69 Practice Hand Grenade With Confidence Clip

Figure 2-4. The M69 TPG with M228 TPF

WARNING

Fuze fragments may exit the hole in the base of the grenade body and cause injuries.

NOTE: Replacing the M228 TPF allows for the repeated use of the M69 TPG.

Install

NOTE: The M228 TPF for the M69 TPG may be issued with or without a confidence clip attached.

2-6. To install the M228 TPF in the M69 TPG—

CAUTION

DO NOT hold or touch the fuze igniter. The igniter, made of light aluminum, has an explosive charge that if twisted can be damaged, and could cause injury to the hand.

(1) Grip the M69 TPG body with the nonthrowing hand, taking care to keep any part of the hand away from the firing port (nonthreaded end) of the grenade (Figure 2-5). While holding the body of the M69 TPG, turn the grenade so that the threaded end is facing inward and the firing port of the grenade is facing away from your body.

(2) Insert the M228 TPG into the threaded end of the M69 TPG, and turn the fuze or grenade body clockwise until the fuze and confidence clip (if attached) is secure.

WARNING

Keep all portions of the hand away from the M69 TPG firing port (nonthreaded end), when installing the M228 TPF, and when throwing the grenade. The fuze explosive charge can cause injury to the hand and fingers when it exits through the firing port.

Use standard issue leather gloves when replacing training fuzes to avoid personal injury if the fuze did not detonate.

Reports detail a rare occurrence of detonation that did not occur until removal of the training fuze.

CAUTION

The M228 TPF should be only finger-tight. DO NOT over-tighten the fuze. This could damage threads in the M69 body and the threaded end of the fuze.

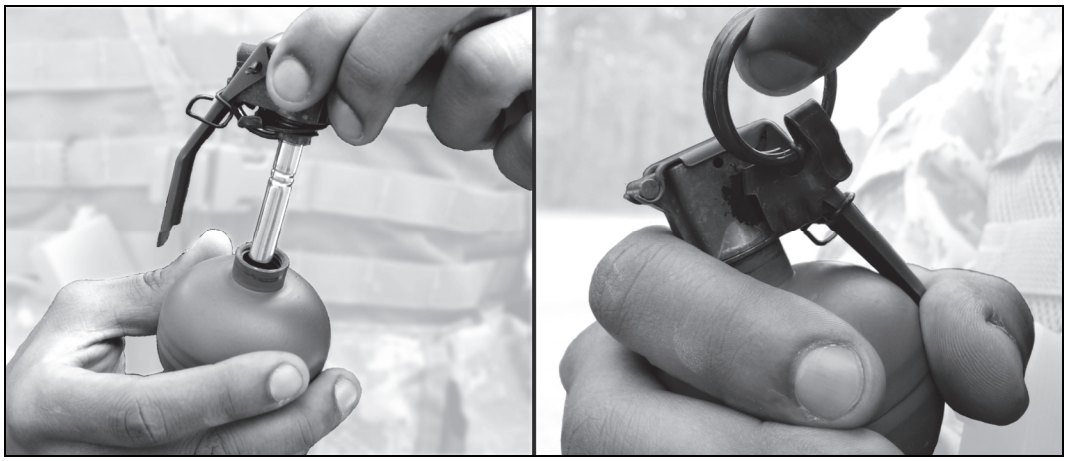

Figure 2-5. Insert the M228 TPF into the M69 TPG body (right hand)

NOTE: If the Soldier is a left-hand thrower, he inserts the fuze in the same manner as described above.

Remove

2-7. To remove a fired M228 TPF—

WARNING

Keep all portions of the hand away from the M69 TPG firing port (nonthreaded end) when removing a fired M228 TPF. Residue from an exploded fuze can cause lacerations to the hand and fingers.

Use standard issue leather gloves and wear eye protection when replacing training fuze to avoid personal injury if the fuze did not detonate.

Reports detail a rare occurrence of detonation that did not occur until removal of the training fuze.

(1) Grip the M69 TPG body with the nonthrowing hand, taking care to keep any part of the hand away from the firing port (nonthreaded end) of the grenade. While holding the M69 TPG body, turn the grenade so that the head of the fuze is facing inward and the firing port of the grenade is facing away from your body.

(2) Grip the head of the M228 TPF with the fingers of the throwing hand.

WARNING

Keep all portions of the hand and fingers away from the lower end of the M228 TPF after removing a fired fuze. Jagged edges of the exploded fuze end can cause lacerations to the hand and fingers.

(3) Turn the M228 TPF or grenade body counterclockwise until the fuze comes out.

(4) Dispose of the fuze according to the unit standard operating procedure (SOP).

M102 Practice Stun Hand Grenade

2-8. The M102 (Figure 2-6) is the reloadable trainer for the M84 stun hand grenade. It offers realistic characteristics of the M84 to assist in the training of missions, such as hostage rescue or capture of criminals, terrorists, or other adversaries. Table 2-3 outlines the grenade's components and characteristics. Table 2-4 outlines the M240 fuze components and characteristics.

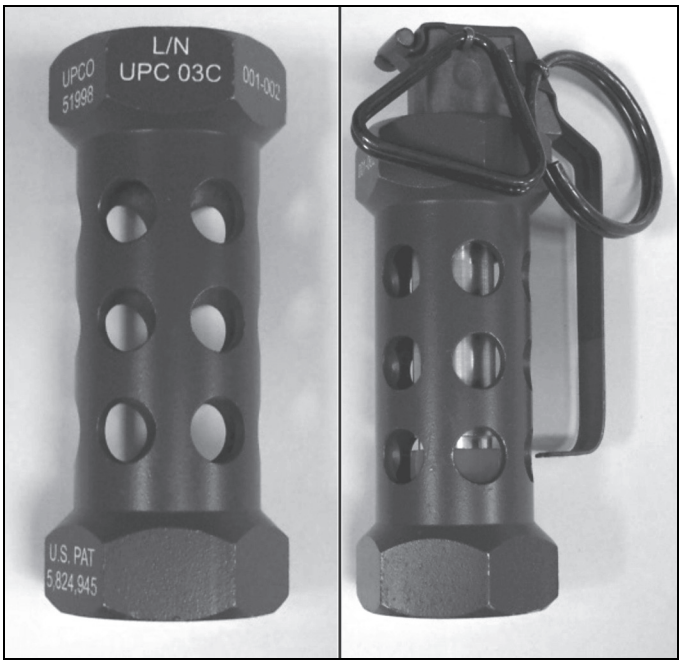

Figure 2-6. M102 practice stun hand grenade and M102 with M240 installed

Table 2-3. Components and characteristics of M102 practice stun grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	5.25 inches in length and 1.73 inches at the corner of the hexagon location, steel hexagon tube with 18 blast and flash release holes along the sides with a heavy steel, hexagon-shaped top and bottom portion.
Filler	None.
Fuze	None.
Safety Features	None.
Fuze Delay	None.
Total Weight	14.3 ounces.
Effects	None.
Colors and Markings	Light blue with white markings.

M240 Pyrotechnic Fuze (Training)

2-9. Prior to training, give Soldiers instructions on installing and removing a fired M240 fuze (Figure 2-7).

NOTE: Procedures for installing and removing the M240 fuze are the same as those used for the M228 TPF. For more information about these procedures, see the M228 TPF section of this chapter.

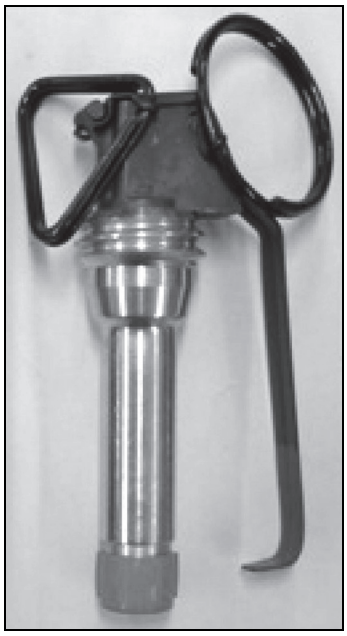

Figure 2-7. M240 pyrotechnic fuze (training)

Table 2-4. Components and characteristics of M240 pyrotechnic fuze (training)

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	The M240 pyrotechnic fuze (training) is 3.87 inches in length, with a red end cap.
Filler	Pyrotechnic Charge System.
Fuze	M201A2 type fuze.
Safety Features	Primary safety pin with circular pull ring. Secondary safety pin with triangular pull ring. Safety lever.
Fuze Delay	1.0 to 2.3 seconds.
Total Weight	5.0 ounces.
Effects	Stun charge that produces the flash and sound report. **NOTE:** After the M102 grenade has functioned, wait 5 minutes for the body to cool before conducting reloading procedures.
Colors and Markings	Light blue with a brown tip with red end cap.

WARNING

Fuze fragments may exit any of the 18 blast and flash release holes of the grenade body and cause injuries.

2-10. The M102 grenade can be used 25 times by replacing the M240 pyrotechnic fuze (training). After each use, inspect the grenade body for cracks; ensure the M240 fuze seats properly. The grenade body should be serviced according to TM 9-1330-200-12.

NOTES: 1. If damage is found, Do Not Use the grenade and turn in as unserviceable.

2. After the M102 grenade has functioned, wait 5 minutes for the body to cool before conducting reloading procedures.

FRAGMENTATION HAND GRENADES

2-11. Fragmentation hand grenades produce high-velocity projection of fragments.

M67 FRAGMENTATION HAND GRENADE

2-12. The M67 (Figure 2-8) is the most commonly used fragmentation hand grenade. Table 2-5 outlines the grenade's components and characteristics according to TM 9-1330-200-12 and TM 43-0001-29.

Figure 2-8. M67 fragmentation hand grenade

Table 2-5. Components and characteristics of M67 fragmentation grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Steel sphere with scored steel for fragmentation.
Filler	6.5 ounce of Composition B.
Fuze	M213.
Safety Features	Safety clip. Safety pin and pull ring. Safety lever. Confidence clip (if equipped).
Fuze Delay	4.0 to 5.5 seconds.
Total Weight	14 ounces.
Throwing Distance of Average Soldier	35 meters.
Effective Casualty-Producing Radius	15 meters.
Killing Radius	5 meters.
Colors and Markings	Olive drab green body with yellow markings.

WARNING

Although the killing radius of the M67 grenade is 5 meters and the casualty-producing radius is 15 meters, fragments can disperse as far as 230 meters.

OFFENSIVE HAND GRENADES

2-13. Offensive hand grenades (for example, concussion grenades) are much less lethal than fragmentation grenades on an enemy in the open, but they are effective against an enemy within a confined space.

MK3A2 OFFENSIVE HAND GRENADE

2-14. The MK3A2 offensive hand grenade (Figure 2-9) used for concussion effects in enclosed areas, for blasting, and for demolition tasks. When used in enclosed areas, the shock waves (overpressure) produced by this grenade are greater than those produced by the fragmentation grenade. It is, therefore, more effective against enemy soldiers located in bunkers, buildings, and fortified areas. Table 2-6 outlines the grenade's components and characteristics.

Figure 2-9. MK3A2 offensive grenade

Table 2-6. Components and characteristics of MK3A2 offensive grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Cylinder shape made of pressed fiber and contains high explosive TNT.
Filler	8 ounces of TNT.
Fuze	M201A1 MOD 2.
Safety Features	Safety pin pull ring. Safety lever. **NOTE:** Issued with or without a safety clip.
Fuze Delay	4.0 to 5.5 seconds.
Total Weight	15.6 ounces.
Throwing Distance of Average Soldier	40 meters.
Effective Casualty-Producing Radius	2 meters (in open areas).
Colors and Markings	Black with yellow markings around the middle.

WARNING

The MK3A2 grenade has an effective casualty-producing radius of 2 meters in open areas, but fragments and bits of fuze have a projected range as far as 200 meters from the detonation point.

NONLETHAL HAND GRENADES

2-15. Use of nonlethal grenades includes diversionary purposes and nonlethal force. The design of nonlethal munitions allows the ability to incapacitate personnel while minimizing fatalities, permanent injury to personnel, and collateral damage to property, and the environment.

M84 STUN GRENADE

2-16. The M84 stun grenade (Figure 2-10) is a nonlethal grenade used for diversionary or distraction purposes. Table 2-7 outlines the grenade's components and characteristics.

Figure 2-10. M84 stun grenade

Table 2-7. Components and characteristics of M84 stun grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	5.25 inches in length and 1.73 inches at the corner of the hexagon location, steel hexagon tube with 18 blast and flash release holes along the sides with a heavy steel, hexagon-shaped top and bottom portion.
Fuze	M201A1 type fuze (designed to be nonfragmenting).
Safety Features	Safety pin and primary circular pull ring. Safety pin and secondary triangular pull ring. Safety lever.
Fuze Delay	1.0 to 2.3 seconds.
Total Weight	14.8 ounces.
Throwing Distance of Average Soldier	40 meters.
Effects	Upon detonation, the M84 generates an intensive heat, a flash of over one million candlepower, and a bang that is 170 to 180 decibels at 5 feet. The flash may damage eyesight and night vision.
Effective Casualty-Producing Radius	The grenade can cause disorientation, confusion, ear injuries, and temporary loss of hearing within 9 meters and up to 3 seconds of flash blindness.
Colors and Markings	Olive drab with white markings, a pastel green band around the middle of the body, and a brown band on the tip end of the safety lever

CAUTION

Use stun grenades as field-expedient early warning devices only when in a combat environment.

WARNING

The M106 screening obscuration device – visual restricted terrain and the M84 stun hand grenade are similar in time delay and blast effects. Both grenades can cause serious personal injury to hands, eyes, and hearing. All users must wear appropriate hearing protection and exposure should be limited to two detonations per day.

CHEMICAL GRENADES

2-17. Chemical grenades used for incendiary purposes or riot control.

AN-M14 TH3 INCENDIARY HAND GRENADES

2-18. The AN-M14 TH3 incendiary hand grenade (Figure 2-11) used to destroy equipment or start fires. It can also damage, immobilize, or destroy vehicles, weapons systems, shelters, or munitions. Table 2-8 outlines the grenade's components and characteristics.

Figure 2-11. AN-M14 TH3 incendiary hand grenade

Table 2-8. Components and characteristics of AN-M14 TH3 incendiary hand grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Sheet metal.
Filler	26.5 ounces of thermite (TH3) mixture.
Fuze	M201A1.
Safety Features	Safety pin and pull ring. Safety lever.
Fuze Delay	0.7 to 2.0 seconds.
Total Weight	32 ounces.
Throwing Distance of Average Soldier	25 meters.
Effects	A portion of thermite mixture converts to molten iron, which burns at 4,330 degrees Fahrenheit. The mixture fuzes together the metallic parts of any object that it contacts. The thermite filler can burn through a 1/8-inch steel plate. It produces its own oxygen and burns under water.
Colors and Markings	Gray with purple markings with a single purple band (pre MIL-STD 709D Ammunition Color Coding Standards). Light red with black markings (according to MIL-STD 709D).

WARNING

Avoid looking directly at the incendiary hand grenade as it burns. The intensity of the light is hazardous to the retina and can cause permanent eye damage.

RIOT-CONTROL HAND GRENADE M7A3CS

2-19. The riot-control hand grenade (Figure 2-12) contains only CS fillers. Table 2-9 outlines the grenade's components and characteristics.

Figure 2-12. M7A3CS riot-control hand grenade

Table 2-9. Components and characteristics of M7A3CS riot-control hand grenades

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Sheet metal with four emission holes at the top and one at the bottom.
Filler	7.35 ounces of burning mixture and 4.5 ounces of CS pellets.
Fuze	M201A1.
Safety Features	Safety pin with pull ring. Safety lever.
Fuze Delay	0.7 to 2.0 seconds.
Total Weight	15.5 ounces.
Throwing Distance of Average Soldier	40 meters.
Effects	The M7A3 riot control grenade produces a cloud of irritant agent for 15 to 35 seconds.
Colors and Markings	Gray body with red bands and markings.

CAUTION

Riot-control grenades throw sparks up to 1 meter from emission, which can ignite vegetation and other flammable materials.

WARNING

DO NOT use a riot-control grenade in an enclosed area. If you must remain in the area, always wear a protective mask

INSPECTION

WARNING

Hand grenades—like any other weapon—require inspection before use and proper securing to avoid serious injury or death.

2-20. Soldiers should perform three types of inspections:

- Initial inspection.
- Before storing.
- Daily checks.

CAUTION

Observe precautions generally applicable to use of ammunition.

NOTE: See TM 9-1330-200-12 and TM 43-0001-29 for more information about hand grenade inspection. These inspections emphasize the M67 fragmentation grenade; however, all grenades with fuzes require inspection.

INITIAL INSPECTION

2-21. When shipped in bulk, hand grenades come secured in containers with either a factory or an ammunition supply point (ASP) seal (Figure 2-13). Personnel should inspect the shipping container upon receipt. DO NOT open damaged shipping containers; return them to the ASP or disposed of using the methods outlined in the unit SOP.

Initial inspection step 1

The hand grenade shipping container should be:

- Unopened (sealed with either a factory and/or ASP seal),

- Undamaged.

Figure 2-13. Hand grenade shipping container

2-22. Individual canisters house each grenade within the shipping container (Figure 2-14). Issue the hand grenades in their individual shipping canisters or unpacked and issue within the chain of command according to unit SOPs and local policies.

2-23. Upon removing the sealed individual canisters from the shipping container, personnel should inspect the canisters and identify any of the following discrepancies:

- Damage to the canister.
- Missing or tampered seal on the canister.

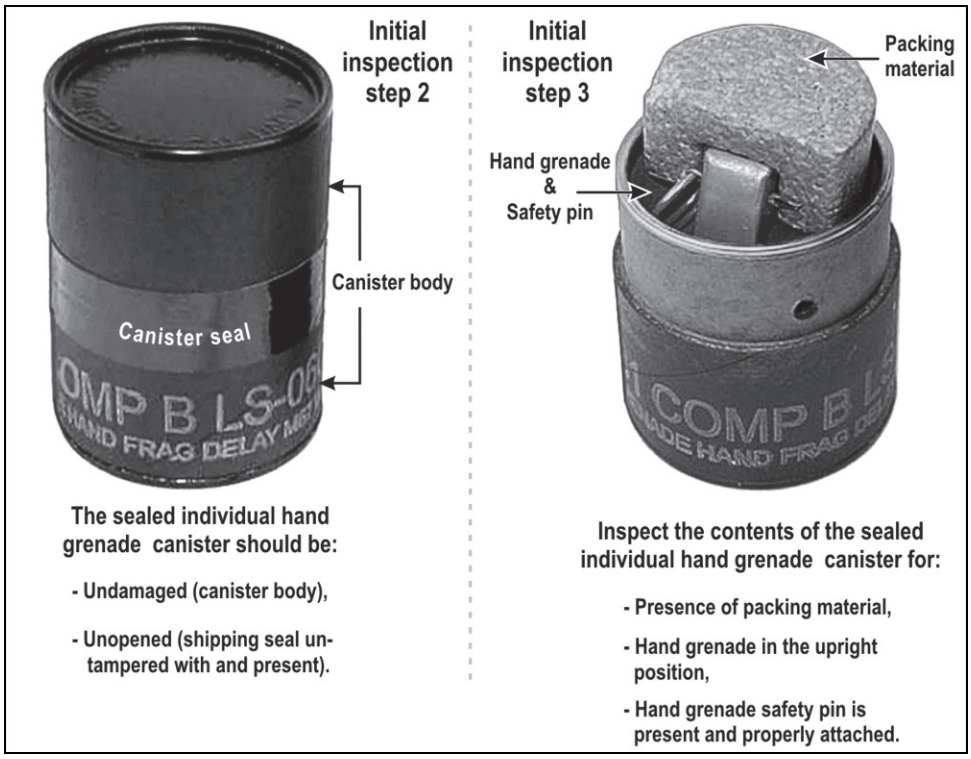

Figure 2-14. Hand grenade shipping canister with packing material

2-24. Personnel should open the canister. Once the canister has been opened but before removing the packing material (Figure 2-14), personnel should inspect the grenade and identify any of the following discrepancies:

- The hand grenade is upside down inside of the shipping canister.
- The safety pins are not properly attached or missing.

2-25. Personnel should then remove the packing material and the grenade from the canister. Once the packing material and the grenade has been removed from the canister (Figure 2-15), personnel should inspect the grenade and identify any of the following discrepancies:

- Rust is on the body or the fuze.
- Holes are visible in the body or the fuze.
- Fuze is tight, and there is no gap between the fuze and the grenade body.
- The safety level hinge ears (7, Figure 2-16) are present and seated under the fuze lug (6, Figure 2-16); the hinge ears should pass the fuze centerline and be pointing upward.

NOTE: If any of the discrepancies are found upon receipt of newly issued hand grenades, personnel should return the grenade and shipping canister to the issuing person or dispose of it according to the unit SOP.

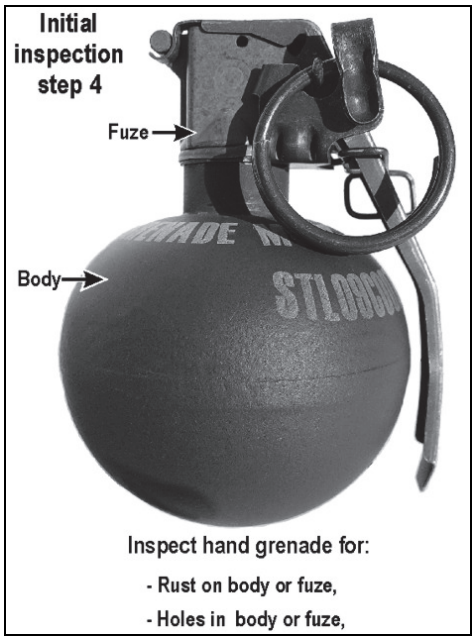

Figure 2-15. Hand grenade initial inspection

BEFORE STORING

2-26. Before securing the hand grenades in ammunition pouches, personnel should take the following safety precautions:

- Inspect grenades to ensure all safety devices are present (Figure 2-16):
  - Safety pin (1) with pull ring and confidence clip (2) (if present).
  - Safety clip (3).
  - Safety lever (4).
- Ensure all the safety devices are intact and serviceable.
- Check the grenade fuze for tightness. Fuzes must tightly fit within the grenade body (5).

WARNING

Never remove the fuze from a live grenade.

- Ensure the lever is not bent or broken.
- Check the body for rust or dirt.

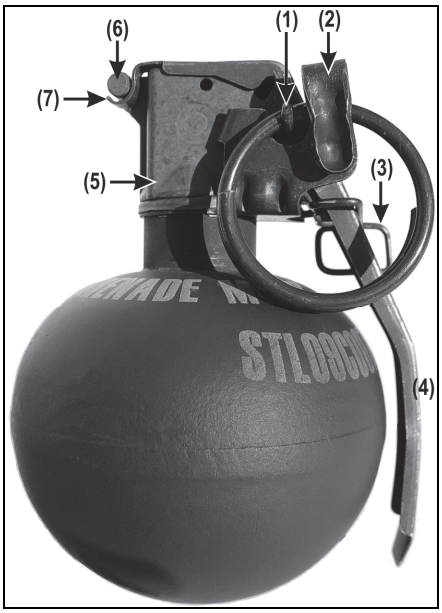

Figure 2-16. Hand grenade with safety clip installed

Safety Clip Installation

NOTE: It is possible to remove and reattach a safety clip to a hand grenade if the safety pin is still in place.

2-27. Hand grenades equipped with a safety clip, which prevents the fuze safety lever from springing loose, may come loose during shipping, or when stowing or removing from the grenade carrying pouch. When installed correctly, the safety clip secures the grenade safety lever if the safety pin assembly is accidentally removed.

NOTE: Not all hand grenades have safety clips. See TM 9-1330-200-12 and TM 43-0001-29 for more information about the types of grenades that require and do not require a safety clip.

2-28. Upon the removal of the hand grenades from their shipping canister, personnel must ensure that the safety clip is present and install a safety clip, if required. The safety clip is adaptable to the M33- and M67-series grenades, the MK3 grenade, and the M228 TPF.

NOTE: It is possible to procure, safety clips for some types of grenades through Class V ammunition supply channels (NSN 1330-00-183-5996).

2-29. To install a safety clip (Figure 2-17)—

(1) Hold the fuzed grenade in the palm of your hand with the pull ring up.

(2) Insert the small loop at the open end of the safety clip into the slot of the fuze body beneath the safety lever.

(3) Press the clip across the safety lever until the closed end of the clip touches the safety lever and snaps securely into place around it.

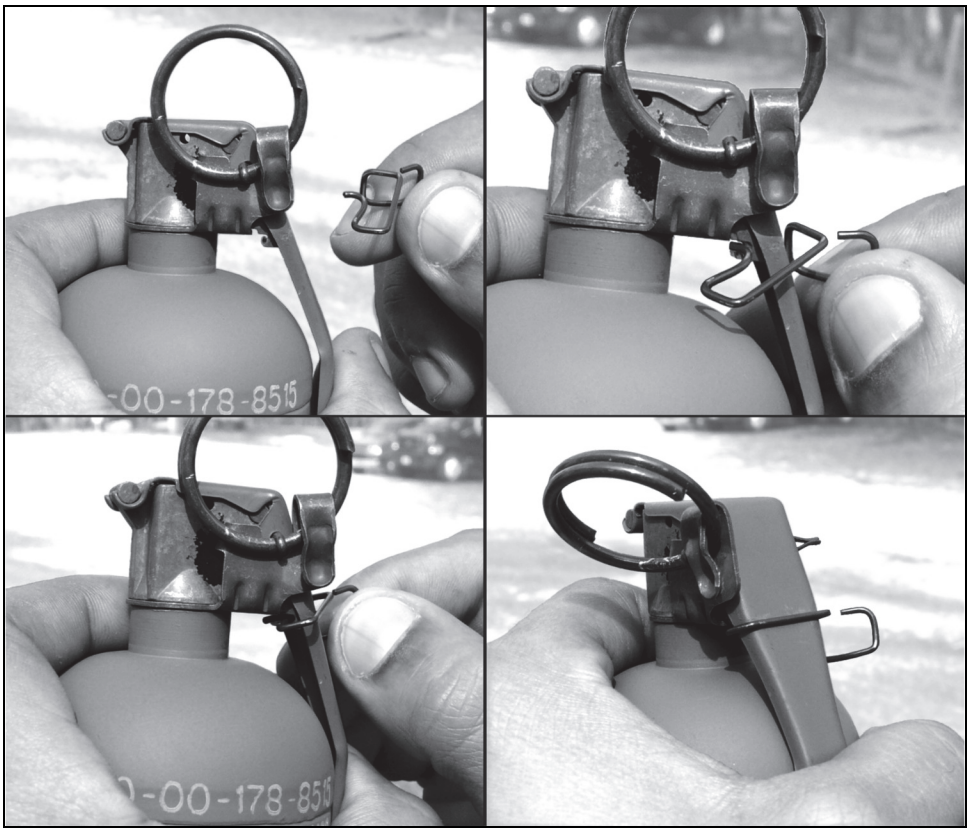

Figure 2-17. Safety clip installation

INSPECTION POINTS

2-30. The following inspections points must be checked:

(1) Pull ring and safety pin (pull pin) assembly.
(2) Confidence clip (if present).
(3) Safety clip.
(4) Safety lever.
(5) Fuze.
(6) Fuze lug.
(7) Safety lever hinge ears.

DAILY CHECKS

2-31. Personnel should check hand grenades daily. To perform daily checks (see Figure 2-18)—

(1) Ensure the safety pin (1) is present.

> **CAUTION**
>
> DO NOT bend the far end of the safety pin back flush against the fuze body. This practice, intended to prevent the accidental pulling of the pin, makes the removal of the safety pin difficult. Repeated working of the safety pin in this manner causes the pin to break, creating a hazardous condition.

(2) Ensure the pull ring is present, fully seated, and secured to the confidence clip (2), if present.
(3) Ensure the safety clip (3) is present and properly secured to the safety lever (4).
(4) Check the grenade fuze assembly (5) for tightness.

WARNING

Never remove the fuze from a live grenade.

(5) Ensure that the safety lever (4) is not broken.

WARNING

If the grenade safety lever is broken, DO NOT use the grenade.

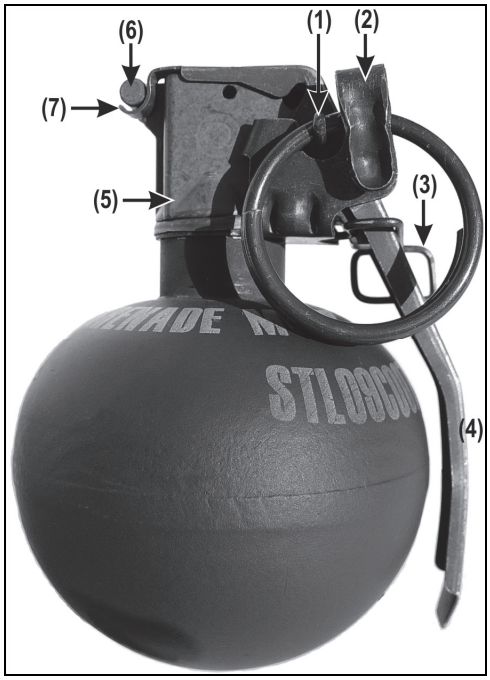

Figure 2-18. Hand grenade safety inspection points

STORAGE

2-32. Personnel should carry hand grenades in designed grenade pouches and according to unit SOP. When storing grenades personnel should adhere to the following guidelines:

- Ensure that the grenade is fully inside of the carrying pouch with the pocket flap fully secured, shown in Figure 2-19.

Figure 2-19. Grenade carrying pouch attached to tactical molle vest

- DO NOT put adhesive tape around a grenade fuze, the pull ring, or safety lever. Images below (Figure 2-20) represent accident investigations where Soldiers were injured or killed when attempting to remove adhesive tape.

WARNING

DO NOT tape a hand grenade safety lever or safety pin. The safety pin can come off with the tape, causing the grenade to explode.

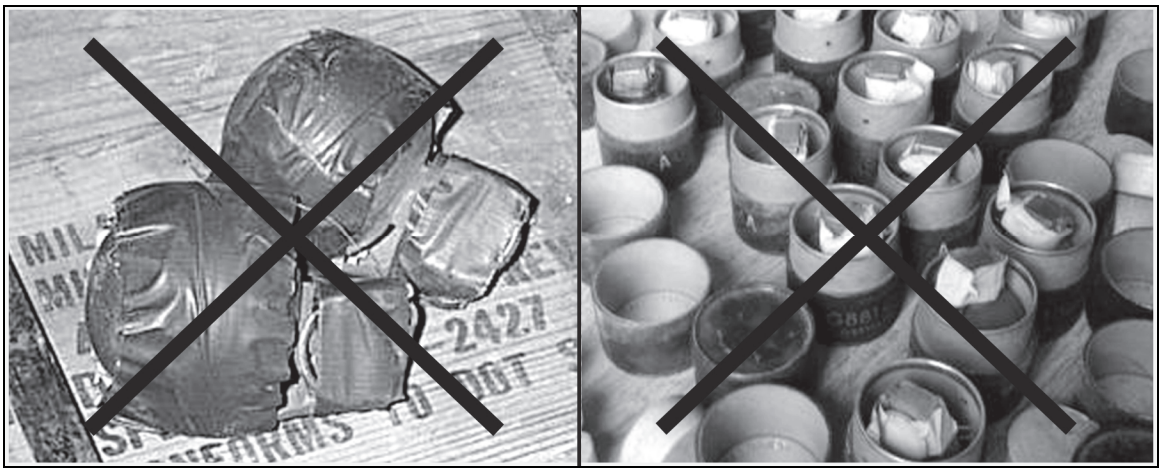

Figure 2-20. DO NOT tape hand grenades

- Carry hand grenades using the proper procedures.

WARNING

Never carry the grenades suspended by the safety pull ring or safety lever.

- DO NOT tape hand grenades to Soldier gear (Figure 2-21).

Figure 2-21. DO NOT tape hand grenades to Soldier gear

- Never make unauthorized modifications to hand grenades.

WARNING

To keep grenades safe in storage, DO NOT bend, tamper, modify, or otherwise alter a hand grenade safety pin or safety lever.

- During air operations in wartime conditions, Soldiers must be prepared to engage the enemy as soon as they land; therefore, Soldiers must carry their grenades in the designated grenade pouch and stowed according to unit SOP.

CAUTION

During training missions, especially airborne operations, DO NOT carry hand grenades in ammunition pouches. Carry the grenades in the main body of the rucksack instead.

USE

2-33. To safely throw hand grenades, Soldiers must demonstrate and execute the proper techniques of gripping, preparing, and throwing the grenade.

NOTE: Use the M69 TPG for all individual and collective training tasks.

GRIPPING

2-34. A grenade not held properly is difficult to arm. Gripping procedures differ slightly for right- and left-handed Soldiers; proper grip remains constant. Holding the grenade in the throwing hand with the safety lever placed between the first and second joints of the thumb provides safety and throwing efficiency.

Right-Hand Grip

2-35. To throw the grenade with the right hand, Soldiers should use the right-hand grip (Figure 2-22). To use the right-hand grip, hold the grenade upright, with the pull ring away from the palm of the throwing hand removing the pull ring with the index or middle finger of the free hand.

Figure 2-22. Right-hand grip

Left-Hand Grip

2-36. To throw the grenade with the left hand, Soldiers should use the left-hand grip (Figure 2-23). To use the left-hand grip, invert the grenade, with the pull ring away from the palm of the throwing hand so that the index or middle finger of the free hand can easily remove the pull ring.

Figure 2-23. Left-hand grip

PREPARING

NOTE: DO NOT remove the safety clip or the safety pin until the grenade is about to be thrown.

CAUTION

Never attempt to reinsert a safety/pull pin into any type of hand grenade. Attempting to reinsert the safety/pull pin can lead to inadvertent functioning of the hand grenade resulting in wounding or killing the Solider and/or damage to equipment.

2-37. The thrower's grip determines the method of grenade preparation. To prepare the grenade—

- Hold the grenade with the proper right- or left-hand grip and ensure that you are holding the safety lever down firmly.
- Tilt the grenade forward to observe the safety clip.
- Remove the safety clip by sweeping it away from the grenade with the thumb of the free hand (Figure 2-24 and Figure 2-25).

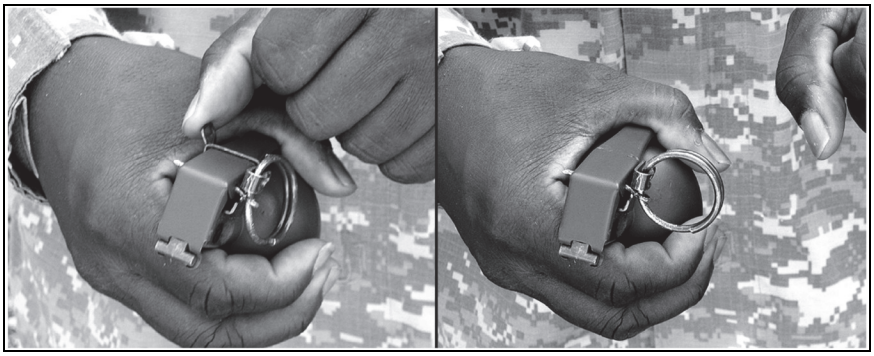

Figure 2-24. Right-hand grip, removing the safety clip

Figure 2-25. Left-hand grip, removing the safety clip

- Insert the index or middle finger of the nonthrowing hand in the pull ring until it reaches the knuckle of the finger (Figure 2-26).

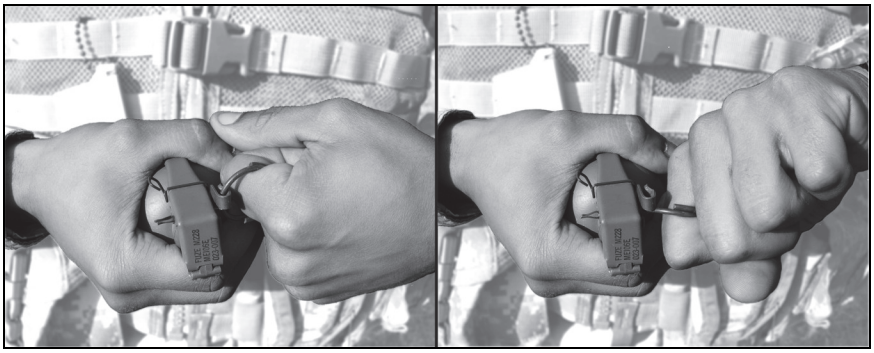

Figure 2-26. Pull ring grip, right-hand thrower

- Remove the pull ring from the confidence clip.
  - For a right-handed thrower, with the palm of the nonthrowing hand facing up, twist the pull ring toward the body to release the pull ring from the confidence clip (Figure 2-26).
  - For a left-handed thrower, with the palm of the nonthrowing hand downward, twist the pull ring away from the body to release the pull ring from the confidence clip (Figure 2-27).

Figure 2-27. Left-hand grip, pulling the safety pin

- Remove the safety pin by pulling on the pull ring.

DANGER

IF PRESSURE ON THE SAFETY LEVER IS RELAXED AFTER THE SAFETY CLIP AND SAFETY PIN ARE REMOVED, THE STRIKER CAN ROTATE AND STRIKE THE PRIMER WHILE THE THROWER IS STILL HOLDING THE GRENADE. CONTINUING TO HOLD THE GRENADE BEYOND THIS POINT CAN RESULT IN INJURY OR DEATH.

COOKING OFF

WARNINGS

In training, never cook off live fragmentation hand grenades. Use cook-off procedures only with grenades that have a fuze setting of 4.0 seconds or greater in a combat environment.

Never attempt to "COOK OFF" or "MILK" the M106 SOD-Vr, the M84 stun grenade (FLASHBANG), or any type of smoke or special purpose grenades. These grenades have short fuze delays (1.0 to 2.3 seconds) and can function as early as 0.7 seconds after the safety level is released, causing serious personal injury if cook-off procedures are attempted or performed.

2-38. To achieve above-ground detonation or near-impact detonation—

- Remove the safety clip.
- Disengage pull ring from confidence clip (if equipped).
- Remove the grenade's safety pin.
- Release the safety lever.
- Count "One thousand one, one thousand two."
- Throw the grenade.

2-39. This is commonly referred to as cooking off. Cooking off or using enough of the grenades 4- to 5-second delay (about 2 seconds) causes the grenade to detonate sooner after thrown. This use of some of the fuze delay causes the grenade to detonate above ground or shortly after impact with the target. Table 2-10 outlines fuze settings.

Table 2-10. Grenade Fuse Settings

GRENADE FUZE SETTING		
Grenade Type	***Fuze Delay***	***Recommended Cook Off***
M69 with M228 Practice Fuze	4.0 to 5.5 seconds	Yes (2 seconds)
M67 Fragmentation Grenade	4.0 to 5.5 seconds	Yes (2 seconds Combat Only)
M18 Colored Smoke (Red, Green, Yellow, and Violet)	1.0 to 2.3 seconds	No
**M8-HC	0.7 to 2.0 seconds	No
M83 TA White Smoke	1.0 to 2.3 seconds	No
M14 Incendiary	0.7 to 2.0 seconds	No
**MK3A2 Offensive-Concussion with M206A1 Fuze with M206A2 Fuze	2.8 to 3.0 seconds	No
	4.0 to 5.5 seconds	Yes (2 seconds Combat Only)
M7A3 Riot CS Grenade	0.7 to 2.0 seconds	No
M84 STUN (Flash Bang)	1.0 to 2.3 seconds	No
M102 Practice Stun Grenade with M240 type fuze	1.0 to 2.3 seconds	No
M106 (SOD-Vr)	1.0 to 2.3 seconds	No
**Grenade is in current combat load and stockpile, restricted for combat operation ONLY. Upon depletion of this stockpile, the grenade status changes to obsolete.		

WARNING

Time delay setting may vary and fuzes may function before prescribed times listed above.

THROWING

WARNING

Throwers must consider the flight path of the grenade to make sure no obstacles alter the flight of the grenade or cause it to bounce back toward them.

2-40. Soldiers can use five positions to throw grenades:

- Standing.
- Prone-to-standing.
- Kneeling.
- Prone-to-kneeling.
- Alternate prone.

2-41. Tactical employment of the hand grenade is METT-TC dependant. The situation dictates the position best suited for delivering a grenade on target.

2-42. If a Soldier can achieve more distance and accuracy using his own personal style, allowing the Soldier to do so is acceptable, as long as his body is facing sideways and toward the enemy's position, and he throws the grenade overhand. There are, however, general steps that the Soldier must follow:

(1) Observe the target to estimate the distance between the throwing position and the target area.

NOTE: In observing the target, minimize exposure time to the enemy (no more than 3 seconds).

(2) Grip the hand grenade in the right- or left-throwing hand.

(3) Prepare the hand grenade.

(4) Throw the grenade overhand so that the grenade arcs, landing on or near the target.

(5) Allow the motion of the throwing arm to continue naturally after releasing the grenade.

NOTE: This follow-through improves distance and accuracy and lessens the strain on the throwing arm.

(6) Seek cover to avoid fragments or direct enemy fire. If no cover is available, drop to the prone position with your protective headgear facing the direction of the grenade's detonation.

NOTE: Soldiers should practice additional throws used in combat, such as the underhand and sidearm throws. Soldiers can practice these throws with practice grenades, but they must throw live fragmentation grenades overhand in a training environment.

Standing Position

2-43. The standing position is the most desirable and natural position from which to throw grenades. It allows the Soldier to obtain the greatest possible throwing distance. However, this position should only be used when cover and concealment is readily available.

2-44. To throw a grenade from the standing position (Figure 2-28)—

(1) Observe the target to estimate the distance between the throwing position and the target area.

(2) Assume a natural stance, with your weight balanced equally on both feet.

(3) Hold the grenade at chest level (WORKING AREA).

(4) Prepare the grenade.

(5) Hold the grenade 4 to 6 inches behind the throwing ear, nonthrowing side towards the enemy with nonthrowing hand at a 45-degree angle; the fingers and thumb extended and joined, pointing toward the intended target.

(6) Throw the grenade overhand so that the grenade arcs, landing on or near the target.

(7) Allow the motion of the throwing arm to continue naturally after release of the grenade.

(8) Seek cover to avoid fragments or direct enemy fire. If no cover is available, drop to the prone position facing the direction of the grenade's detonation.

Figure 2-28. Standing position

Prone-to-Standing Position

2-45. Use the prone-to-standing position to immediately suppress an area, when exposure time is more important than accuracy, and when cover and concealment is not readily available.

2-46. To throw a grenade from the prone-to-standing position (Figure 2-29)—

(1) Lie down on the stomach with the body parallel to the grenade's intended line of flight. Place weapon one arms length away on your throwing side, muzzle pointing down range with the port ejection cover facing upward.

(2) Observe target area.

(3) Hold the grenade at chest level (WORKING AREA).

(4) Prepare the grenade.

(5) Place the hands (knuckles down with elbows skyward) in a modified push-up position, while maintaining a firm grip on the grenade.

(6) Stand up while holding the grenade in the throwing hand. Assume a good standing position, if the situation permits.

(7) Hold the grenade 4 to 6 inches behind the throwing ear, nonthrowing side towards the enemy with nonthrowing hand at a 45-degree angle; the fingers and thumb extended and joined, pointing toward the intended target.

(8) Throw the grenade overhand so that the grenade arcs, landing on or near the target.

(9) Allow the motion of the throwing arm to continue naturally after release of the grenade.

(10) After throwing the grenade, drop to the ground on the stomach and press flat against the ground.

Figure 2-29. Prone-to-standing position

Kneeling Position

2-47. The kneeling position reduces the distance a Soldier can throw a grenade. Used primarily from behind low-level ground cover.

2-48. To throw a grenade from the kneeling position (Figure 2-30)—

(1) Observe the target mentally estimating the throwing distance.

(2) Hold the grenade at chest level (WORKING AREA).

(3) Prepare the grenade while behind cover.

(4) Bend the nonthrowing knee at a 90-degree angle, placing that knee on the ground. Keep the throwing leg straight and locked, with the side of the boot firmly on the ground.

(5) Move the body to face sideways, toward the target position.

(6) Hold the grenade 4 to 6 inches behind the throwing ear, nonthrowing side towards the enemy with nonthrowing hand at a 45-degree angle; the fingers and thumb extended and joined, pointing toward the intended target.
(7) Throw the grenade overhand so that the grenade arcs, landing on or near the target. Push off with the throwing foot to give added force to the throw.
(8) Allow the motion of the throwing arm to continue naturally after release of the grenade.
(9) Drop to the prone position or behind available cover to reduce exposure to fragmentation and direct enemy fire.

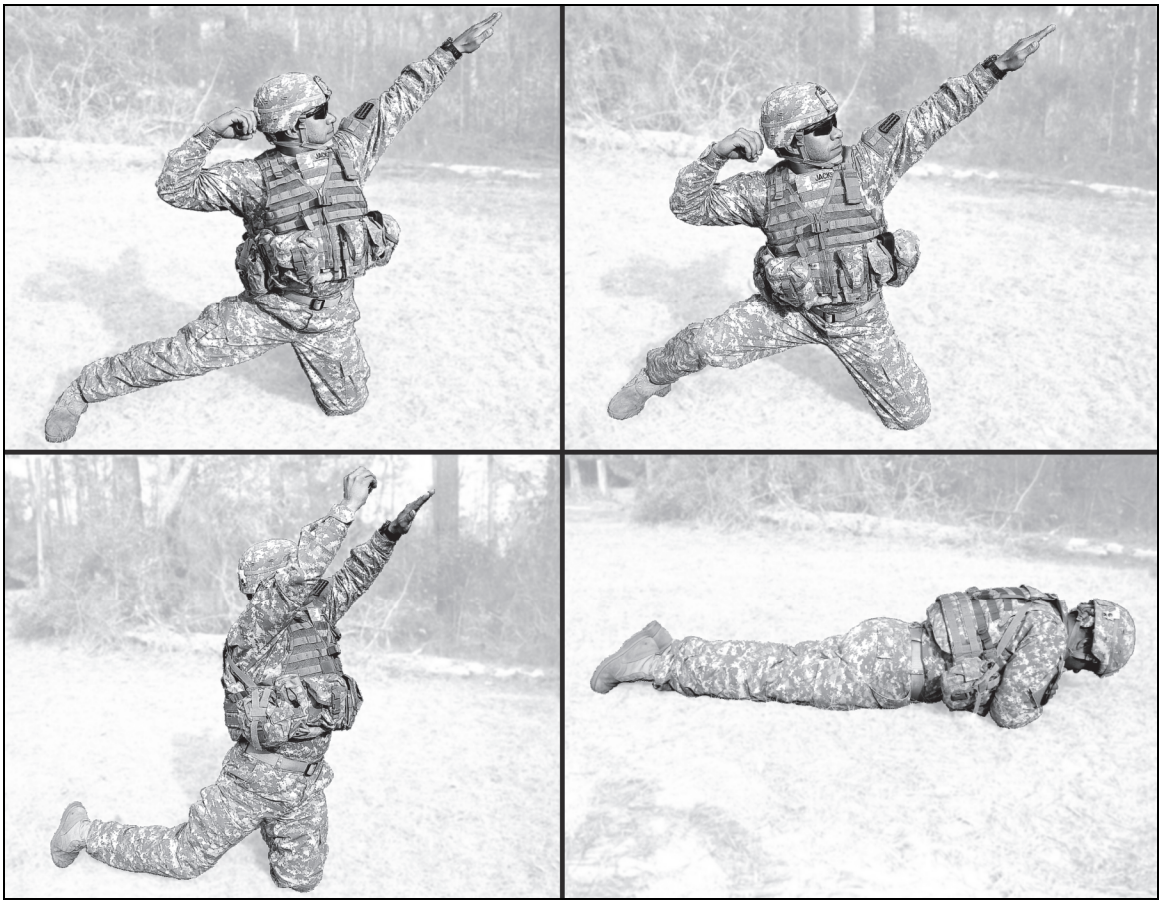

Figure 2-30. Kneeling position

Prone-to-Kneeling Position

2-49. The prone-to-kneeling position enables the Soldier to throw the grenade farther and used for the same reasons as the prone-to-standing position; time to throw is more important than accuracy.

2-50. To throw a grenade from the prone-to-kneeling position (Figure 2-31)—

(1) Lie down on the stomach, with the body parallel to the grenade's intended line of flight. Place weapon one arms length away on your throwing side, muzzle pointing down range with the port ejection cover facing upward.
(2) Observe target area.
(3) Hold the grenade at chest level (WORKING AREA).
(4) Prepare the grenade.
(5) Place the hands (knuckles down with elbows skyward) in a modified push-up position. Cock your nonthrowing knee while maintaining a firm grip on the grenade. Rotate up onto your nonthrowing knee, bringing your throwing leg behind you (DO NOT lock your knee) with the side of the boot

firmly on the ground to stabilize your throwing position while holding the grenade in the throwing hand. Assume a good kneeling position, if the situation permits.

(6) Hold the grenade 4 to 6 inches behind the throwing ear, nonthrowing side towards the enemy with the nonthrowing hand at a 45-degree angle; the fingers and thumb extended and joined, pointing toward the intended target.

(7) Rock back on your throwing leg and use the momentum to throw the grenade overhand so that the grenade arcs, landing on or near the target.

(8) Allow the motion of the throwing arm to continue naturally after release of the grenade.

(9) After throwing the grenade, drop to the ground on the stomach and lay flat against the ground.

Figure 2-31. Prone-to-kneeling position

Alternate Prone Position

2-51. The alternate prone position reduces both distance and accuracy. This position is used when cover is limited and rising to engage a target would expose the Soldier to direct fire.

2-52. To throw a grenade from the alternate prone position (Figure 2-32)—

(1) Lie down on the back, with the body perpendicular to the grenade's intended line of flight. Place weapon on the nonthrowing side with the port ejection cover facing skyward.
(2) Observe target area.
(3) Hold the grenade at chest level (WORKING AREA).
(4) Prepare the grenade.
(5) Cock the throwing leg at a 45-degree angle, maintaining knee-to-knee contact and bracing the side of the boot firmly on the ground.
(6) Hold the grenade 4 to 6 inches behind the ear with the arm cocked for throwing.
(7) With the free hand, grasp any object that provides additional leverage to increase the throwing distance.
(8) Throw the grenade, and push off with the rearward foot to give added force to the throw.

CAUTION

DO NOT lift the head or body when attempting to throw the grenade as this may cause exposure to direct enemy fire.

(9) After throwing the grenade, roll over onto the stomach and press flat against the ground.

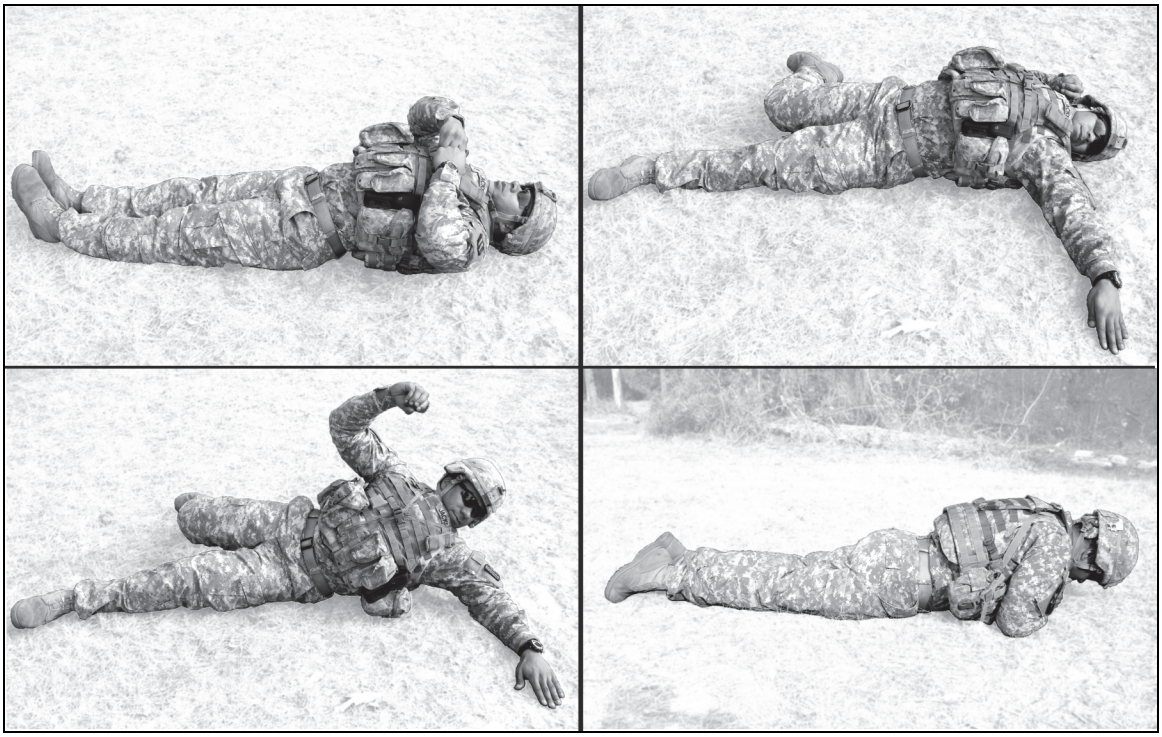

Figure 2-32. Alternate prone position

MAINTENANCE

2-53. When exposed to the environment, hand grenades require just as many preventive maintenance checks and services (PMCS) as a Soldier's personal weapon. The body of the hand grenade is made of metal, which rusts when exposed to moisture or submerged in water. If not removed, dirt or rust can cause the hand grenade to malfunction. (See TM 9-1330-200-12 for more information about required grenade maintenance.)

2-54. For most hand grenades, keeping them clean and lubricated is sufficient maintenance. With the M69 practice grenade, however, maintenance is more difficult because the grenade bodies repeatedly used. To maintain the M69 TPG—

- Paint the grenade body at least quarterly.
- Clean the threads with a wire brush on a monthly basis.
- Remove fuze residue from the body immediately after each use.

NOTE: Cleaning the threads and removing the residue from the hand grenade body make replacement of the fuzes easier. Conducting these preventive maintenance procedures provide a grenade body that also lasts longer.

CLEANING

2-55. Clean the grenade of dirt, grease, sand—

- Wipe off with a clean, dry cloth, or other nonabrasive material.
- Wipe off light rust from grenade bodies with a clean, dry cloth.

CAUTION

Vigorous cleaning of a grenade with a heavy bristled brush or cleaning rag may loosen or dislodge the pull ring.

Take care not to disturb the safety devices when wiping off grenades.

LUBRICATING

2-56. When in adverse weather conditions refer to TM 9-1130-200-12, section III, operation under unusual conditions for instructions.

DESTRUCTION PROCEDURES

2-57. Destruction of any military weapon is a last resort to prevent the enemy from capturing or using it. In combat, the commander has the authority to destroy weapons, but he must report doing so through the proper channels. (Refer to TM 9-1330-200-12 for more information.) The following information is for guidance only.

2-58. The conditions under which destruction will be effected are command decisions and may vary depending upon a number of factors, such as—

- Tactical situation.
- Security classification.
- Quantity and location of grenades.
- Facilities for accomplishing destruction.
- Time.

METHODS OF DESTRUCTION

2-59. Selection of the method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. In general, the most effective method to destroy grenades is by detonation or burning, or a combination of these methods.

NOTE: For the successful execution of methods of destruction involving the use of demolition materials, all personnel concerned must be thoroughly familiar with the provision of FM 3-34.214. Training and careful planning are essential.

2-60. If destruction of grenades is directed, due consideration should be given to the following:
(1) Selection of a site, for the destruction operation causes greatest obstruction to enemy movement and prevents hazard to friendly troops from fragments incidental to the destruction.
(2) Observe appropriate munition safety precautions.
(3) Clear the area of personnel.
(4) Protect assets not in danger of falling to the enemy from blast or fragments.
(5) Notify adjacent military units.

Detonating

2-61. Packed and unpacked high-explosive (HE) grenades, fuzes, and accessories may be destroyed by placing them in piles and detonating them with demolition charges.

2-62. To use this method—
(1) Prepare the demolition charge (using one-pound dynamite (TNT) blocks [or equivalent] and the necessary detonating cord to make up each charge).

NOTE: One hundred pounds of packed HE grenades require a two-pound demolition charge to ensure complete detonation of the pile. For unpacked HE grenades, a one-pound demolition charge is sufficient.

(2) Place the charges on the pile designated for detonation.
(3) Provide for dual priming to minimize the possibility of a misfire. For priming, use a nonelectric blasting cap crimped to at least 5 feet of time blasting fuze or an electric blasting cap and firing wire).

NOTE: Time blasting fuzes contain black powder and a blasting cap; protect them from moisture at all times.

WARNING

Test each roll of fuze shortly before use. The burning rate of a safety fuze varies under different atmospheric and/or climatic conditions (from a burning time of 30 seconds or less per foot to 45 seconds or more per foot).

WARNING

Keep blasting caps, detonating cord, and time blasting fuzes separated from the charges until required for use.

(4) If primed with nonelectric blasting cap and time blasting fuze, ignite and take cover; if primed with electric blasting cap, take cover before firing the charge.

NOTE: Use a blasting fuze igniter to ignite time blasting fuzes; the electric blasting cap requires a blasting machine or equivalent source of electricity.

2-63. The danger area for piles detonated in the open is a circular area that varies according to the quantity of explosive items.

NOTE: Quantity/distance data (inhabited building distance) is located in TM 9-1330-200-12, Chapter 4.

Burning

2-64. Burning quickly and effectively destroys packed and unpacked HE grenades, smoke grenades, and illuminating grenades.

2-65. To destroy hand grenades by fire—

(1) Stack the ammunition into a pile.

(2) Place flammable materials (for example, rags, scrap wood, or brush) on and about the pile.

(3) Pour gasoline and oil over the entire pile.

WARNING

Carelessness in the use of gasoline and oil may result in painful burns. Consider the highly flammable nature of gasoline and its vapor.

(4) Ignite the pile using an incendiary grenade fired from a safe distance, a combustible train of suitable length, or other appropriate means.

(5) Take cover immediately.

WARNING

Take cover immediately, since the fire may cause an early explosion of ammunition.

2-66. The danger area for piles burned in the open is 600 meters.

Degree of Damage

2-67. The method of destruction used must damage the grenades and their components to such an extent that they cannot be restored to a usable condition in the combat zone. Further, the same essential components of all grenades must be destroyed so that the enemy cannot assemble complete rounds from undamaged components of several undamaged or moderately damaged rounds.

2-68. Confirmation of destruction and degree of damage IS NOT recommended, since time is usually a critical factor in destroying grenades to prevent enemy capture. It is possible that some munitions remain in various levels of operational condition. Munitions also have an increased chance, when destroyed in the open, to blow away from the destruction point. Consider the area selected an unsafe area for friendly forces.

DANGER

NO ATTEMPT SHOULD BE MADE TO VALIDATE THE LEVEL OF DESTRUCTION. TO PREVENT INJURY AND DEATH THE AREA 600 METERS AROUND THE DETONATION/BURN PILE IMMEDIATELY BECOMES A DUD AREA. DEEM ALL FRAGMENTS AND PARTS IN THE IMMEDIATE AREA UNEXPLODED ORDNANCE (UXO). FRIENDLY FORCES SHOULD CONSIDER THIS AREA UNSAFE AND OFF LIMITS.

Chapter 3

Pyrotechnic Signals and Simulators

Pyrotechnic signals provide Soldiers with a means of communication and signals, obscuration, warning of an intruder, and for simulating enemy fires.

SECTION I. COMMUNICATION SIGNALS

3-1. The two classifications of pyrotechnic communication signals are handheld signals and ground smoke signals. Both types of signals come in varied color patterns. Soldiers can use these patterns to coordinate troop movements and, in the case of an emergency, designate pick-up points.

NOTE: The signals are usually prescribed at command level and prearranged according to the signal operating instructions (SOI).

HANDHELD SIGNALS

3-2. Handheld signals include the following:

- Star clusters.
- Star parachutes.
- Smoke parachutes.

3-3. Star clusters, star parachutes, and smoke parachutes come issued in an expendable launcher that comprises a launching tube and firing cap (Figure 3-1).

Figure 3-1. Handheld pyrotechnic signal expendable launcher

IDENTIFICATION

3-4. The label and muzzle cap of a handheld ground signal identifies its color and type. The star clusters and parachutes also have two raised letters on the muzzle cap allowing for identification of the color and type at night by feel. Table 3-1 provides information about handheld signal identification.

NOTE: When practical, practice in the dark or blindfolded for identification of handheld ground signals.

Table 3-1. Handheld signal identification

TYPE	*LETTERS ON MUZZLE CAP*	*COLOR OF MUZZLE CAP*
Green star cluster	GS	Green
Red star cluster	RS	Red
White star cluster	WS	White
Green star parachute	GP	Green
Red star parachute	RP	Red
White star parachute	WP	White
Smoke cluster	None	Plain

STAR CLUSTERS

3-5. Use star clusters for signaling and illuminating. These signals produce a cluster of five free-falling pyrotechnic stars. When fired, the star cluster rises to an approximate height of 200 to 215 meters, and burn about 6 to 10 seconds.

3-6. Types include:

- M125 and M125A1 (green star).
- M158 (red star).
- M159 (white star).

NOTE: The white star cluster provides the most effective illumination.

STAR PARACHUTES

3-7. Use star parachutes for signaling and illuminating. These signals produce a single illuminant star suspended from a parachute.

NOTE: Fire these signals in the same manner as the star clusters.

3-8. Star parachutes types include:

- M126A1 (red star).
- M127A1 (white star).
- M195 (green star).

3-9. The M126 and M127-series star parachutes rise to a height of 200 to 215 meters. The M126 burns for 50 seconds, and the M127 burns for 25 seconds. The average rate of descent for both is 2.1 meters per second. The signals are visible for 50 to 58 kilometers at night.

SMOKE PARACHUTES

3-10. Smoke parachutes are for signaling only. These signals produce a single, perforated, colored smoke canister suspended from a parachute.

3-11. Smoke parachutes types include:

- M128A1 (green smoke).
- M129A1 (red smoke).
- M194 (yellow smoke).

3-12. Smoke parachutes rise to an approximate height of 200 to 215 meters. The signals emit smoke for 12 seconds during the day, forming a smoke cloud that persists for about 60 seconds. Their rate of descent is 4 meters per second. At night, the M126A1 emits smoke for 50 seconds, the M129A1 for 25 seconds, and the M194 for 50 seconds.

INSPECTION

WARNING

Inspect handheld communication signals before use and properly secure them to avoid serious injury.

NOTE: See TM 9-1370-206-10 and SB 742-1370-97-700 for more information about handheld communication signal inspection.

Initial Inspection

CAUTION

During storage, keep boxes sealed. Duds or improper functioning could occur if exposed to moisture for long periods of time. Open just before use.

3-13. When in bulk, communication signals come secured in shipping containers (Figure 3-2). Personnel should inspect the shipping container upon receipt. Shipping containers that appear damaged should not be opened; return them to the ASP or disposed of using the methods outlined in the unit SOP.

3-14. The two types of communication signal shipping container are the M548 metal container and wood ammunition box containers.

M548 metal container

3-15. This container contains 24 handheld signals, individually secured in plastic containers (Figure 3-2).

Figure 3-2. Handheld signal shipping container

Wood Ammunition Box Container

3-16. This container contains 36 handheld signals, sealed in plastic barrier bags (Figure 3-3). Each barrier bag contains 18 hermetically sealed metal containers. Each sealed container contains one handheld signal.

3-17. Upon removing the sealed barrier bags from the shipping container (Figure 3-3), personnel should inspect each barrier bag and identify any of the following discrepancies:

- Damage to the barrier bag.
- Broken, tampered with, or missing seals on the barrier bag.

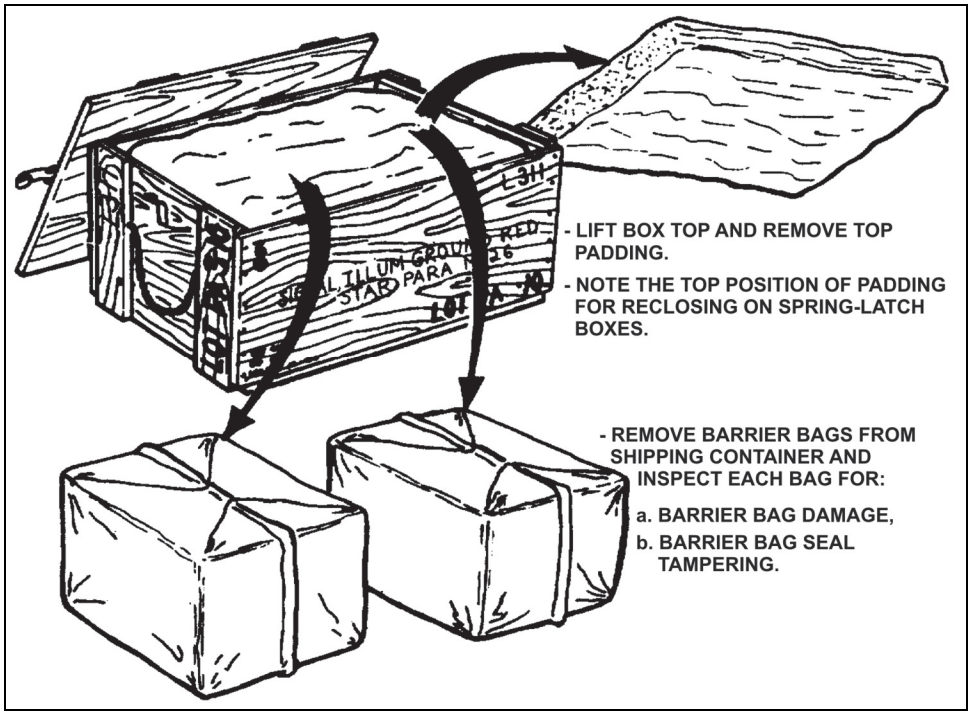

Figure 3-3. Handheld signal barrier bag

3-18. Each signal within the barrier bag comes housed in a hermetically sealed steel container (Figure 3-4) or plastic container (Figure 3-5). Handheld communication signals may be issued while still in their individual containers or unpacked and issued by someone within the chain of command. Upon removing the sealed individual containers from the barrier bag (Figure 3-3), personnel should inspect the containers and identify any of the following discrepancies:

- Container damaged.
- Seal on the container, broken, missing, or tampered with.

CAUTION

DO NOT open hermetically sealed (airtight) containers until ready for use. A signal exposed to moisture may not function.

3-19. Personnel should then remove the handheld signal from the container.

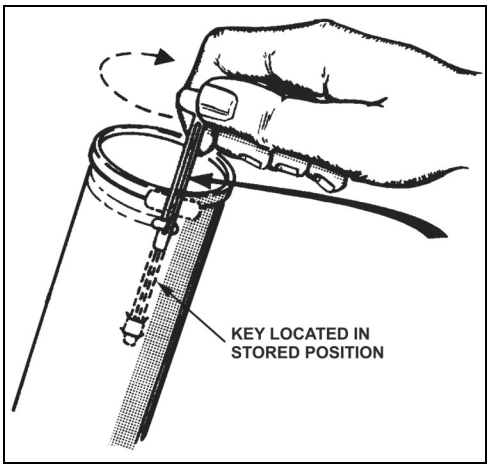

Figure 3-4. Handheld signal individual sealed steel container

Handheld Signal Sealed Steel Container

3-20. To open the handheld signal from a hermetically sealed steel container, use the key attached to the container (Figure 3-4)—

- Remove the sealing strip.
- Remove the top of container.
- Remove any padding pieces from the container.
- Remove the signal.

Handheld Signal Plastic Sealed Container

3-21. To open the handheld signal plastic sealed container (Figure 3-5)—

- Hold the container in one hand.
- Twist the end-cap counterclockwise with the other hand.
- Remove the signal.

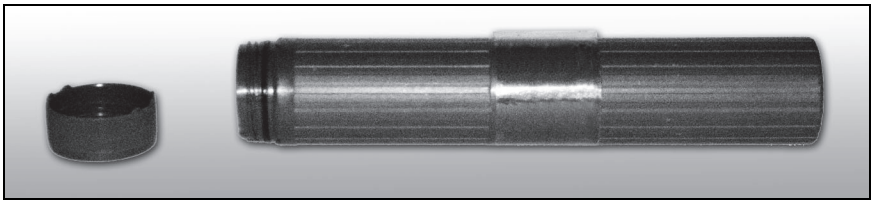

Figure 3-5. Handheld signal individual container

Inspect a Handheld Signal

3-22. Once the signal has been removed from the container (Figure 3-6), personnel should inspect the signal and identify any of the following discrepancies:

- Corrosion is on the launcher tube.
- Holes are visible in the launcher tube.
- Dents in the launcher tube.
- The forward-end seal is broken or damaged.
- The firing pin is not present.
- The primer is not intact (is dented).
- The primer is missing or protruding from signal.
- The color-coded forward-end seal does not match the color listed on the data plate.

Figure 3-6. Handheld signal removed from the individual container

NOTE: If any of the discrepancies are found upon receipt of newly issued handheld signals, personnel should return the signal and individual container to the issuing person or dispose of it according to the unit SOP.

Before Storing

3-23. Before securing handheld communication signals, personnel should take the following safety precautions (Figure 3-7):

- Ensure the launcher tube is not bent or punctured.
- Check the launcher tube for corrosion or dirt.
- Ensure that the forward-end seal is not broken or damaged.
- Ensure that the firing pin is present and the primer is intact (not dented).
- Ensure that the primer is not missing or protruding from signal.
- Ensure that the signal is returned to its original container, if available.

Figure 3-7. Safety inspection points—before storage

Daily Checks

3-24. Personnel should check handheld communication signals daily to ensure that they are free of foreign material and that they remain serviceable.

STORAGE

3-25. Personnel should carry handheld communication signals according to the unit SOP. When carrying handheld communication signals, personnel should adhere to the following guidelines:

- Ensure that the communication signal is stored in a secure, dry area.

CAUTION

Duds or improper functioning could occur if exposed to moisture for long periods of time. Open just before use.

- DO NOT put adhesive tape around any portion of the handheld communication signal.

WARNING

DO NOT bend, tamper, modify, or otherwise alter a handheld communication signal. DO NOT tape any portion of the launcher or firing mechanism.

USE

3-26. To safely use handheld signals, Soldiers must properly determine the type and color of the pyrotechnic signal for use then safely launch the signal.

Determining the Type and Color

3-27. When choosing a pyrotechnic signal, Soldiers must consider the signal's intensity and color.

Intensity

3-28. Handheld colored pyrotechnic signal flares burn at different intensities.

Color

3-29. Determining specific colors at night is not difficult. However, Soldiers should avoid using red and green star clusters near aircraft.

CAUTION

Avoid signaling aircraft at night with star clusters. Red and green star clusters can be mistaken for tracers causing the aircraft to open fire on the friendly ground element or to withdraw.

3-30. In daylight, Soldiers should adhere to the following considerations:

- It can be difficult to differentiate between white and green depending on lighting conditions.
  - Green is pale in daylight and is especially difficult to detect in fog, haze, or smoke-filled skies. In fact, white flares are easier to detect in daylight than green.
  - White flares can be mistaken for illumination flares.
- Red may be difficult to detect when launched in a position that forces the observer to see it near a vivid sunrise or sunset.

Launching Handheld Signals

NOTE: See TM 9-1370-206-10 for more detailed information on safety precautions.

3-31. To fire handheld signals (Figure 3-8)—

- Observe the surrounding area to ensure that you have overhead clearance.

DANGER

DO NOT FIRE A HANDHELD SIGNAL IN AN AREA WITHOUT OVERHEAD CLEARANCE. WHEN FIRED IN AN AREA WITHOUT OVERHEAD CLEARANCE, THE SIGNAL CAN CAUSE FIRE, INJURY, OR DEATH.

- Grasp the signal firmly with your nonfiring hand, red-knurled band down, with your little finger above the red band.
- With your firing hand, withdraw the firing cap from the upper end of the signal.
- Point the ejection end of the signal up and away from your body, and push the firing cap onto the signal until the open end of the cap is aligned with the red band.
- Hold the signal away from your body and at the desired trajectory angle.

WARNING

Turn your head away from the signal to avoid injury to your face and eyes from particles ejected by the small rockets.

Figure 3-8. Firing a handheld signal

- Strike the bottom of the cap using a sharp blow with the palm of your firing hand or strike it on a hard surface, keeping your nonfiring arm rigid (Figure 3-9).

CAUTION

When firing handheld signals by hand, avoid contact with the bones of the hand. This can result in injury to the hand. Instead, use the meaty portion of the hand.

Figure 3-9. Firing a handheld signal (continued)

Misfire

3-32. In the event of a misfire—

- While keeping the signal aimed, pull the cap back to the red knurled band, and rotate 90 degrees.
- Make two more attempts to fire.
- If it still does not fire, wait 30 seconds keeping the arm rigid and the signal aimed overhead.
- Return the cap to the ejection end of the signal and dispose of it according to the unit SOP.

MAINTENANCE

3-33. When exposed to the environment, handheld signals require PMCS. The color-coded forward end seal can deteriorate if exposed to moisture for long periods of time or submerged in water. If not removed, dirt or sand can cause the handheld signal to malfunction. (Refer to TM 9-1370-206-10 and TM 9-1370-203-20 for more information about required maintenance.)

CLEANING

3-34. To clean the handheld signal—

- Wipe the dirt off the launcher tube and the firing cap using a clean, dry, lint-free cloth.
- Use a fine-bristled camel hair brush to remove any foreign matter or debris.

DESTRUCTION PROCEDURES

3-35. Destruction of any military weapon is authorized only as a last resort to prevent the enemy from capturing or using it. In combat, the commander has the authority to destroy weapons, but he must report doing so through the proper channels.

3-36. The conditions under which destruction will be effected are command decisions and may vary depending upon a number of factors, such as—

- Tactical situation.
- Security classification.
- Quantity and location of grenades and pyrotechnic signals.
- Facilities for accomplishing destruction.
- Time.

METHODS OF DESTRUCTION

3-37. Selection of the method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. The most effective method to destroy handheld signals is by burning or firing, or a combination of these methods. If destruction by burning is the chosen method, evacuate personnel 800 feet from destruction point.

DEGREE OF DAMAGE

3-38. The method of destruction used must damage the handheld signals and their components to such an extent that they cannot be restored to a usable condition in the combat zone. Further, the same essential components of all handheld signals must be destroyed so that the enemy cannot assemble complete rounds from undamaged components of several undamaged or moderately damaged signals.

3-39. Confirmation of destruction and degree of damage IS NOT recommended, since time is usually a critical factor in destroying handheld signals to prevent enemy capture. It is possible that some signals remain in various levels of operational condition. Signals also have an increased chance, when destroyed in the open, to blow away from the destruction point. Consider the area selected an unsafe area for friendly forces.

DANGER

NO ATTEMPT SHOULD BE MADE TO VALIDATE THE LEVEL OF DESTRUCTION. TO PREVENT INJURY AND DEATH THE AREA 600 METERS AROUND THE DETONATION/BURN PILE IMMEDIATELY BECOMES A DUD AREA. DEEM ALL FRAGMENTS AND PARTS IN THE IMMEDIATE AREA UNEXPLODED ORDNANCE (UXO). FRIENDLY FORCES SHOULD CONSIDER THIS AREA UNSAFE AND OFF LIMITS

GROUND SMOKE SIGNALS

3-40. Ground smoke signals or smoke grenades are self-contained units used by ground Soldiers to signal aircraft or to convey information through a prearranged signal. The various colors of ground smoke signals are depicted in Figure 3-10. Uses for ground smoke signals include: ground-to-ground or ground-to-air signaling device, convey information through a prearranged signal, or screening unit movements. These smoke grenades have a 0.7- to 2.0-second time delay and produce a smoke cloud that lasts approximately 25 to 90 seconds. (Refer to TM 9-1330-200-12 for more information about smoke grenades.)

M18 COLORED SMOKE HAND GRENADE

3-41. Use the M18 colored smoke hand grenade (Figure 3-10) as a means of communication. Table 3-2 outlines it components and characteristics.

Figure 3-10. Smoke grenades

Table 3-2. Components and characteristics of M18 colored smoke hand grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	A cylinder of thin sheet metal 2.5 inches in diameter and 5.7 inches long with one hole at the bottom, which allows smoke to escape when the grenade is ignited.
Filler	11.5 ounces of colored smoke mixture (red, yellow, green, or violet).
Fuze	M201A1.
Safety Features	Safety pin and pull ring. Safety lever.
Fuze Delay	1.0 to 2.3 seconds.
Total Weight	16 ounces.
Throwing Distance of Average Soldier	35 meters.
Effects	The grenade burns for 50 to 90 seconds.
Colors and Markings	Forest green body with light green markings. **NOTE:** The color of the top indicates the color of the smoke.

WARNING

Burning-type grenades burn oxygen. Standard protective masks filter particles but DO NOT supply oxygen. Use of the M18 colored smoke hand grenade are harmful to personnel and may cause fires inside of confined spaces. Therefore, DO NOT use burning grenades in enclosed or confined spaces.

M83 TEREPHTHALIC ACID WHITE SMOKE HAND GRENADE

3-42. Use the M83 terephthalic acid (TA) white smoke hand grenade (Figure 3-11) for screening the activities of small units and for ground-to-air signaling. Although the M83 TA is not a member of the M18 colored smoke series of grenades, the Soldier can use it for signaling. Table 3-3 outlines its components and characteristics.

Figure 3-11. M83 TA white smoke hand grenade

Table 3-3. Components and characteristics of M83 TA white smoke hand grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	A cylinder of thin sheet metal, 2.5 inches in diameter and 5.7 inches long with one hole at the bottom that allows smoke to escape when the grenade is ignited.
Filler	11 ounces of terephthalic acid (TA).
Fuze	M201A1.
Safety Features	Safety pin with pull ring. Safety lever.
Fuze Delay	1.0 to 2.3 seconds.
Total Weight	17.6 ounces.
Throwing Distance of Average Soldier	35 meters.
Effects	The M83 TA produces a cloud of white smoke for 55 to 90 seconds.
Colors and Markings	Forest green body with light green markings and a white top.

WARNING

Burning-type grenades burn oxygen. Standard protective masks filter particles but DO NOT supply oxygen. Therefore, DO NOT use burning grenades in enclosed or confined spaces.

M106 SCREENING OBSCURATION DEVICE - VISUAL RESTRICTED TERRAIN

3-43. The M106 screening obscuration device – visual restricted terrain (SOD-Vr) (Figure 3-12) provides a near instantaneous screen of dense smoke and is safe to use inside of urban structures, subterranean locations, and caves. Table 3-4 outlines its components and characteristics.

NOTE: Use the M106 SOD-Vr in lieu of M83 TA white smoke hand grenades when inside of confined spaces and when encountering enemy in close quarters.

Figure 3-12. M106 SOD-Vr

Table 3-4. Components and characteristics of M106 SOD-Vr

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Mylar coated fiberboard canister tube.
Filler	Nontoxic, noncombustible, environmentally safe titanium dioxide.
Fuze	M201A1 MOD 3.
Safety Features	Single circular pull ring with pin Safety lever (double tooth). Confidence clip.
Total Weight	20.7 ounces.
Fuze Delay	1.0 to 2.3 seconds.
Throwing Distance of Average Soldier	40 meters.
Effects	The filler forms a dense, obscurant cloud within 1.0 to 2.3 seconds after employment. Weather effects may cause the M106 to dissipate quickly. For long-lasting smoke screens (external use only), other white smoke should be deployed with the M106. **NOTE:** Inside of a building the heavy particles of the M106 may linger in the air for 2 to 4 minutes.
Colors and Markings	Light green body with black markings and warning, a brown band indicating a low order explosive and an orange safety label, fuze is olive drab with black markings.

WARNING

The M106 SOD-Vr and the M84 stun hand grenade have similar fuze delay settings: 1.0 to 2.3 seconds, and can function as early as 0.7 seconds after the safety lever has been released. Both grenades can cause serious personal injury to hands, eyes, and hearing. All users must wear appropriate hearing protection and exposure should be limited to two detonations per day.

Never attempt to "COOK OFF" or "MILK" the M106 SOD-Vr smoke grenade or M84 STUN (FLASHBANG) before throwing.

WARNINGS

Once the safety/pull pin is pulled from the M106 SOD-Vr, DO NOT attempt to switch hands. DO NOT attempt to reinsert the safety/pull pin in the M106 SOD-Vr.

Never attempt to pick up a dropped hand grenade, sound off with "GRENADE OUT," and seek cover.

Users must wear leather gloves when handling the M106 SOD-Vr.

DO NOT RELEASE THE SAFETY LEVER BEFORE THROWING the M18, M83, or M106 SOD-Vr smoke grenade or any other canister shaped hand grenade (M14, M7A3, MK3A2). Immediately after throwing, the thrower should quickly move at least 10 meters from the target area for a burning type smoke grenade and seek cover for the M106 SOD-Vr. The M106 SOD-Vr has a 20-foot surface danger zone (SDZ).

CAUTION

The M106 has been tested and found to be nontoxic; however, exposure to heavy concentrations should be limited to less than 15 minutes.

INSPECTION

WARNING

Inspect smoke grenades before use and properly secure them to avoid serious injury.

NOTE: Refer to Chapter 3 for inspection procedures.

STORAGE

3-44. Personnel should secure smoke grenades using a similar method to the carrying of hand grenades. (See Chapter 2 for storage procedures.)

USE

3-45. Before employing smoke grenades, Soldiers must understand the effects of environmental conditions on obscuration.

CONSIDERATIONS

3-46. Soldiers should consider wind direction and speed before employing smoke grenades:

- Throw grenades upwind of the desired location.
- Lack of wind and heavy humidity can cause smoke to linger. Heavy concentrations of smoke can obscure obstacles, restrict friendly movements, and hide an enemy's location.
- DO NOT throw smoke grenades on dry tender.

CAUTION

M18 and M83, have the potential to start fires when thrown on dry tender.

EMPLOYMENT

3-47. To safely employ smoke grenades, Soldiers must demonstrate and execute the proper techniques of gripping, preparing, and throwing the grenade.

NOTE: Smoke grenades have a pull ring, safety pin, and safety lever.

Gripping

3-48. Gripping procedures for the smoke grenade are the same as those for the M67 fragmentation grenade. (See Chapter 2 for gripping procedures.)

Preparing

3-49. Preparing procedures for the smoke grenade are the same as those for the M67 fragmentation grenade. (See Chapter 2 for preparing procedures.)

Throwing

3-50. Many of the same throwing positions that are used to employ hand grenades can also be used to employ smoke. (See Chapter 3 for more information.)

SECTION II. SURFACE TRIP FLARES

3-51. The M49A1 surface trip flare resembles a hand grenade in size and shape, except that it comes with a bracket provided for attachment to a tree or post and a trigger mechanism for firing. Surface trip flares (Figure 3-13) can be used to—

- Provide early warning of infiltration of enemy troops or signaling.

NOTE: To use the surface trip flare as an early warning device, Soldiers should attach a trip wire to the trigger or pull pin. This arms the flare.

- Illuminate an immediate area.

NOTE: Trip flares are not suitable for producing continuous illumination.

- Ignite fires.
- Force the enemy to withdraw.

3-52. Table 3-5 outlines its components and characteristics.

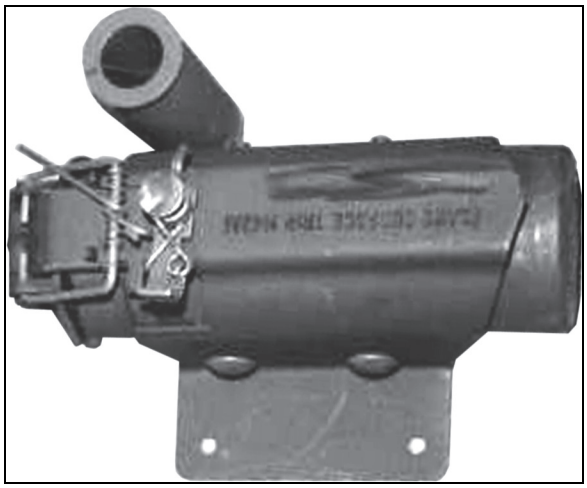

Figure 3-13. M49A1 surface trip flare

Table 3-5. Components and characteristics of M49A1 surface trip flare

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Aluminum.
Weight	0.75 pounds.
Length	4.85 inches.
Diameter	3.10 inches.
Method of activation	Trip wire (50 feet).
Filler	Illumination composition.
Primer	Percussion M42.
Safety Features	The trigger is attached to the exterior of the mounting bracket. The lever is hinged to the cover and is held in position by the safety clip when unarmed. A pull on the trip wire causes either the trigger tongue or pull pin to release the lever, which in turn permits the firing pin to strike the primer. The primer sets off the intermediate charge, and the intermediate charge ignites the first-fire composition on the ignition increment of the flare.
Delay	0 seconds.
Effects	The trip flare produces 35,000 candlepower illumination for 55 seconds (minimum). The area of illumination is an approximately 300-meter radius.
Colors and Markings	Olive drab body with black markings.

WARNINGS

Surface trip flares can cause fires when thrown on dry tender.

The minimum safe distance from an ignited surface trip flare is 2 meters because of sparks and the popping of burning magnesium.

Never look directly at a burning surface trip flare. The intense flame can injure your eyes. At close ranges, surface trip flares may damage night vision devices and sights.

DO NOT attempt to cook off a trip flare. The fuze has a .0-second time delay.

WARNING

Inspect trip flares before use and properly secure them to avoid serious injury.

3-53. Several portions of the trip flare must be inspected:

- Body.
- Mounting bracket.
- Other components.

BODY

3-54. Inspect the body of the trip flare in the same way as that of a hand grenade. (See Chapter 2 for inspection procedures.)

MOUNTING BRACKET

3-55. Personnel should inspect the mounting bracket to ensure that—

- The mounting bracket is present and firmly affixed to the flare.
- The mounting bracket shows no signs of damage.

3-56. To inspect the flare and mounting bracket for proper operation (Figure 3-14), press lever against the flare body and check for:

- Straightness of the pull pin.
- Alignment of the safety clip and holes in the cover loading assembly.
- Corrosion and looseness of the cover loading assembly.
- Alignment of the hinge pins in the cover loading assembly.

WARNING

Turn in immediately to the supervisor if the cover assembly is corroded or loose, or if the hinge pins are misaligned.

- Deformed flare and bracket.
- Tension and position of the trigger spring. The trigger should rotate counterclockwise to the extreme position as shown in Figure 3-14, and return to the original position when released.
- Legibility of ammunition lot number.

NOTE: Flares unable to pass the above inspection should be disposed of according to the unit SOP.

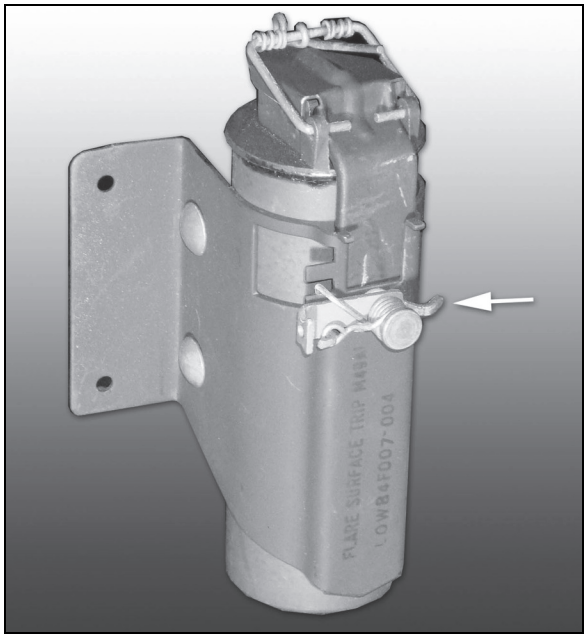

Figure 3-14. M49A1 surface trip flare trigger spring position

OTHER COMPONENTS

3-57. The trip flare is issued with a spool of trip wire and nails. Personnel should inspect these components and ensure that they are present.

STORAGE

3-58. Personnel should carry trip flares according to the unit SOP. When carrying trip flares, personnel should adhere to the following guidelines:

- Ensure placement of the trip flare is in a secure, dry area.

CAUTION

Duds or improper functioning could occur if exposed to moisture for long periods of time. Open just before use.

- DO NOT put adhesive tape around any portion of the trip flare during storage.

WARNING

DO NOT bend, tamper, modify, or otherwise alter a trip flare. DO NOT tape any portion of the trip flare during storage.

USE

NOTE: A graphic training aid (GTA) is included in the trip flare's shipping box that gives detailed instructions for installing the flare.

MOUNTED

3-59. Soldiers should mount the trip flare using the following procedures:

- Choose a location.

NOTE: The location chosen for the flare should be to the right (looking toward the enemy) of the field to be illuminated, so the trip wire, when attached, runs to the right of the flare (when facing the trigger).

WARNING

Surface trip flares can cause fires when mounted on dry tender.

- Using two of the nails supplied, nail the mounting bracket (with ends of the two tabs upward) to a stake, post, or suitable support at the height desired for the trip wire (usually 15 to 18 inches above the ground).

WARNING

Never mount a surface trip flare above knee level.

- Mount the flare by sliding the two square holes of the anchor clip over the matching tabs on the holder, and press the flare down until it locks in position.

NOTE: If desired, a third nail may be driven through the hole in the lower end of the anchor clip.

- Fasten one end of the trip wire to the post, stake, or other rigid object at the desired distance from the flare (usually about 40 feet) and at the right of the flare (when facing the flare trigger).
- Press the fuze safety lever down with one hand, and rotate the trigger one-quarter turn counterclockwise against the spring pressure with the other hand to the vertical position, so the lower end of the safety lever is behind the upper end of the trigger.
- Pull the loose end of the trip wire taut, and fasten it to the tripwire hole in the lower end of the trigger.
- Check to see that the trip wire is taut and fastened at both ends. That the trigger tongue is vertical with the fuze safety lever (ensure the bottom portion of the lever is behind the upper end of the trigger tongue) so when the safety clip and pull pin are withdrawn, the trigger tongue holds the safety lever.

DANGER

ENSURE THAT THE TRIGGER TONGUE IS VERTICAL WITH THE FUZE SAFETY LEVER (LEVER IS BEHIND THE UPPER END OF THE TRIGGER TONGUE) SO WHEN THE SAFETY CLIP AND PULL PIN ARE WITHDRAWN, THE SAFETY LEVER IS STILL HELD BY THE TRIGGER TONGUE. FAILURE TO DO SO CAN RESULT IN ACCIDENTAL IGNITION OF THE TRIP FLARE.

- Hold the lever with one hand, while carefully withdrawing the pull ring and safety pin from the flare.
- Carefully release the hold on the safety lever, while making sure the lever is held in place by the upper end of the trigger tongue.

- Move to a safe location.

WARNINGS

The minimum safe distance from an ignited surface trip flare is 2 meters because of sparks and the popping of burning magnesium.

Never look directly at a burning surface trip flare. The intense flame can injure your eyes.

At close ranges, surface trip flares may damage night vision devices and sights.

Never conduct PMCS maintenance while the trip flare is mounted for operation. Render the trip flare safe before cleaning by following the removal steps in paragraph 3-60.

REMOVAL

3-60. To remove a trip flare—

- Carefully depress the safety lever to align the holes in the lever and the fuze.
- Insert and return to the safety clip and pull pin to their original configuration.
- Detach the trip wire from the trigger, while holding the safety lever against the flare.
- Rotate the trigger to its original position.
- Remove the nails from the mounting bracket and the anchor clip.
- Return the flare to its original configuration in the mounting bracket and tighten the wing nuts snug.
- Return the flare to its original packaging if available.

MAINTENANCE

3-61. When exposed to the environment, trip flares require PMCS. If not removed, dirt or sand can cause the trip flare to malfunction.

CLEANING

3-62. To clean the trip flare—

- Wipe the dirt off the flare using a clean, dry, lint-free cloth.
- Use a fine-bristled camel hair brush to remove any foreign matter or debris.

SECTION III. SIMULATED SIGNALS

3-63. Some pyrotechnic simulators can be used to provide early warning signals and to illuminate the immediate area; however, the primary purpose and design is to imitate the sounds and effects of combat detonations during field training exercises.

EARLY WARNING SIMULATORS

3-64. Early warning simulators generate different effects upon initiation, but are used the same way. They are activated by triggering trip wires attached to the igniter cords. The three types of booby trap simulators each generate a different effect upon initiation.

WARNING

Simulators are potentially dangerous if activated close to personnel or if improperly handled.

M117 FLASH EXPLOSIVE BOOBY TRAP SIMULATOR

3-65. The M117 flash booby trap simulator (Figure 3-15) produces an explosion, flash, and sound. Table 3-6 outlines its components and characteristics.

NOTE: The M117 simulator has a dimple in the mounting bracket for additional identification at night.

Figure 3-15. M117 flash explosive booby trap simulator

Table 3-6. Components and characteristics of M117 flash explosive booby trap simulator

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	1370-00-028-5256.
Weight loaded	0.09 ounces.
Length	3.9 inches.
Diameter	0.98 inches.
Method of activation	Tripwire.
Body	Kraft paper.
Color	White label with black markings.
Effects	Explosion, flash, and sound.
Functioning time	Instantaneous.

WARNING

DO NOT pull the igniter cord on the M117 booby trap simulator by hand, as it immediately activates. Booby trap simulators may cause ear damage or burns if activated within 2 meters of personnel. Never open a simulator; the photoflash powder is extremely susceptible to flash ignition by even a slight amount of friction.

M118 ILLUMINATING EXPLOSIVE BOOBY TRAP SIMULATOR

3-66. The M118 illuminating booby trap simulator (Figure 3-16) produces illumination. Table 3-7 outlines its components and characteristics.

Figure 3-16. M118 illuminating explosive booby trap simulator

Table 3-7. Components and characteristics of M118 illuminating explosive booby trap simulator

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	1370-00-028-5257.
Weight loaded	0.18 ounces.
Length	3.9 inches.
Diameter	0.98 inches.
Method of activation	Trip wire.
Body	Kraft paper.
Color	White label with black markings.
Effects	Illumination.
Functioning time	28 seconds minimum flame.

WARNING

DO NOT pull the igniter cord on the M118 booby trap simulator by hand, as it immediately activates. Booby trap simulators may cause ear damage or burns if activated within 2 meters of personnel. Never open a simulator; the photoflash powder is extremely susceptible to flash ignition by even a slight amount of friction.

M119 WHISTLING EXPLOSIVE BOOBY TRAP SIMULATOR

3-67. The M119 whistling booby trap simulator (Figure 3-17) produces a whistling sound. Table 3-8 outlines its components and characteristics.

Figure 3-17. M119 whistling booby trap simulator

Table 3-8. Components and characteristics of M119 whistling booby trap simulator

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	1370-00-028-5255.
Weight loaded	0.12 ounces.
Length	4.4 inches.
Diameter	0.98 inches.
Method of activation	Trip wire.
Body	Kraft paper.
Color	White label with black markings.
Effects	Whistle sound.
Functioning time	2.5 to 5 seconds.

WARNING

DO NOT pull the igniter cord on the M119 booby trap simulator by hand, as it immediately activates. Booby trap simulators may cause ear damage or burns if activated within 2 meters of personnel. Never open a simulator; the photoflash powder is extremely susceptible to flash ignition by even a slight amount of friction.

INSPECTION

WARNING

Inspect early warning simulators before use and properly secure them to avoid serious injury.

Initial Inspection

CAUTION

During storage, keep boxes sealed. Duds or improper functioning could occur if exposed to moisture for long periods of time. Open just before use.

3-68. When in bulk, simulators arrive secured in shipping containers (Figure 3-18). Personnel should inspect the shipping container upon receipt. DO NOT open damaged shipping containers; return them to the ASP or disposed of using the methods outlined in the unit SOP.

3-69. Within the shipping container are vacuumed sealed barrier bags. Upon removing the sealed barrier bags from the shipping container (Figure 3-18), personnel should inspect each barrier bag and identify any of the following discrepancies:

- Damage to the barrier bag.
- Signs of tampering.

Figure 3-18. Early warning simulator shipping container and barrier bags

3-70. Inside the barrier bags are cardboard shipping boxes. Upon removing the cardboard shipping boxes from the sealed barrier bags (Figure 3-19), personnel should inspect each cardboard shipping box and identify any of the following discrepancies:

- Crushed or damage to the cardboard shipping box.
- Signs of tampering.

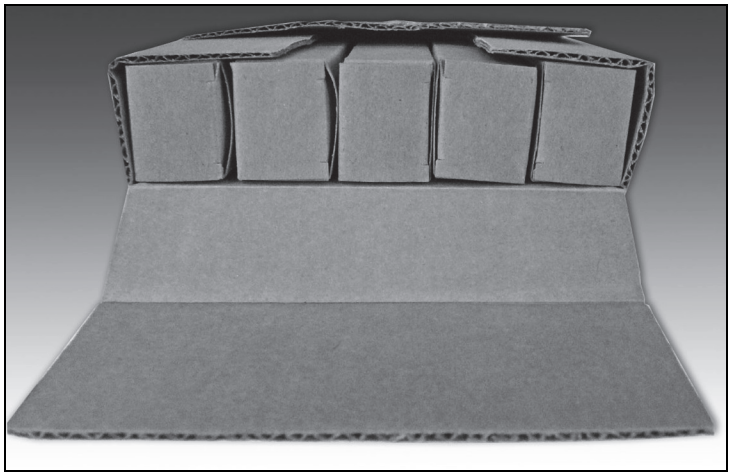

Figure 3-19. Early warning simulator cardboard shipping box

3-71. Personnel should then remove the early warning simulator from the container. Once the signal has been removed from the container (Figure 3-20), personnel should inspect the signal and identify any of the following discrepancies:

- Missing components, such as—
  - Simulator assembly.
  - Spool assembly.
  - Simulator cap.
  - Extension spring.
  - Bracket.
- Damage to the simulator assembly.
- Visible holes in the body.
- Broken cap seal.
- Damage to the mounting bracket.
- Damage or missing safety clip.

Figure 3-20. Early warning simulator removed from the cardboard shipping box

NOTE: If any of the discrepancies are found upon receipt of newly issued early warning simulators, personnel should return the simulator and shipping containers to the issuing person or dispose of it according to the unit SOP.

Before Storing

3-72. Before securing early warning simulators, personnel should take the following safety precautions:

- Ensure the body is not bent or punctured.
- Ensure the seal securing the cap is not broken.
- Ensure the safety clip is present and not damaged.
- Ensure all other kit components (Figure 3-21) are present.

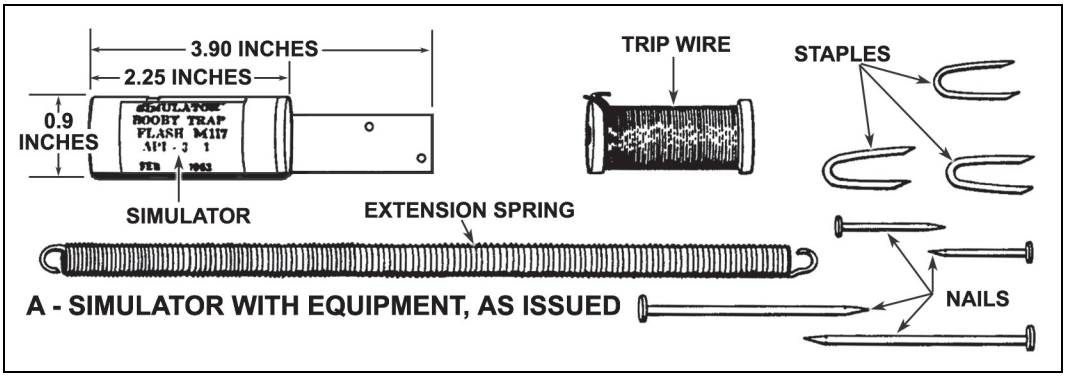

Figure 3-21. Kit components

STORAGE

3-73. Personnel should carry early warning simulators according to the unit SOP. When carrying early warning simulators, personnel should adhere to the following guidelines:

- Ensure that the early warning simulator is placed in a secure, dry area.

CAUTION

Duds or improper functioning could occur if exposed to moisture for long periods of time. Open just before use.

- DO NOT put adhesive tape around any portion of the early warning simulator during storage.

WARNING

DO NOT bend, tamper, modify, or otherwise alter a trip flare. DO NOT tape any portion of the trip flare during storage.

USE

DANGER

EARLY WARNING SIMULATORS MUST BE MOUNTED; DO NOT ACTIVATE THEM BY HAND. EARLY WARNING SIMULATORS IMMEDIATELY ACTIVATE.

EARLY WARNING SIMULATORS CAN SERIOUSLY INJURE PERSONNEL WITHIN 2 METERS.

NEVER OPEN A SIMULATOR; THE PHOTOFLASH POWDER IS EXTREMELY SUSCEPTIBLE TO FLASH IGNITION BY EVEN A SLIGHT AMOUNT OF FRICTION.

WARNINGS

Early warning simulators must not be activated in loose gravel, sticks, or other materials that could become projectiles, nor should they be thrown into dry leaves, grass, or other flammable materials. Dry grass or leaves within 3 feet may become ignited.

DO NOT tape or wire early warning simulators to any surface. Use nails.

DO NOT remove the simulator cap before use.

NOTE: A GTA is included in the early warning simulator's cardboard shipping box that gives detailed instructions for installing the simulator. TM 9-1370-207-10 provides the same illustrative instructions.

3-74. The instructions included with the early warning simulator show how to install the simulator on a tree. This is just one technique of installing the early warning simulator.

3-75. To install an early warning simulator—

(1) Select two objects, such as trees or stakes, not more than 20 feet apart.
(2) About 6 inches above the ground, drive a large nail into one object.
(3) Drive a staple about 2 inches above and to the right of the nail.
(4) Drive a second staple into the object about 20 inches above the first staple.
(5) Drive a large nail 1 inch below the top staple.

NOTE: This can be used to temporarily hold the spring on the lower staple.

(6) Extend the spring to the nail driven in during Step 5.
(7) Make a 6-inch loop in one end of the tripwire, and tie it with a double-knot. Thread the loop down through the top staple, and attach to the upper end of the spring only.
(8) Maintain tension on the tripwire, and run it down the object, under the bottom nail, and toward the second object.
(9) Drive a staple into the second object at the lowest point that allows free travel of the tripwire.
(10) Maintain tension on the tripwire, and tie the wire to a large nail, just below its head. Wedge the nail between the staple and the object to ensure a taut and secure tripwire.
(11) Carefully unhook the extended spring from the temporary nail. The spring should keep the wire taut.
(12) Remove the tape securing the cap. Remove the cap from the simulator, and allow the pull cord to hand freely.
(13) Nail the simulator about 4 inches above the top of the spring.
(14) Leave 1 or 2 inches of slack in dangling cord, and tie the cord to the end of the spring that is fastened to the tripwire.

MAINTENANCE

3-76. There is no unit level maintenance for the early warning simulators. Turn in unused items to ammunition support area as soon as possible, or dispose of according to the unit SOP. Provide as much protection for these items by repacking in original containers, if available, or equivalent improvised packaging.

- All repacking should be tightly wrapped, clearly marked, and waterproof.
- Avoid exposure to moisture and rough physical contact.

DESTRUCTION PROCEDURES

3-77. Selection of the method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. The most effective method to destroy handheld signals is by burning or firing, or a combination of these methods. If destruction by burning is the chosen method, evacuate personnel 800 feet from destruction point. Refer to paragraph 3-38 for degree of damage for information.

GROUND-BURST SIMULATOR

3-78. The M115A2, projectile ground-burst simulator replicates the detonation of artillery and mortar projectiles or artillery-type rockets (Figure 3-22). Activated by pulling its M3A1 friction delay igniter cord and immediately thrown into a cleared area. After a 6- to 10-second delay, it produces a high-pitched whistle that lasts 2 to 4 seconds and then detonates with a loud report and brilliant flash. Table 3-9 outlines its components and characteristics.

NOTE: Instructions for the ground-burst simulator are printed directly on the simulators.

WARNING

The M115A2 projectile ground-burst simulator must not be used near personnel due to potential hazard from fragmentation. Ensure the simulator is not thrown to any point within 35 meters of unprotected personnel. When using the M115A2 ground-burst simulator, the thrower should turn away from the simulator after throwing and assume a protective stance.

WARNING

For protection, personnel throwing the M115A2 simulator must wear the following items: ear protection, safety eyewear, and a protective helmet and vest. The user must wear a standard-issue leather glove on the throwing hand.

WARNING

DO NOT activate the M115A2 in loose gravel, sticks, or other materials that could become projectiles. DO NOT throw into dry leaves, grass, or other flammable materials.

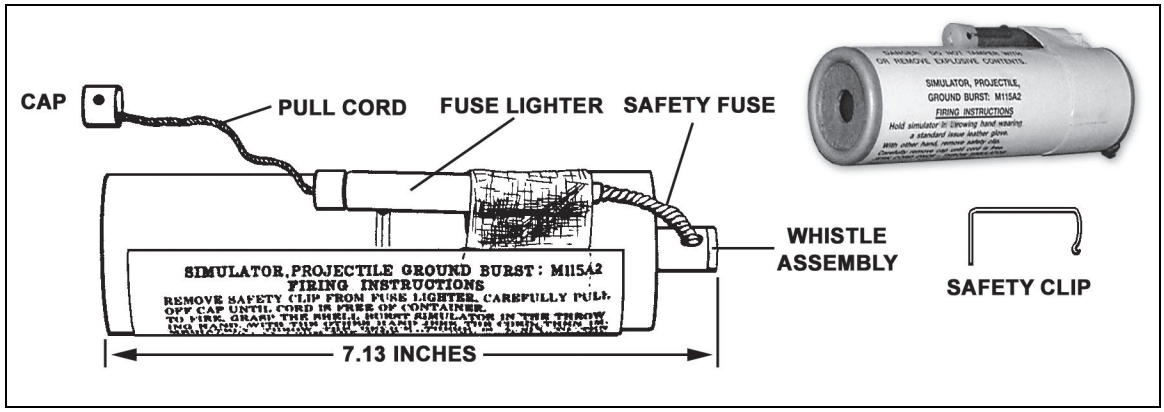

Figure 3-22. M115A2 ground-burst simulator

Table 3-9. Components and characteristics of M115A2 ground-burst simulator

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	1370-00-752-8126.
Weight loaded	2.2 pounds.
Length	7.13 inches.
Diameter	2.38 inches overall.
Method of activation	Hand pull cord.
Body	Kraft paper.
Color	White overall with white label with black markings.
Effects	Whistle sound and explosive blast.
Functioning time	Whistle 6 to10 seconds after ignition. Burst 8 to14 seconds after ignition.

INSPECTION

3-79. Inspection at unit level comprises a visual check of packaging materials. DO NOT open any moisture-proof container or barrier bag because the item must be protected from moisture until just before use.

3-80. The most commonly encountered packaging defects are listed below:

- Outer containers (boxes) damaged, weathered, or rotted to the extent that contents are not protected.
- Inner container damaged to the extent that contents are not protected or cannot be readily removed.
- Container cap or closure not secured to the extent that contents are not protected.
- Inner containers wet (except metal), rusted, moldy, or mildewed.
- Hardware or banding loose, missing, broken, or ineffective.
- Handle or cleat missing or broken.
- Contents loose to the extent that item may be damaged in handling.

STORAGE

3-81. Take the following precautions when storing M115A2 ground-burst simulators—

- Select level, well-drained sites free from readily ignitable and flammable materials.
- Provide nonflammable or fire-resistant overhead covers (for example, tarpaulin) for all items. Maintain overhead space of approximately 18 inches (46 centimeters) between cover and items. Keep cover at least 6 inches (15.5 centimeters) from pile on the ends and at sides to permit circulation of air.
- Temporarily store unserviceable items in a segregated area.

USE

3-82. To prepare and throw a ground-burst simulator by hand—

- Remove safety clip from fuze lighter.
- Grasp simulator in throwing hand. Carefully remove cap until free end of igniter and cord is partially extended.
- Assume throwing position (standing, kneeling, or prone). Jerk the pull-cord once, and throw immediately. (See Chapter 2 for throwing positions.)

MAINTENANCE

3-83. There is no unit level maintenance for the ground-burst simulators. Turn in unused items to ammunition support area as soon as possible. Provide as much protection for these items by repacking in original containers, if available, or equivalent improvised packaging.

- All repacking should be tightly wrapped, clearly marked, and waterproof.
- Avoid exposure to moisture and rough physical contact.

DESTRUCTION PROCEDURES

3-84. Selection of the method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. The most effective method to destroy handheld signals is by burning or firing, or a combination of these methods. If destruction by burning is the chosen method, evacuate personnel 800 feet from destruction point. Refer to paragraph 3-38 for degree of damage information.

HAND GRENADE SIMULATOR

3-85. Use the M116A1 hand grenade simulator (Figure 3-23) to create battle noises and flashes during training. It differs from the ground-burst simulator in that it is shorter and does not emit a high-pitched whistle before detonation. The hand grenade simulator is thrown in the same manner as a live grenade. It creates a flash and loud report 5 to 10 seconds after ignition. New lots feature an orange label with black lettering instead of a white background with black and red lettering. Table 3-10 outlines its components and characteristics.

WARNINGS

The safety radius for the M116A1 simulator is 30 meters. If this distance is not observed, hearing damage and possible fragmentation injury could result.

The M116A1 simulator must not be used near personnel due to potential hazard from fragmentation.

DO NOT activate the M116A1 in loose gravel, sticks, or other materials that could become projectiles. DO NOT throw into dry leaves, grass, or other flammable materials.

For protection, personnel throwing the M116A1 simulator must wear the following items: ear protection, safety eyewear, and a protective helmet and vest. The user must wear a standard-issue leather glove on the throwing hand.

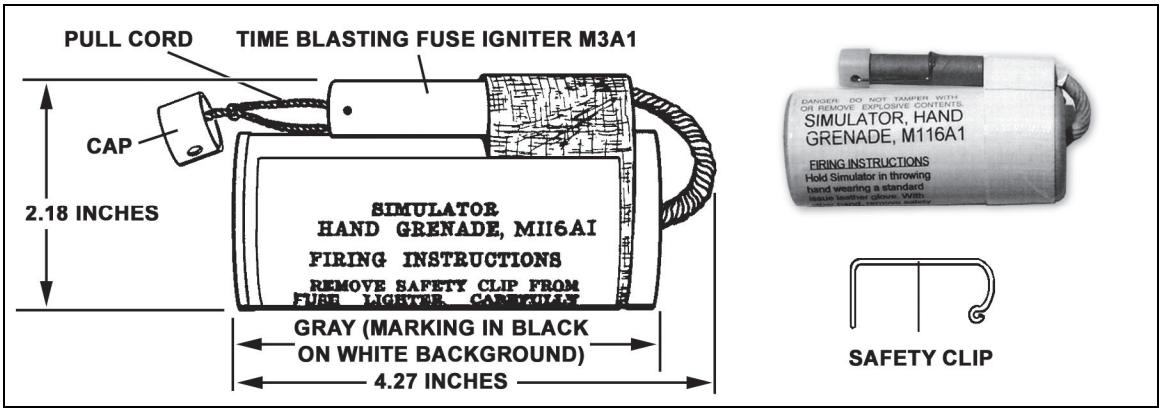

Figure 3-23. M116A1 hand grenade simulator

NOTE: Instructions for the hand grenade simulator are printed directly on the simulators.

Table 3-10. Components and characteristics of M116A1 ground-burst simulator

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	1370-00-752-8124.
Weight loaded	0.2 pounds.
Length	4.30 inches.
Diameter	2.18 inches overall.
Method of activation	Hand pull cord.
Body	Kraft paper.
Color	White overall with white label with black markings.
Effects	Explosive blast.
Functioning time	Burst 5-to 10 seconds after ignition.

SECTION IV. ILLUMINATION GROUND SIGNAL KITS

3-86. The pen gun flare supports the small-unit leader in fire control, maneuver, and initiating operations such as ambushes. These signals are also a component of air crewmen's survival vest and used for distress signaling or to identify ground locations for aircraft (Figure 3-24). The pen gun flare comes in two kits, the M185/M186 (personnel signal kit) and the M260 (red personnel distress signal kit).

WARNINGS

At close-range, these signals can injure or kill if they strike a person.

When signaling an aircraft, DO NOT aim directly at the aircraft; the signals, regardless of color, may appear to be small arms fire.

While the flares are small and usually burn out before reaching the ground, they can ignite fires.

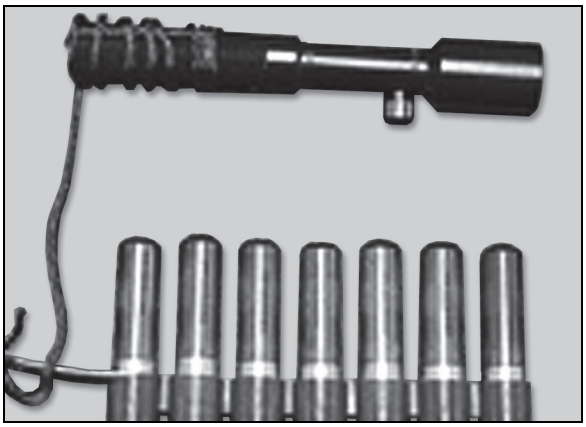

Figure 3-24. M260 illumination ground signal kit

M185 AND M186 PERSONNEL SIGNAL KITS

3-87. This pen gun flare has a threaded projector with the projectiles contained in a cloth bandoleer. The projector, the bandoleer, and seven projectiles or signals make up the signal kit (Figure 3-25). All signals may be obtained and fired separately.

3-88. Four signals may be fired from a handheld projector while in a bandoleer:

- M187 red illumination ground signal.
- M188 white illumination ground signal.
- M189 green illumination ground signal.
- M190 amber illumination ground signal.

3-89. The M185 red signal kit contains seven red ground illumination signals (M187). The M186 signal kit contains three red ground illumination signals (M187), two green, and two white signals. Table 3-11 outlines its components and characteristics.

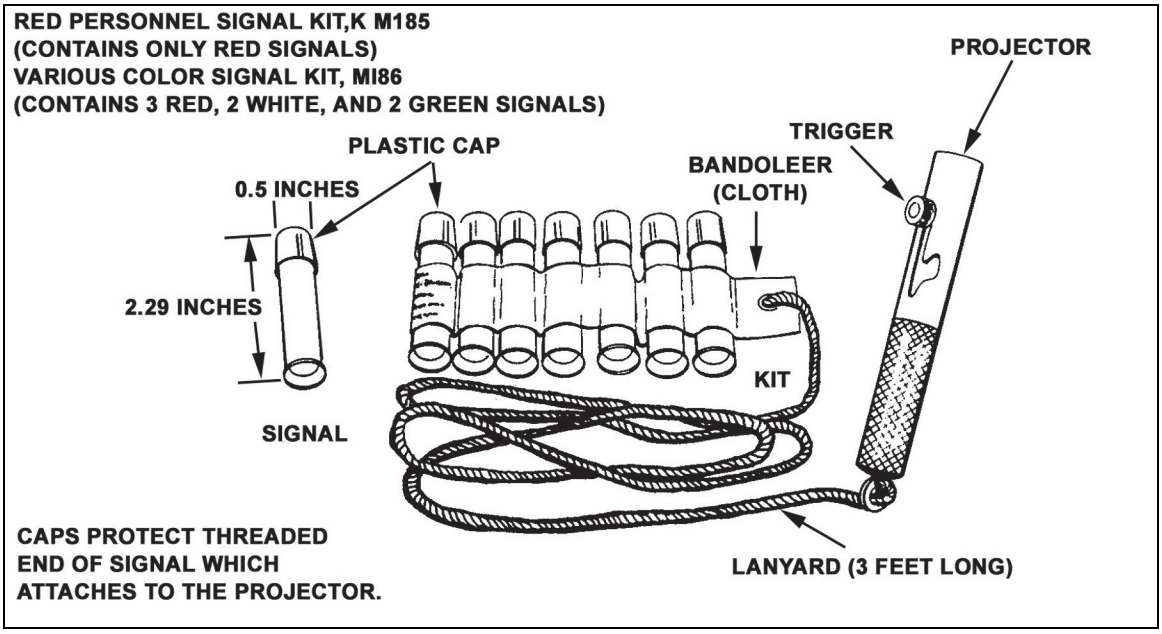

Figure 3-25. M185-red/M186-various color personnel signal kit

Table 3-11. Components and characteristics of M185-red/M186-various color personnel signal kit

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	M185: 1370-00-921-6172. M186: 1370-00-926-9387.
Weight loaded	0.39 pounds.
Length	Projector: 4 inches. Lanyard: 36 inches. Signal: 2.29 inches.
Diameter	Projector: 0.59 inches. Signal: 0.5 inches.
Method of activation	From projector.
Body	Aluminum.
Color	Black projector: anodized color coding on signals.
Effects	Illuminant composition with 3200 candlepower.
Functioning time	5-seconds.

M260 RED PERSONNEL DISTRESS SIGNAL KIT

3-90. This pen gun flare has a force-fitted projector and a plastic bandoleer. The projector, the bandoleer, and seven signals make up this kit (Figure 3-26). Table 3-12 outlines its components and characteristics.

3-91. This kit contains only red illumination ground signals. The signals in this kit are more powerful than those in the M185 and M186 personnel signal kits. They have a more powerful propellant allowing a higher probability of penetration through overhead foliage. The burning time for these signals is 10 seconds at 10,000 candlepower.

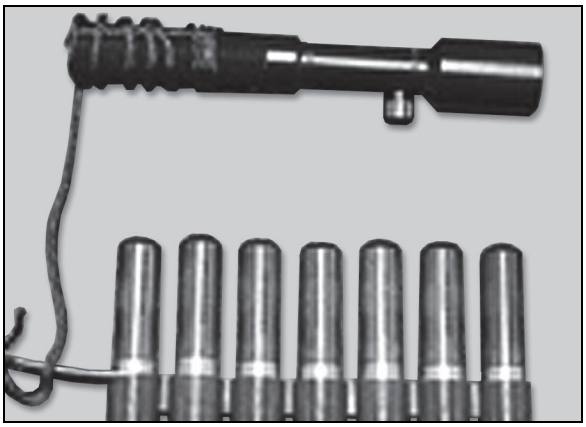

Figure 3-26. M260 red personnel distress signal kit

WARNINGS

At close-range, these signals can injure or kill if they strike a person.

When signaling an aircraft, DO NOT aim directly at the aircraft; the signals, regardless of color, may appear to be small arms fire.

While the flares are small and usually burn out before reaching the ground, they can ignite fires.

Table 3-12. Components and characteristics of M260 red personnel distress signal kit.

COMPONENTS AND CHARACTERISTICS	*DETAILS*
NSN	1370-00-490-7362.
Weight loaded	3.2 ounces.
Length	Projector: 5.5 inches. Lanyard: 30 inches. Signal: 2 inches.
Diameter	Projector: 0.8 inches. Signal: 0.5 inches.
Method of activation	From projector.
Body	Aluminum.
Color	Black projector: anodized color coding on signals.
Effects	Illuminant composition with 10,000 candlepower.
Functioning time	10-seconds.

INSPECTION

3-92. Inspection at unit level comprises a visual check of packaging materials. DO NOT open any moisture-proof container or barrier bag because the item must be protected from moisture until just before use.

3-93. The most commonly encountered packaging defects are listed below:

- Outer containers (boxes) damaged, weathered, or rotted to the extent that contents are not protected.
- Inner container damaged to the extent that contents are not protected or cannot be readily removed.
- Container cap or closure not secured to the extent that contents are not protected.
- Inner containers wet (except metal), rusted, moldy, or mildewed.
- Hardware or banding loose, missing, broken, or ineffective.
- Handle or cleat missing or broken.
- Contents loose to the extent that item may be damaged in handling.

STORAGE

3-94. Take the following precautions when storing the illumination ground signal kit—

- Select level, well-drained sites free from readily ignitable and flammable materials.
- Provide nonflammable or fire-resistant overhead covers (for example, tarpaulin) for all items. Keep cover at least 6 inches (15.5 centimeters) from pile on the ends and at sides to permit circulation of air.
- Temporarily store unserviceable items in a segregated area.

USE

3-95. To operate an illumination ground signal kit—

- Select the signal to be fired by color (if using the M186 pen flare kit). If the bandoleer contains more than one signal of the chosen color, use the one farthest from the lanyard.
- Remove and discard the plastic cap (M185 and M186 only).
- Cock the projector by moving the trigger to the safety slot (M185 and M186 only).
- Carefully thread the projector onto the signal. Take care not to dislodge the trigger from the safety slot (M185 and M186 only).
- Aim in the chosen direction.
- Fire by moving the trigger to the bottom of the slot and releasing it with a snap.
- If the expended signal is on the end of the bandoleer or if the signals between the expended signal and the end have been used, cut the bandoleer and discard the waste.
- Return the partly used kit to the carrier bag, and seal with tape.

MAINTENANCE

3-96. There is no unit level maintenance for the illumination ground signal kit. Turn in unused items to ammunition support area as soon as possible. Provide as much protection for these items by repacking in original containers, if available, or equivalent improvised packaging.

- All repacking should be tightly wrapped, clearly marked, and waterproof.
- Avoid exposure to moisture and rough physical contact.

DESTRUCTION PROCEDURES

3-97. Selection of the method of destruction requires imagination and resourcefulness in the utilization of the facilities at hand under the existing conditions. The most effective method to destroy handheld signals is by burning or firing, or a combination of these methods. If destruction by burning is the chosen method, evacuate personnel 800 feet from destruction point. Refer to paragraph 3-38 for degree of damage information.

Chapter 4
Training

This chapter outlines the hand grenade and pyrotechnic signal training program. This training program progresses from fundamentals to advanced training, culminating with the integration of hand grenades and pyrotechnics into situational and field training exercises.

SECTION I. TRAINING STRATEGY

4-1. The goal of the hand grenade and pyrotechnic signal training program is to produce Soldiers who are proficient in using hand grenades and pyrotechnic signals for any tactical situation. The primary focus of the training program is making Soldiers aware of the types of hand grenades and pyrotechnic signals available, and their purposes, capabilities, and target applications. Throughout this training, incorporate safe handling and employment practices in instructions and task execution to reduce injuries.

OBJECTIVES

4-2. The hand grenade training program progresses using the crawl—walk—run methodology. The program advances from fundamental to advanced training, culminating with the integration of hand grenades into situational and field training exercises.

4-3. Once Soldiers achieve proficiency, implement a sustainment program to maintain the high proficiency level. The following progressive training outline can be used or modified, as needed:

- Instruction on—
  - Safety inspection and maintenance of hand grenades and pyrotechnic signals.
  - Visual identification of hand grenades and pyrotechnic signals, and classification by their purposes and capabilities.
- Instruction and practical exercises on—
  - Fundamentals of hand grenade gripping/preparing procedures, throwing techniques, and throwing positions.
  - Fundamentals of pyrotechnic signal procedures and employment techniques.
- Practical exercises emphasizing—
  - Distance and accuracy of hand grenades using targets of different types at various ranges.
  - Placement of smoke and incendiary grenades, and early warning devices; communication signal launching procedures; and use of ground-burst simulators.
  - Negotiation of training courses that integrate hand grenades and pyrotechnic signals into buddy team movement techniques and multiple target engagements at various ranges.

INITIAL AND SUSTAINMENT TRAINING

4-4. The training strategy for hand grenades begins in IET and continues in the unit.

INITIAL TRAINING

4-5. In IET, Soldiers learn how to inspect and maintain hand grenades. The training received includes proper preparing and griping techniques for throwing the grenades from three positions—standing, kneeling, and prone. Instruction also covers the M67 and M69 hand grenades, and Soldiers receive a demonstration of the AN-M14 TH3 incendiary hand grenade and M18 and M83 smoke grenades. Then, Soldiers demonstrate skill in

preparing and throwing practice grenades. Once the Soldier demonstrates proficiency, they progress to throwing live hand grenades.

4-6. IET training culminates in the Soldier's proficiency assessment conducted on the hand grenade qualification course (consisting of seven stations). During this training, Soldiers master the art of using cover and concealment to assault enemy soldiers in the open, in trenches, in fighting positions, in bunkers, and against enemy vehicles. At the last station, Soldiers must identify the hand grenades and pyrotechnics shown and demonstrated throughout the course.

4-7. Figure 4-1 shows the IET training strategy.

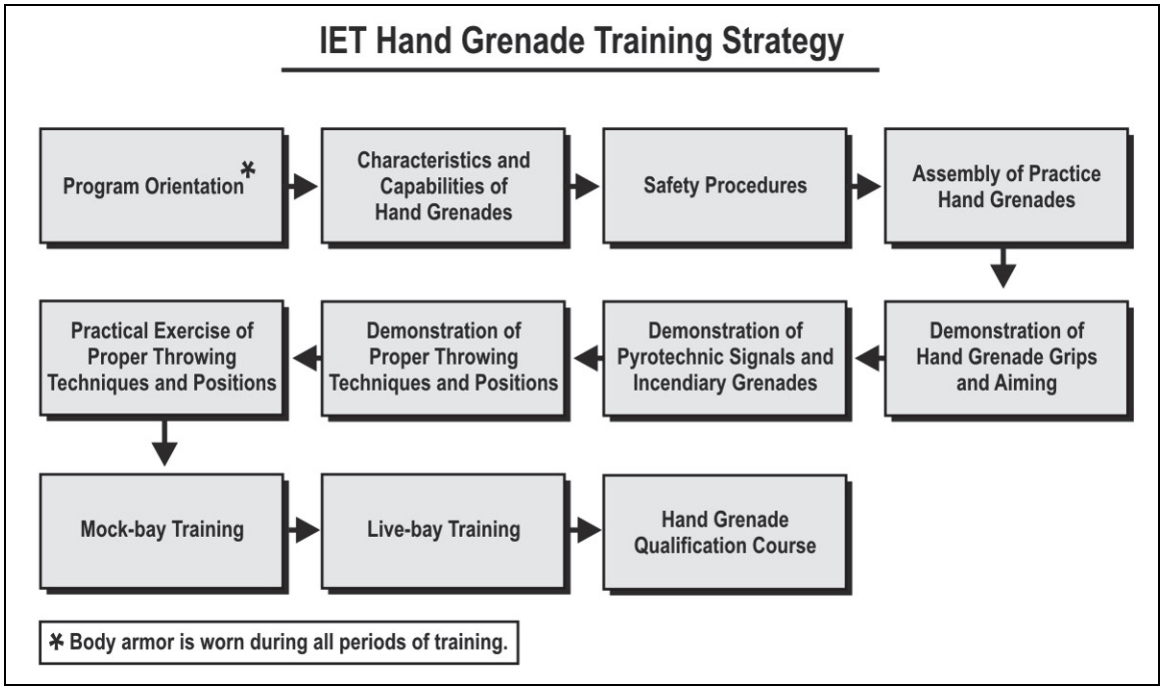

Figure 4-1. Initial entry training hand grenade training strategy

SUSTAINMENT TRAINING

4-8. Training continues in active Army, National Guard, and Army Reserve units using the same basic skills taught in IET, but at a higher level of skill. Units should set up a year-round program to sustain skills and have a plan for when they are at their home station and deployed.

NOTES: 1. Hand grenade training is a high-risk form of individual training. Not only must units reinforce training Soldiers received during IET, they must add training on hand grenades used at the unit level (not covered in IET).

2. Pyrotechnic signals are used throughout IET. However, IET Soldiers only view demonstrations provided by range instructors and training cadre. Unit leaders must ensure Soldiers receive training and are aware of the capabilities of pyrotechnic signals before issuing them.

4-9. To sustain the basic hand grenade skills taught in IET, periodic preliminary instruction is conducted, followed by the hand grenade instructional and qualification course. Key elements include—

- Training the trainer.
- Refresher training of hand grenade skills using the M69 TPG.
- Sustainment training using live hand grenades.
- Remedial training.

NOTE: Not all Soldiers are proficient in throwing grenades. A Soldier who demonstrates high-risk tendencies during practice events must be identified and receive training reinforcement before throwing live hand grenades. Soldiers who continually demonstrate high-risk tendencies during reinforcement training should not be allowed to throw live hand grenades or use pyrotechnic signals.

4-10. Additional skills trained in the unit include—

- Hand grenades other than the M67.
- Pyrotechnic signal employment considerations.
- Chemical, biological, radiological, nuclear (CBRN) with hand grenades and pyrotechnic signals.
- Employment of hand grenades (exploding, bursting, and burning smoke) as a member of a fire team.

4-11. Train and integrate these skills into collective training exercises, such as platoon and squad live-fire situational training exercises (STXs).

CAUTION

Fragmentation, concussion, and stun (FLASHBANG) grenade training is considered high-risk training. These grenades should be thrown on designated hand grenade ranges only. Units must use the M69 TPG with a M228 TPF to simulate employment of the fragmentation grenade, and the M102 practice stun hand grenade with M240 detonating fuze to simulate the employment of the stun grenade for reinforcement training and collective training scenarios.

SECTION II. TRAINING PROGRAM

4-12. The training listed in this chapter, except for the standard Army hand grenade qualification course, is a model to assist units in meeting their training objectives. This training can be modified to support the unit mission-essential task list (METL), the terrain, and the commander's intent.

MISSION-ESSENTIAL TASKS

4-13. Hand grenade proficiency is critical to Soldiering and is required for any unit deployed to a wartime theater. All commanders should develop a METL and organize a training program that devotes adequate time to hand grenade and pyrotechnic signals. Consider the unit's combat mission when establishing training priorities. This not only applies to the tasks selected for the unit's METL, but also to the conditions under which the tasks are to be performed, especially in an urban environment, where the effects of blast, burning, and/or vapor hazards, and wind cause adverse effects.

TRAINING ASSESSMENT

4-14. To conduct an effective hand grenade program, the unit commander must determine the current level of proficiency of all assigned personnel. Constant evaluation provides commanders understanding of where training emphasis is needed. Review results to determine any areas that need strengthening, along with any individuals that require special attention. Based on this evaluation, develop hand grenade and pyrotechnic signal training programs. Commanders continually assess the program and modify it, as required. To develop a training plan and assess the training program, commanders should use the following tools:

- Direct observation of training.
- Spot checks.
- Review of past training.

4-15. Based on the commander's evaluation, identify goals, missions, and semiannual or annual training events. Training programs must be continuous, and to sustain an effective program, resources are required.

While the unit may only qualify its Soldiers annually, test results show that sustainment training is required at least semiannually to maintain Soldier skills.

DIRECT OBSERVATION OF TRAINING

4-16. Observing and accurately recording Soldier performance reveals the status of qualification results, and each Soldier's ability to identify the threat and successfully engage a target with the correct hand grenade. This also allows the commander to identify Soldiers who need special assistance to reach required standards and those who exceed these standards.

NOTE: Soldiers should also be certified on pyrotechnic signals.

SPOT CHECKS

4-17. Spot checks of individual training performance, such as interviews and evaluations of Soldiers, provide commanders with valuable information about Soldier proficiency and knowledge of the training tasks.

REVIEW OF PAST TRAINING

4-18. Commanders review past training to gain valuable information to develop a training plan. The assessment should include—

- The training program task.
- The frequency and results of training.

COMMANDER'S EVALUATION GUIDE

4-19. The commander's evaluation guide contains three sections. They are as follows:

- Commander's priorities and intent.
- Soldier assessment.
- Trainer assessment.

4-20. The following is an example of a commander's evaluation guide. Commanders can use this guide not only to assess their unit's training proficiency, but also to assess the unit leaders and their ability to implement a training program. They can also use it to develop noncommissioned officers (NCOs) into subject matter experts.

Commander's Priorities and Intent

4-21. When considering their priorities and intent, commanders answer the following questions:

- Have you clearly stated the priority of hand grenades and pyrotechnic signals in your unit? What is it? Do the staff and subordinates support this priority? Is it based on your METL and an understanding of Field Manual (FM) 7-15 and Army Doctrine and Training Publication (ADP) 7-0?
- Have you clearly stated the intent of hand grenade and pyrotechnic signal training and qualification? Are leaders evaluating Soldier performance based on accurately recorded data and results?
- Have you clearly stated that hand grenade training and qualification is one of the commander's opportunities to assess several skills relating to team and squad readiness?
- What training and qualification course will be used to evaluate your unit's readiness?
  - How will it be conducted? Will the prescribed procedures be followed?
  - Who will collect the data?
- Have you clearly stated the purpose and intent of preliminary instruction?
  - What skills will preliminary instruction address?
  - Will preliminary instruction be performance-oriented? Are tasks integrated?

Soldier Assessment

4-22. During Soldier assessment, commanders answer the following questions:

- Do Soldiers know how to maintain, inspect, and stow their assigned hand grenades and pyrotechnic signals according to the TM? Do they have a manual?
- Do Soldiers conduct serviceability checks of assigned hand grenades and pyrotechnic signals before training? Were maintenance deficiencies corrected?
- Do Soldiers demonstrate an understanding of the operation, functioning, and capabilities of hand grenades and pyrotechnic signals?
- Do Soldiers demonstrate their knowledge of the effects of wind when employing smoke grenades?
- During individual and collective training, do Soldiers demonstrate their ability to manage allocated hand grenades to engage all targets? Do they throw several hand grenades at one target?
- Do Soldiers demonstrate proficiency during night operations? When using night vision devices (NVDs)?
- Do Soldiers demonstrate individual proficiency during CBRN conditions? During collective exercises?
- Are hand grenade skills and pyrotechnic signals integrated into tactical exercises and unit live-fire exercises (LFXs)?
- Based on, onsite observations and analysis of training performance, what skills, or tasks show a readiness deficiency?
  - What skills need training emphasis? Individual emphasis? Leader emphasis?
  - What are the performance goals?

Trainer Assessment

4-23. During trainer assessment, commanders answer the following questions:

- Who has trained or will train the trainers?
  - What is the subject matter expertise of the cadre?
  - Are they actually training the critical skills?
  - Have they addressed the basic skills first?
  - What aids and devices are being used?
- What administrative constraints or training distracters can you overcome for the junior officer and NCO? Do the sergeants do the job they are charged with?
- At what level are the resources necessary to train hand grenades and pyrotechnic signals (time, training aids, ammunition, and ranges) controlled?

TRAINERS

4-24. Knowledgeable cadre/trainers are the key to hand grenade training performance. All commanders must be aware of this to maintain expertise in hand grenade instruction/training.

CADRE/TRAINER

4-25. Cadre/trainer refers to a weapons instructor/trainer that has more experience and expertise than the Soldier who is receiving the instruction. He trains Soldiers in the safe and effective use of hand grenades, and if required, pyrotechnic signals. The cadre/trainer maintains strict discipline during training, insists on compliance with range procedures and program objectives, and enforces safety regulations.

Selection

4-26. Select institutional and unit cadre/trainers from the most highly-qualified Soldiers. These Soldiers must demonstrate proficiency in all aspects of hand grenade and pyrotechnic signal employment, know the importance of training, and have a competent and professional attitude. The commander must ensure that selected unit cadre/trainers can effectively train other Soldiers. Establish local cadre/trainer training courses and weapons certification programs to ensure that instructor/trainer skills are developed.

Duties

4-27. The cadre/trainer helps the Soldier master the fundamentals of hand grenade and pyrotechnic signal employment. He ensures that the Soldier consistently applies what he has learned. When training the beginner, the cadre/trainer confronts problems, such as fear, nervousness, forgetfulness, failure to understand, and a lack of coordination or determination; arrogance or carelessness can compound the problems. With all types of Soldiers, the cadre/trainer must ensure that Soldiers are aware of their errors, understand the causes, and apply remedies. To perform these duties, cadre/trainers—

- Observe Soldier actions.
- Question the Soldier.
- Analyze Soldier actions.

Observing Soldier Actions

4-28. To pinpoint errors, the cadre/trainer observes the Soldier during drills, when preparing and throwing hand grenades, and when using pyrotechnic signals. If there is no indication of probable error, the Soldier's grip, preparation (removing safety devices or placement), launching/throwing position, release, and safe covering position are closely observed.

Questioning the Soldier

4-29. The Soldier is asked to state his throwing hand and to explain his throwing procedures.

Analyzing Soldier Actions

4-30. Analyzing Soldier actions is an important step in detecting and correcting errors. When analyzing Soldier actions, the cadre/trainer correlates observations of the Soldier to probable errors in performance, according to the type of hand grenade used and the target. Poor performance is usually caused by more than one observable error.

TRAINING THE TRAINER

4-31. Knowledgeable small-unit leaders are key to weapons training. This training circular and other training publications provide the unit commander with the required information to develop a good train-the-trainer program.

4-32. The goal of a progressive train-the-trainer program is to achieve a high state of combat readiness. Through the active and aggressive leadership of the chain of command, a perpetual base of expertise is established and maintained.

4-33. The commander should identify unit personnel who have had assignments as weapons instructors. Use these individuals to train other unit cadre by conducting preliminary instruction and LFXs for their Soldiers.

4-34. A suggested train-the-trainer program is outlined below:

- Conduct a diagnostic test to determine what training is needed.
- Conduct practice/live hand grenade range operations.
- Conduct hand grenade qualification course.

TRAINER CERTIFICATION PROGRAM

4-35. The certification program sustains the cadre/trainers' expertise and develops methods of training. The program standardizes procedures for certifying hand grenade and pyrotechnic signal trainers. Cadre/trainers' technical expertise must be continuously refreshed, updated, and closely managed.

TRAINING BASE

4-36. The training base can expect the same personnel changes as any other organization. Soldiers assigned as cadre/trainers have varying degrees of experience and knowledge of training procedures and methods. Therefore, the trainer certification program must be an ongoing process that is tailored to address these variables. At a minimum, formal records should document program progression for each trainer. All

cadre/trainers must complete the four phases of training using the progression steps, and update the records on a quarterly basis.

CERTIFICATION PROGRAM OUTLINE

4-37. Before certification, all trainers must attend all phases of the train-the-trainer program in the following order:

- Phase I—Program Orientation.
- Phase II—Preliminary Hand Grenade and Pyrotechnic Signal Training.
- Phase III—Basic Hand Grenade Pyrotechnic Signal Training.
- Phase IV—Advanced Hand Grenade Pyrotechnic Signal Training.

4-38. They then conduct all phases to demonstrate their ability to train Soldiers and to diagnose and correct problems. Cadre/trainers who fail to attend or DO NOT pass any phase of the diagnostic examination should be assigned to subsequent training.

Phase I—Program Orientation

4-39. During this phase, the cadre/trainer must accomplish the following tasks and be certified by the chain of command:

- Be briefed on the concept of the certification program.
- Be briefed on the unit weapons training strategy.
- Review the unit weapons training outlines.
- Review issued reference material.
- Visit training sites and firing ranges.

Phase II—Preliminary Hand Grenade and Pyrotechnic Signal Training

4-40. Phase II should be completed no more than two weeks following the conclusion of Phase I. During Phase II, the cadre/trainer demonstrates his ability to master hand grenade and pyrotechnic signal fundamentals, and his performance is reviewed by the chain of command. Record the results of this review and maintain on the cadre/trainer's progression sheet according to the unit SOP. The cadre/trainer explains—

- Characteristics.
- Capabilities.
- Safety, inspection, and maintenance procedures.
- Assembly of practice hand grenades.
- Installation of safety clips (M228 practice fuze or M67 fragmentation grenade).

NOTE: For hand grenades that come with a safety clip, the safety clip may detach during shipping and storage. See Chapter 2 for information about safety clip installation.

- Demonstration of pyrotechnic signals and incendiary grenades.
- Preparation (safety devices, right- and left-hand grips).
- Throwing positions and techniques.
- Mock-bay training.
- Live-bay training.
- Hand grenade qualification course.

Phase III—Basic Hand Grenade and Pyrotechnic Signal Training

4-41. During this phase, the cadre/trainer demonstrates and reinforces what he has learned during Phase II. The cadre/trainer explains—

- Coordination requirements and range duties for conducting a hand grenade training course.
- The range layout and the conduct of training.

4-42. The commander determines when the cadre/trainer is ready to move to the next phase of certification. He only does this when satisfied the cadre/trainer has successfully demonstrated expertise in setting up and conducting hand grenade and pyrotechnic signal training and qualification. At the completion of Phase III, the commander should schedule Phase IV certification and direct the cadre/trainer to begin coordinations. Record the results of this review and maintain on the cadre/trainer's progression sheet.

NOTE: The commander should select a unit range operations certified officer in charge (OIC) and range safety officer (RSO) to open and run the range so that he can view the cadre/trainer being certified according to DA PAM 385-63.

Phase IV—Advanced Hand Grenade and Pyrotechnic Signal Training

4-43. The final phase of the train-the-trainer program tests the cadre/trainer. During this phase, the cadre/trainer sets up a hand grenade range and hand grenade qualification course, and conducts training for at least one person. If M69 hand grenades (with the M228 training fuze), M67 hand grenades, and pyrotechnic signals are available, the cadre/trainer conducts a firing exercise. If training ammunition and pyrotechnic signals are not available, base the evaluation on the quality of training given.

SECTION III. TRAINING PREPARATION

4-44. Training preparation involves the following three steps:

(1) Conduct a training risk assessment.

(2) Conduct an environmental risk assessment.

(3) Make range coordinations.

CONDUCT A TRAINING RISK ASSESSMENT

4-45. The OIC or noncommissioned officer in charge (NCOIC) conducts a training risk assessment. It is vital to identify unnecessary risks by comparing potential benefit to potential loss. The CRM process allows units to identify and control hazards, conserve combat power and resources, and complete the mission. This process is cyclic and continuous; it must be integrated into all phases of operations and training.

> CRM balances benefits against potential losses. It provides commander and leaders with the tools to accomplish realistic training while preserving the scarce resources of personnel, time, and equipment. When used properly, CRM is a training enabler.
>
> FM 5-19.

4-46. The five steps to the CRM process are:

(1) Identify hazards.

(2) Assess hazards to determine risk.

(3) Develop controls and make risk decisions.

(4) Implement controls.

(5) Supervise and evaluate.

NOTE: Risk decisions must be made at the appropriate level.

IDENTIFY HAZARDS

4-47. When identifying hazards, leaders should consider—

- The lethality of the hand grenades and pyrotechnic signals used.
- The area in which training is to be conducted.
- How the addition of new elements influences known hazards.
- Any environmental impact.

ASSESS HAZARDS TO DETERMINE RISK

4-48. Once identified, hazards are assessed by considering the likelihood of its occurrence and the potential severity of injury without considering any control measures. When assessing hazards, leaders should consider the Soldiers' current state of training.

DEVELOP CONTROLS AND MAKE RISK DECISIONS

4-49. Leaders must apply two types of control measures to hand grenade risk assessments, see below:

- Educational controls.
- Physical controls.

4-50. The unit commander's controls should be clear, concise, executable orders.

NOTE: Most vital to developing CRM controls is mature, educated leadership.

Educational Controls

4-51. Educational controls occur when adequate training takes place. They require the largest amount of planning and training time. Leaders implement educational controls using the following two sequential steps:

(1) Supervisors and instructors must be certified.

(2) Soldier training must be executed.

NOTE: Hand grenade and pyrotechnics training requires extensive direct supervision, but how much supervision required decreases as the Soldier's proficiency increases.

Physical Controls

4-52. Physical controls are the measures emplaced to reduce injuries. This includes not only protective equipment, but also certified personnel to supervise the training. Unrestrained physical controls are, in themselves, a hazard.

IMPLEMENT CONTROLS

4-53. When leaders implement the controls, they must match the controls to the Soldier's skill level. They must also enforce every control measure as a means of validating its adequacy.

SUPERVISE AND EVALUATE

4-54. This step allows leaders to eliminate unnecessary risk and ineffective controls by identifying unexpected hazards and determining if the implemented controls reduced the residual risk without interfering with the training.

CONDUCT AN ENVIRONMENTAL RISK ASSESSMENT

4-55. All leaders, trainers, and Soldiers must comply with environmental laws and regulations. The leader must identify the environmental risks associated with training individual and collective tasks, and implement environmental protection measures by integrating them into plans, orders, SOPs, training performance standards, and rehearsals.

4-56. Environmental risk management parallels safety risk management and is based on the same philosophy. Environmental risk management comprises identifying hazards before they happen and assessing hazards caused during training. (Refer to FM 5-19 for more information.)

IDENTIFY HAZARDS

4-57. Leaders should identify the potential sources for environmental degradation during the analysis of METT-TC factors. An environmental hazard is a condition with the potential for polluting air, soil, or water or destroying cultural or historical artifacts.

ASSESS HAZARDS

4-58. Leaders should analyze the potential severity of environmental degradation by using the environmental risk assessment matrixes in ADP 7-0. The risk effect value is defined as an indicator of the severity of environmental degradation. Leaders quantify the risk to the environment resulting from the operation as extremely high, medium, or low using the environmental assessment matrixes.

MAKE RANGE COORDINATIONS

4-59. Once the risks assessment is completed, viewed, and command approved, then the OIC or NCOIC should check out the range and coordinate for range use.

NOTE: Ensure the range layout is consistent with requirements outlined in TC 25-8. The OIC or NCOIC should coordinate at least one day ahead of actual use to rehearse range setup and conduct.

RANGES

4-60. Ranges include distance and accuracy ranges, mock-bay throwing pits, and live-bay throwing pits.

Distance and Accuracy Ranges

4-61. A four-lane layout (Figure 4-2) is recommended. These lanes should enable Soldiers to engage—

- A fighting position at 30 meters.
- A trench target at 40 meters.
- A fortified mortar pit at 20 meters.
- Soldiers in the open at 20 meters.

NOTE: The four lanes may be combined if the terrain does not allow four stations.

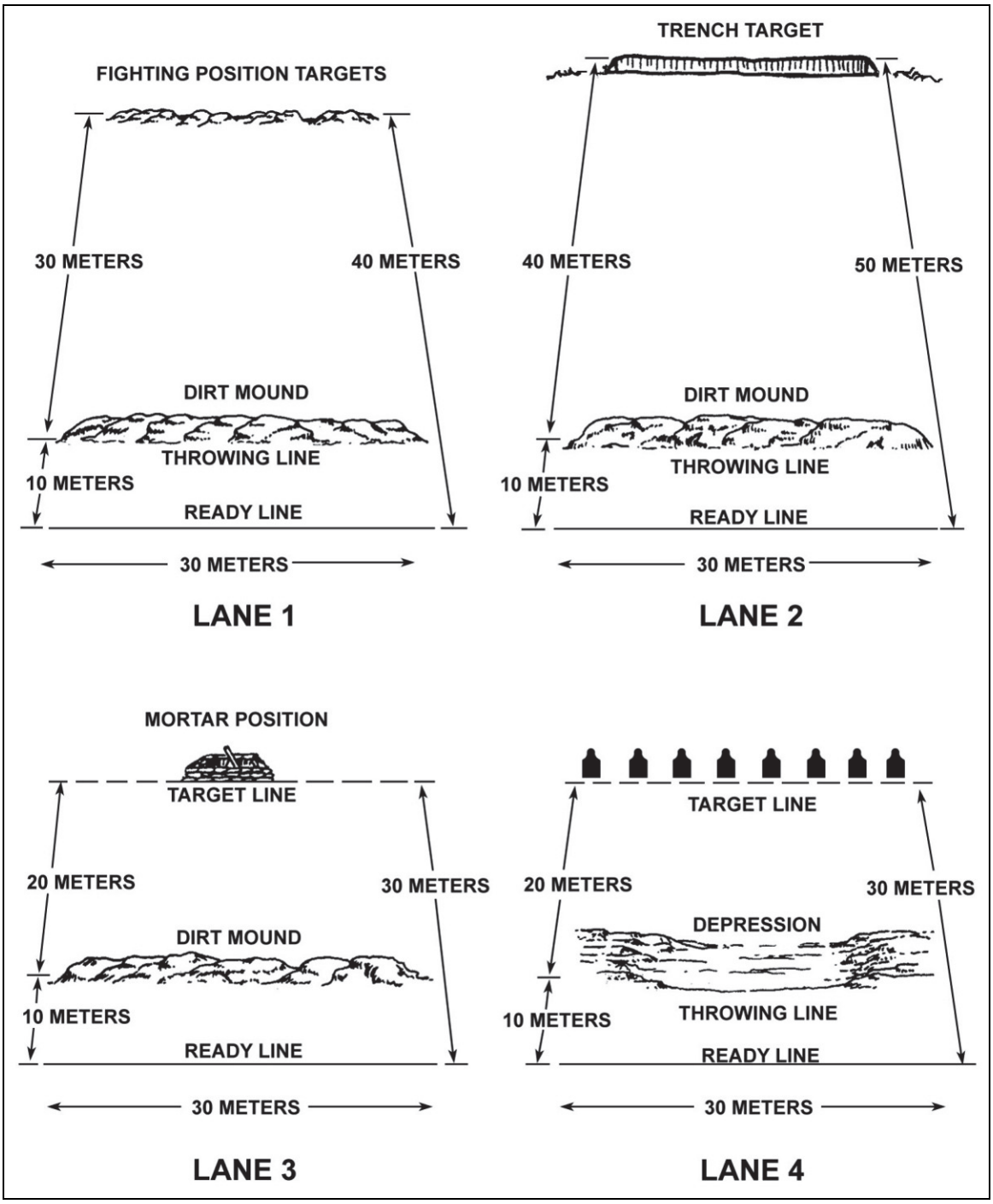

Figure 4-2. Distance and accuracy layout

Mock-Bay Throwing Pits

4-62. The hand grenade mock-bay must replicate the dimensions and safety areas found at live-bay. At this station of hand grenade training, Soldiers are instructed on live-bay procedures. Each Soldier attending this training has to identify his throwing hand and demonstrate the correct throwing procedures.

NOTE: Soldiers throw from the standing position during mock-bay and live-bay training.

Throwing Pit and Knee Wall

4-63. A mock-bay training pit can be made from treated plywood (Figure 4-3). Protective reinforcement materials used in a live-bay throwing pit are not necessary.

Suspended Guide Wire

4-64. Placing an approximate 6-meter (20-feet) high suspended guide wire approximately 28 meters (92 feet) in front of the mock-bay pit assists Soldiers in achieving throwing distance.

E-Type Silhouettes

4-65. Placing E-type silhouettes at 40 meters from the mock-bay pit provides targets for throwing accuracy and distance.

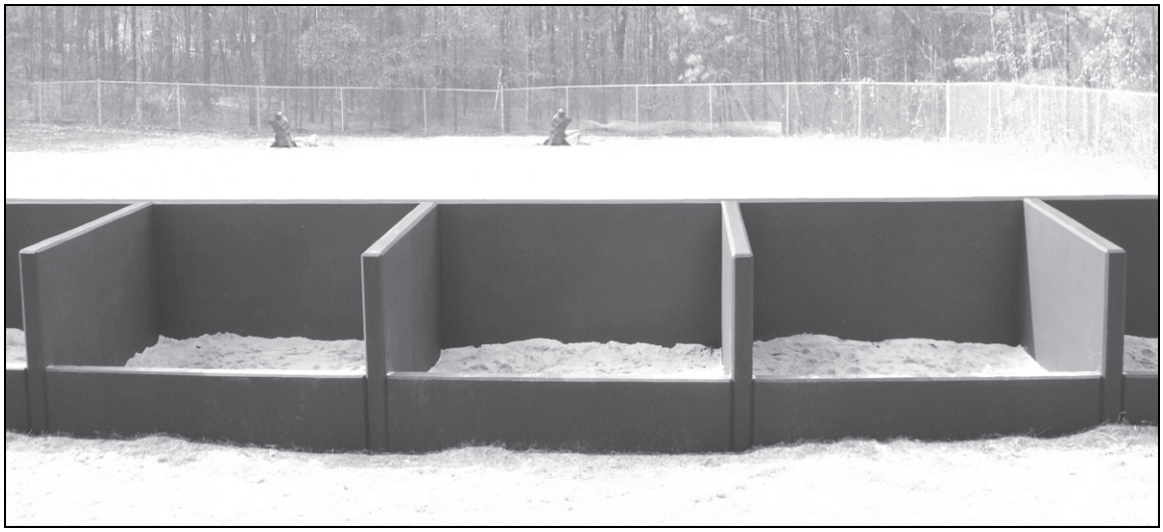

Figure 4-3. Hand grenade mock-bay layout

Live-Bay Throwing Pits

4-66. Figures 4-4 through 4-9 depict a suggested hand grenade live-bay design. Live-bay throwing pits should incorporate the following elements:

- Observation pits or tower.
- Throwing pit.
- Knee wall.
- Sand/sawdust pit.
- Revetments and berms.
- Separation distance.
- Observation windows.

Observation Pits or Tower

4-67. Observation pits or towers should be a sufficient height to enable range personnel to observe and control all throwing pits. Laminated 35-millimeter (about 1 3/8 inches) windowpanes (constructed as described below) provide the necessary degree of safety:

- 10-mm glass (outside).
- 7-mm polycarbonate resin sheet.
- 6-mm glass.

- 6-mm polycarbonate resin sheet.
- 6-mm glass.

ThrowingPit

4-68. The throwing pit provides 1.5 meters of frontal cover (approximately 59 inches). This height allows the Soldier to stand, see the target, and safely throw the hand grenade. The wall, also provides cover when in a kneel position.

Knee Wall

4-69. The throwing pit should have a rear wall (knee wall) approximately 0.6 meter (24 inches) high and 0.15 meter (6 inches) thick (Figure 4-4). The knee wall should extend the width of the throwing pit, connecting both ends of the enclosure. The top of the knee wall should slope inward to allow any grenade dropped on the wall to roll into the throwing pit. The knee wall should have drain pipes (no more than 2 inches in diameter) to allow throwing pit drainage. The floor of the pits should slope in the direction of the drainage pipes.

NOTE: DO NOT construct grenade sumps or ditches inside the throwing pits.

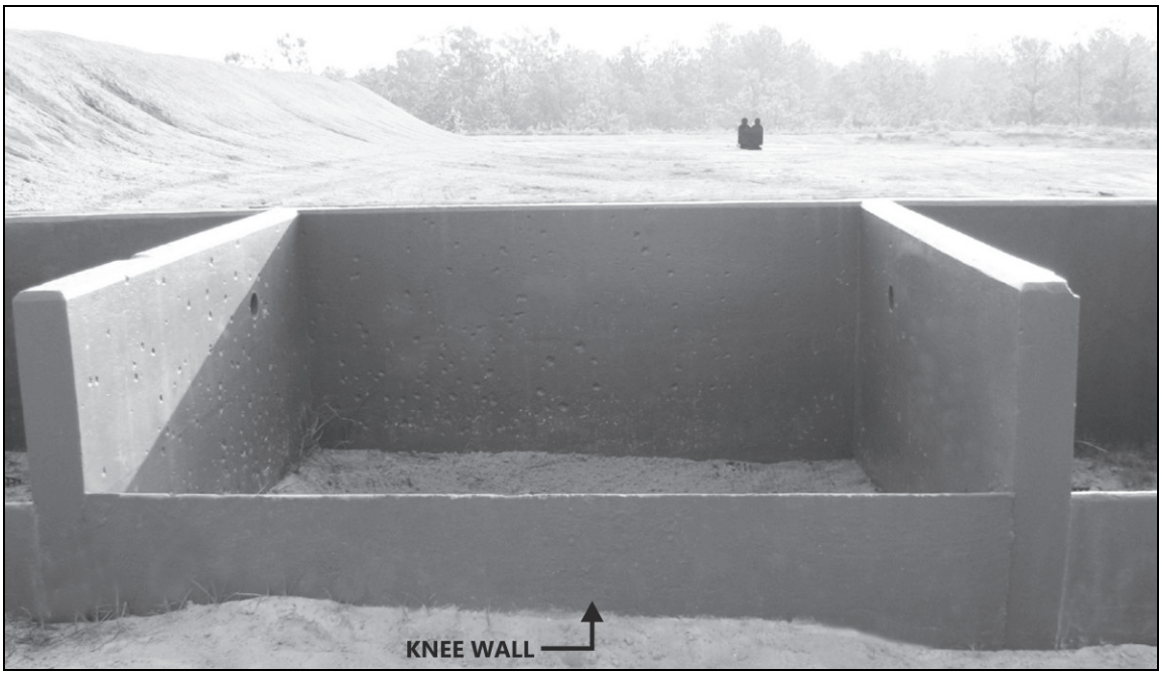

Figure 4-4. Throwing pit with knee wall

4-70. Throwing pits that DO NOT have knee walls must have safety pits attached to both sides (Figure 4-5).

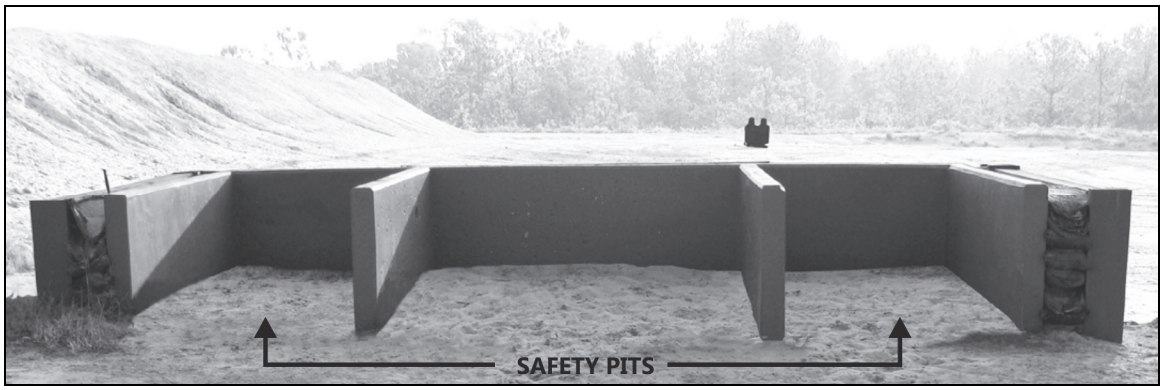

Figure 4-5. Throwing pit with safety pits

Sand/Sawdust Pit

4-71. A sand/sawdust pit is placed outside of the knee wall to cushion the fall of personnel diving over the wall in the event a grenade is dropped in the throwing pit.

Revetments and Berms

4-72. Where possible, the throwing pits should be separated using steel, concrete, or wooden revetments or earthen berms of a length and height to lessen the effect of high-velocity, low-angle fragments (for example, 50 meters long and 1.8 meters high). The thickness varies according to the type of construction used. This permits grenade throwing to continue from the adjacent pit when a dud grenade requires closure of a specific pit pending dud disposal.

Separation Distance

4-73. Live-bay throwing pits should have a separation distance of 25 meters between each lane. This places adjacent pits outside the effective casualty-producing radius of 15 meters for the M67 fragmentation grenade.

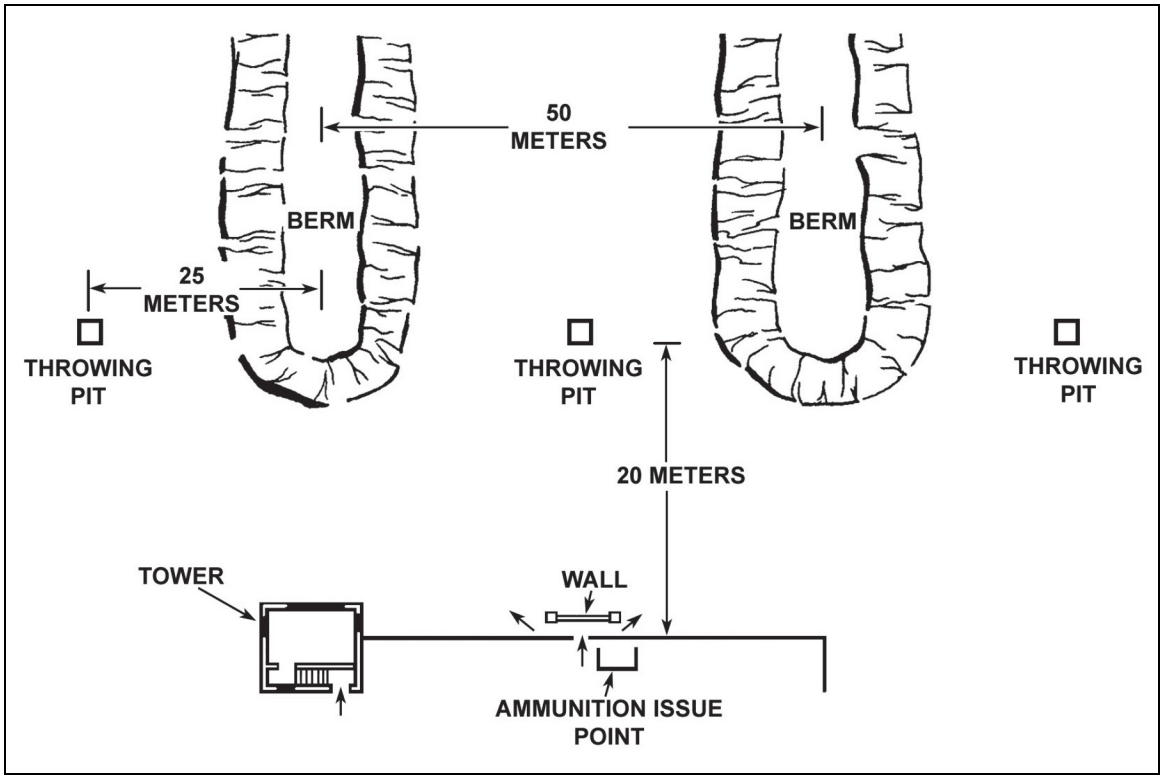

Figure 4-6. Suggested live-bay layout

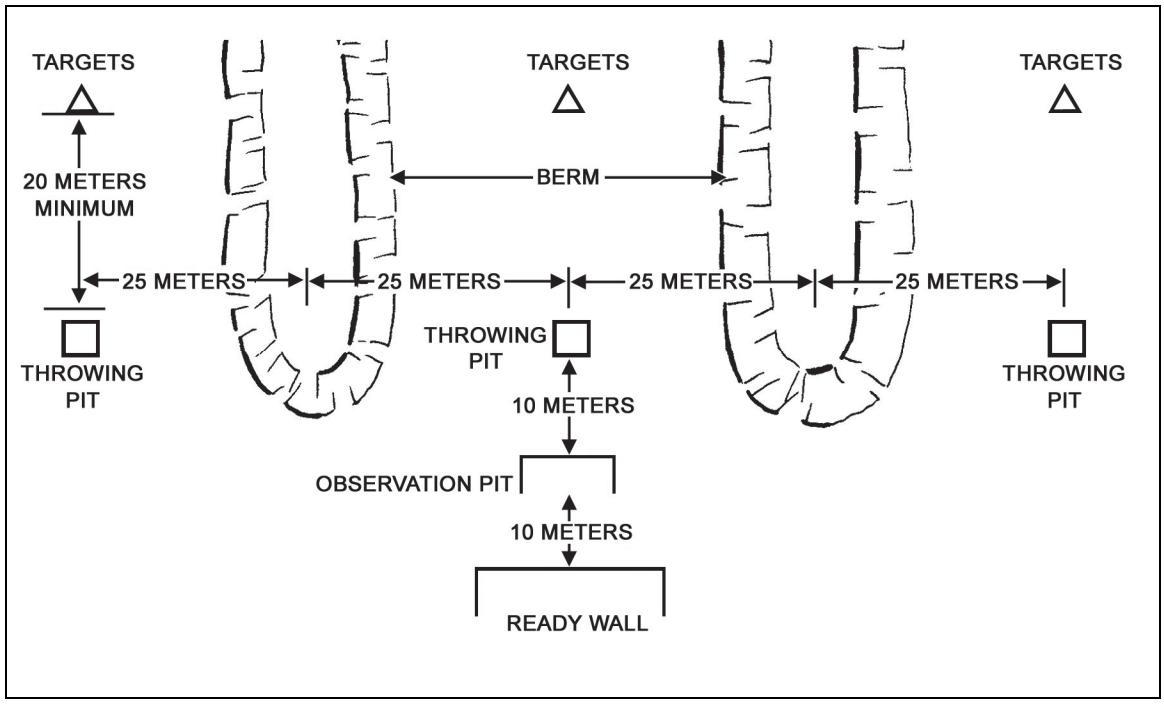

Figure 4-7. Hand grenade range requirements

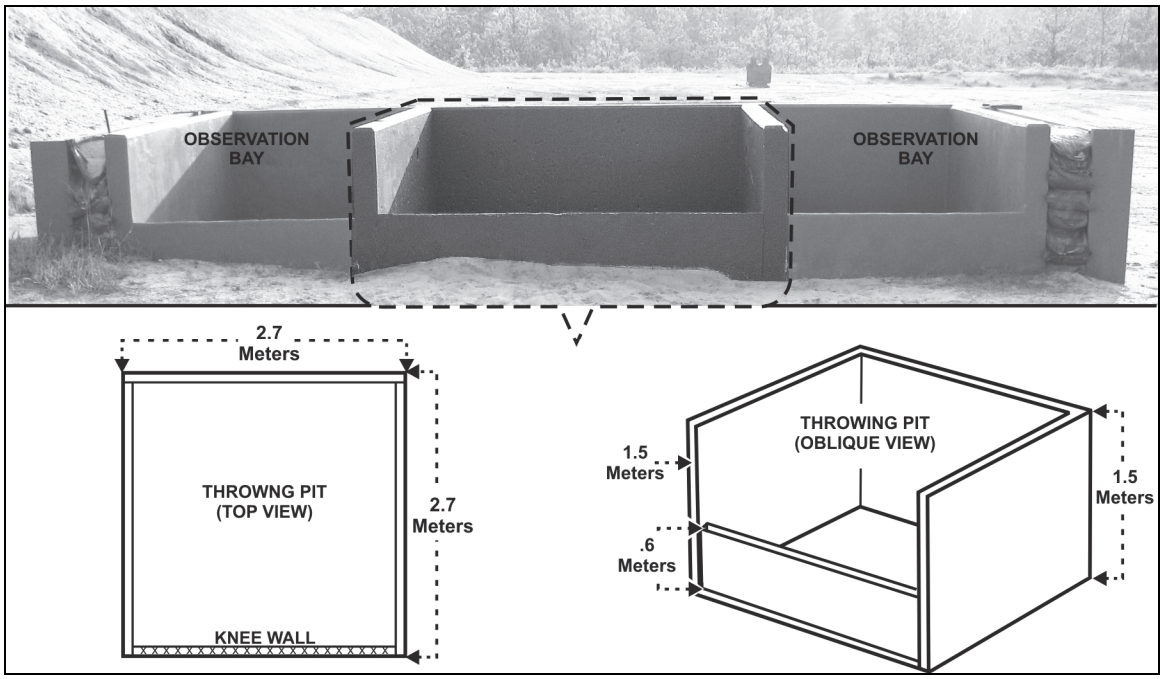

Figure 4-8. Hand grenade live-bay layout

Observation Windows

4-74. If facilities permit, an observation window should be constructed to allow Soldiers to observe the live-bay throwing procedures before and after throwing the hand grenades (Figure 4-9). The observation window must be of the same construction used for observation pits and towers.

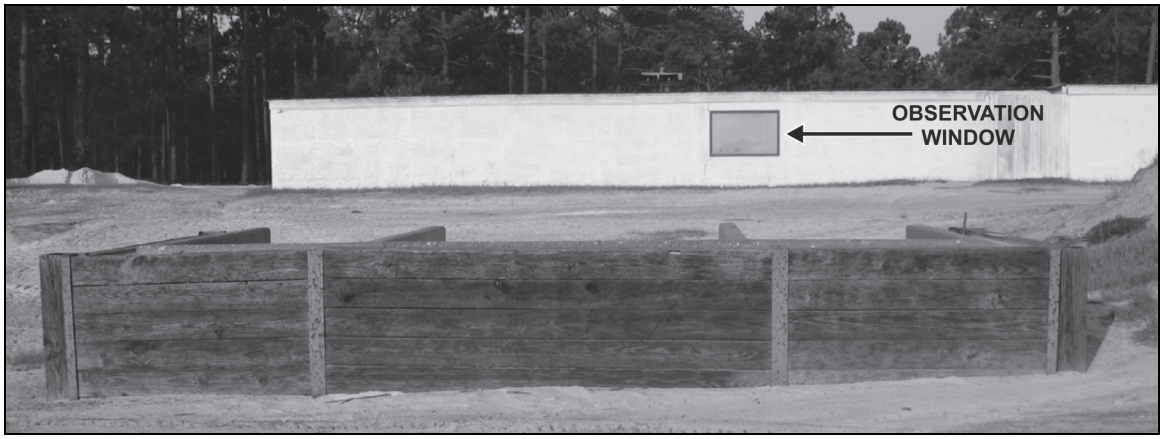

Figure 4-9. Hand grenade live-bay layout, observation window

Hand Grenade Qualification Course

4-75. A seven-station layout (Figures 4-10 through 4-17) is recommended. These stations should enable Soldiers to perform the following tasks:

- Engage the enemy from a fighting position at 35 meters (standing).
- Engage bunker (prone).
- Engage enemy mortar position at 25 meters (kneeling).
- Engage enemy behind cover at 20 meters (prone).

- Engage trench at 25 meters (standing).
- Engage wheeled vehicle at 25 meters (kneeling).
- Identify hand grenades.

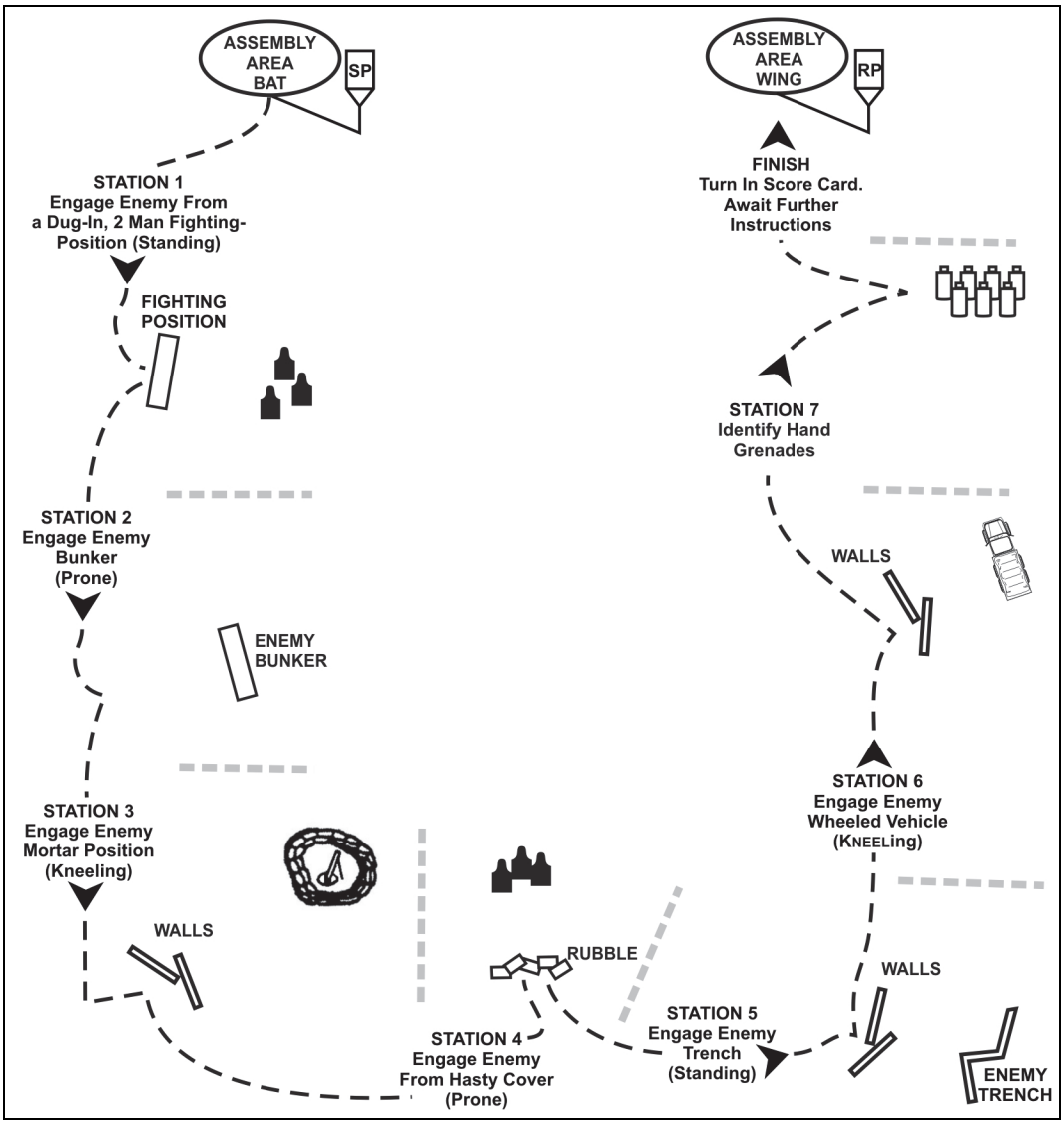

Figure 4-10. Hand grenade qualification course layout

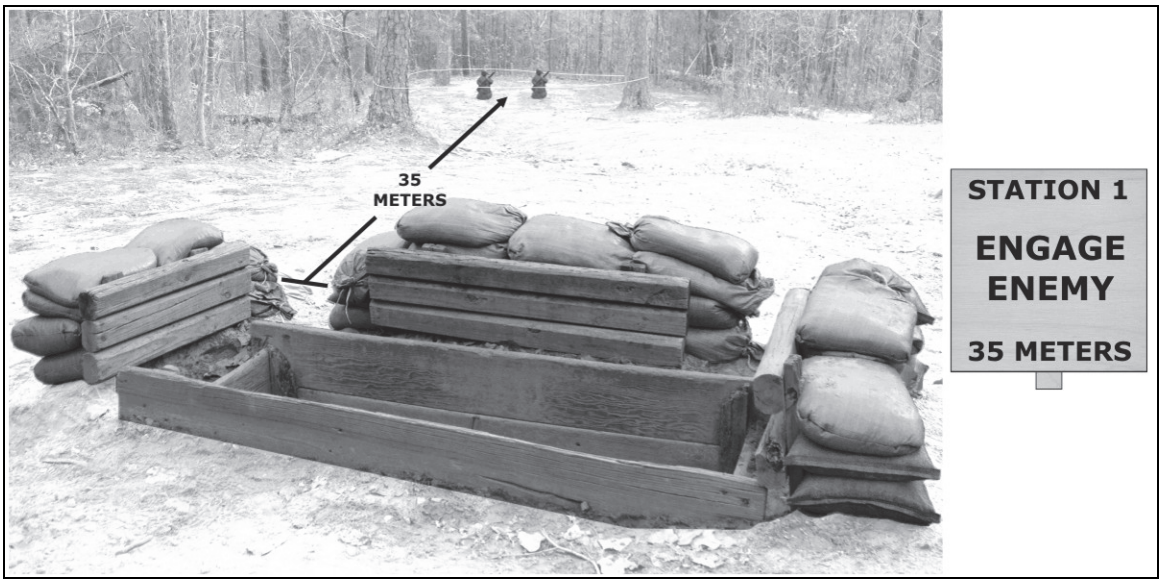

Figure 4-11. Station 1, engage enemy from fighting position (standing)

Figure 4-12. Station 2, engage bunker (prone)

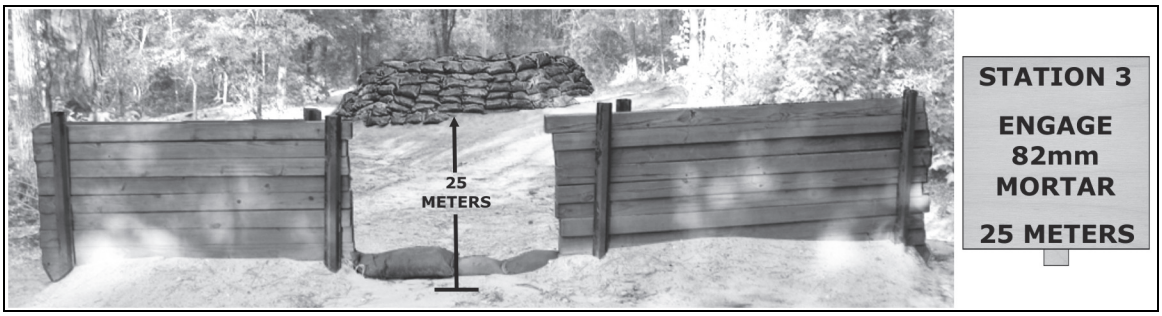

Figure 4-13. Station 3, engage enemy mortar position (kneeling)

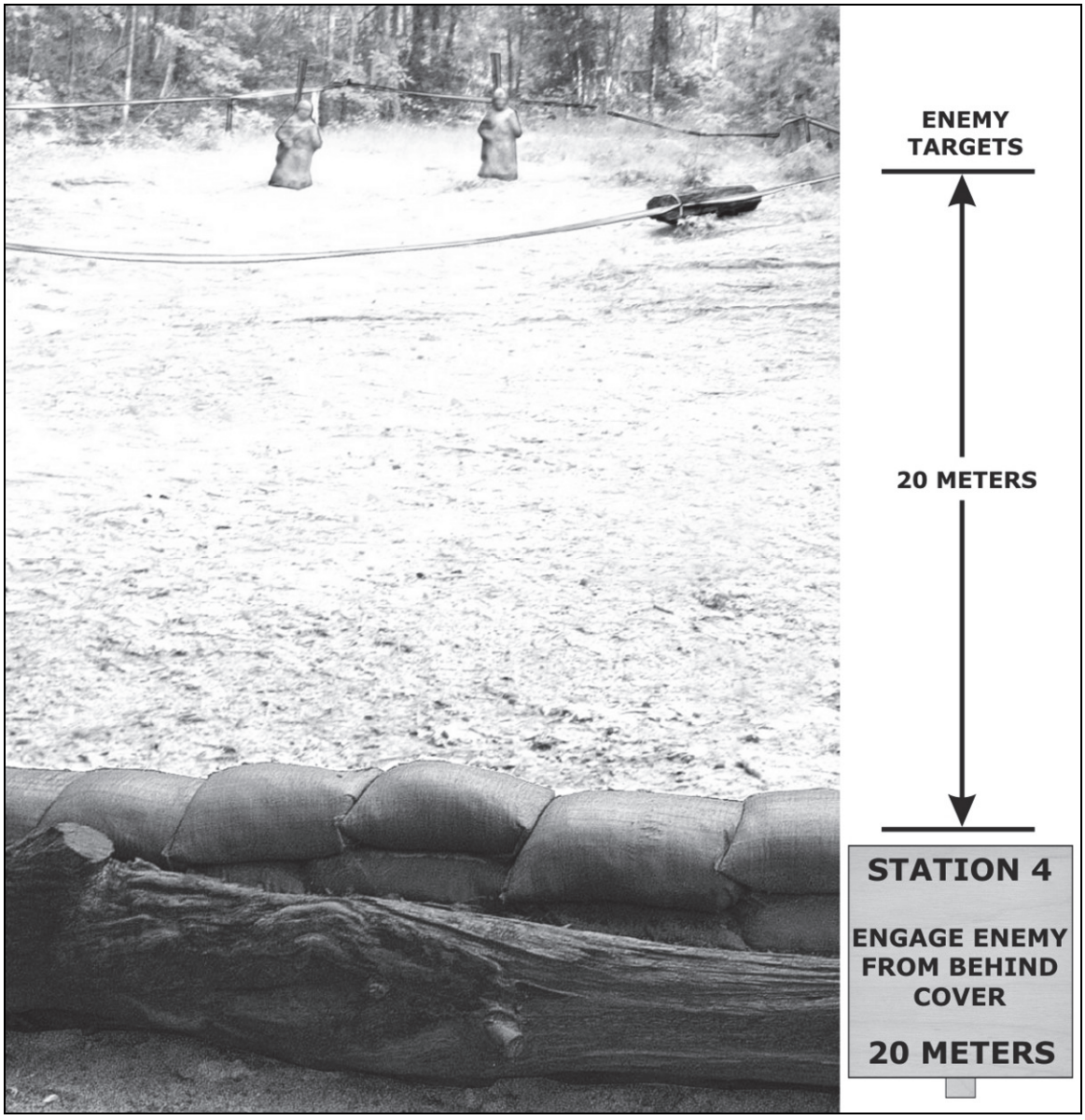

Figure 4-14. Station 4, engage enemy from behind cover (prone)

Figure 4-15. Station 5, engage trench (standing)

Figure 4-16. Station 6, engage wheeled vehicle (kneeling)

Figure 4-17. Station 7, identify hand grenades

EQUIPMENT

4-76. The following is a minimum amount of range material and supplies needed to operate a practice and live hand grenade range.

- A helmet, a body armor vest, load-carrying equipment, and ear protection for all range personnel and Soldiers attending training.
- Appropriate publications pertaining to training (FMs, TMs, ARs, SOPs).
- Range flag.
- Communications equipment.
- Targets according to this training circular.
- Grenades (live/practice) and pyrotechnics, as needed.
- Training aids, as needed.
- Ambulance or required dedicated evacuation vehicle.

NOTE: The driver must have knowledge of the route to the hospital.

- Potable water.
- Qualification scorecards according to this training circular.

PERSONNEL

4-77. According to DA PAM 385-63, the following safety personnel are required for hand grenade training (Table 4-1):

- Officer in charge.
- Range safety officer.

4-78. Safe and successful performance of training also requires experienced support personnel. Support personnel required for training include—

- Pit safety NCOs.
- Ammunition personnel.
- Tower operator.

- Guards, as required.
- Medical personnel.
- Truck driver, if applicable.

Table 4-1. Officer in charge/range safety officer requirements

WEAPON SYSTEMS	PERSONNEL REQUIREMENTS	
	OIC	RSO
Practice hand grenade, firing devices, simulators, or trip flares	SSG	SSG
Chemical agents and smoke[1]	SSG	NONE
Live grenades	SFC	SSG
Live-fire exercises, using organic weapons (squad through company, battery, and troop)	SFC	SSG
Combined arms live-fire exercises (CALFEXs) using outside fire support (section, platoon, squad, company, battery, troop, battalion, and squadron or larger)[2]	SFC	SSG

[1] When chemical, biological, radiological, and nuclear (CBRN) training is being conducted, the OIC/RSO must be CBRN-qualified.

[2] The OIC will be a field-grade officer for battalion and larger-size units. The RSO on CALFEXs will be of the ranks listed above based on the complexity of the exercise and number of participants (such as, squad, section, platoon, company, troop, squadron, battalion, and larger).

NOTE: Ranks of other services, Department of the Army (DA) civilians, and contractors must be equivalent to U.S. Army ranks.

NOTE: OICs and RSOs involved in serious range incidents may lose their certification if determined to be in violation of AR 385-63 or DA PAM 385-63. While an incident is under investigation, their certificate may be suspended for as long as deemed necessary or revoked by the installation commander.

Officer in Charge and Noncommissioned Officer in Charge

4-79. The OIC or NCOIC is responsible for the overall conduct of the training, range orientation, range safety briefing, and briefing unit leaders. The OIC must have satisfactorily completed a standard program of instruction in the duties of the OIC (developed by the unit to which he is assigned) and attended a range safety briefing conducted by the installation range operations. The OIC or NCOIC must—

- Be an E7 or above (NCOIC only).
- Be knowledgeable in the weapon systems involved and the duties required.
- Be certified by the commander.
- Receive instruction by the installation range operations.
- Have current safety cards.

NOTE: The rank of the OIC is determined by unit polices and regulations.

4-80. Once selected by the commander, the OIC should select the right personnel to conduct the training. Next, he should appoint an NCOIC who has current experience in the use of grenades and pyrotechnic signals. Together, the OIC and NCOIC should coordinate with adjacent units that are conducting or have conducted live grenade training for key personnel train-up and certification. The OIC and NCOIC should—

- Select and brief range support personnel on expected duties.

- Schedule for range certification with installation range operations. If currently certified, review installation range instructions.
- Certify selected range personnel on their range duties.

NOTE: Before conducting training, the OIC and NCOIC should review TC 3-23.30, TM 9-1330-200-12, TM 9-1370-206-10, unit SOPs, AR 385-63, and DA PAM 385-63.

Range Safety Officer

4-81. The RSO should be the senior hand grenade instructor. The RSO must have satisfactorily completed a standard program of instruction in the duties of RSO (developed by the unit to which he is assigned) and attended a range safety briefing conducted by the installation range operations. The RSO must—

- Be an E6 or above.
- Be knowledgeable in the weapon systems involved and the duties required.
- Ensure that the OIC has current safety cards.
- Perform no duties other than those of safety officer.

Pit Safety Noncommissioned Officers

4-82. Pit safety NCOs provide instruction, prepare practice grenades, and conduct practice and live hand grenade training safety. Range safety pit NCOs should—

- Be an E5 or above.
- Be knowledgeable in the weapon systems involved and the duties required.
- Be selected and certified on all hand grenade and pyrotechnic tasks by the OIC and NCOIC.

NOTE: These personnel require no safety cards, but must be task-certified by their unit on all grenade and pyrotechnic signals.

4-83. Pit safety NCOs also perform the five drop procedures in case of an emergency. These drop procedures are contingent on Soldier actions:

- Soldier milks the hand grenade.
- Soldier freezes after arming the hand grenade.
- Soldier remains standing after he throws the hand grenade downrange (attempting to observe the impact).
- Soldier drops the hand grenade.
- Soldier fails to take commands from the pit safety NCO.

Soldier Milks the Hand Grenade

4-84. Soldiers can milk the hand grenade in two ways; they can move their fingers or their thumb.

Moving the Fingers

4-85. When a Soldier milks the hand grenade by moving his fingers, the pit safety NCO performs the following procedures:

- Tell the Soldier to cease all action (**"FREEZE"**). The Soldier closes his hand.
- Decide if the grenade is armed or safe.
- Tell the Soldier to **"THROW,"** if you determine that the grenade is armed or unsafe.

Moving the Thumb

4-86. When a Soldier milks the hand grenade by moving his thumb, the pit safety NCO performs the following procedures:

- Tell the Soldier to **"THROW**."

NOTE: If the Soldier does not throw, perform the following actions.

- Place your thumb across the Soldier's thumb and your fingers across your Soldier's fingers, securing the Soldier's throwing hand (right hand for right-handed Soldiers, left hand for left-handed Soldiers).
- Use your free hand to force the Soldier to the front wall.
- Force the Soldier to drop the grenade over the front wall.
- Pull the Soldier into the pit, and protect him from the blast.

Soldier Freezes After Arming the Hand Grenade

4-87. When a Soldier freezes after arming the hand grenade, the pit safety NCO performs the following procedures:

- Tell the Soldier to **"THROW."**

NOTE: If the Soldier does not throw, perform the following actions.

- Place your thumb across the Soldier's thumb and your fingers across your Soldier's fingers, securing the Soldier's throwing hand (right hand for right-handed Soldiers, left hand for left-handed Soldiers).
- Use your free hand to force the Soldier to the front wall.
- Force the Soldier to drop the grenade over the front wall.
- Pull the Soldier into the pit, and protect him from the blast.

Soldier Remains Standing After He Throws the Hand Grenade Downrange

4-88. Once the pit safety NCO sees the hand grenade leave the throwing pit, he ensures that the Soldier is kneeling. If the Soldier continues to stand, the pit safety NCO physically forces the Soldier to kneel.

Soldier Drops the Hand Grenade

4-89. If a live hand grenade is dropped accidentally after the safety pin has been removed, the pit safety NCO is responsible for reacting accordingly. He is responsible for the safety of the thrower and must decide what actions are the most appropriate. The pit safety NCO's actions are dependent upon the following factors:

- The location of the dropped grenade.
- The location of the thrower.
- The ability to physically move the thrower out of harm's way.

NOTE: All of these factors need to be considered before the safety pin is pulled.

4-90. Often, a pit safety NCO's actions depend upon the location of the designated safe area (dependant on the presence or absence of a knee wall).

Throwing Pit with Knee Wall

4-91. Knee walls provide a fast and safe means of reacting to a dropped grenade. In most instances, the pit safety NCO reacts to a dropped live grenade using the following procedures:

- Yell **"GRENADE"** to alert all other personnel in the area of the dropped grenade.
- Physically push the thrower over the knee wall.
- Fall on top of the thrower.

4-92. If a hand grenade is dropped over the knee wall, the pit safety NCO uses the following procedures:

- Yell **"GRENADE."**
- Force the thrower to the ground inside the throwing pit.

Throwing Pit Without Knee Wall

4-93. When using throwing pits that DO NOT have knee walls, the pit safety NCO reacts to a dropped live grenade using the following procedures:

- Yell **"GRENADE"** to alert other personnel in the area.
- Physically move the thrower out of the throwing pit and into a safety pit.

4-94. If the hand grenade is dropped to the rear of the throwing pit, the pit safety NCO uses the following procedures:

- Yell **"GRENADE."**
- Force the thrower over the front of the throwing pit.
- Follow the thrower.

WARNING

In response to a dropped grenade, Soldiers must move immediately from the danger area and drop to the prone position with the Kevlar helmet facing the direction of the grenade. This reduces the Soldier's exposure. At no time should a Soldier attempt to recover, kick, or move a dropped grenade.

Soldier Fails to Take Commands

4-95. When a Soldier fails to take commands from the pit safety NCO, the pit safety NCO performs the following procedures:

- Repeat the command "**PREPARE TO THROW**."

NOTE: If the Soldier does not make an attempt to arm the grenade, perform the following actions.

- Place your hand over the Soldier's throwing hand (left hand for right-handed Soldiers, right hand for left-handed Soldiers), covering the fuze head.
- Place your other hand on the Soldier's helmet, and tell him to kneel in the throwing pit.
- Explain to the Soldier what he must do to throw the grenade downrange.

Ammunition Personnel

4-96. The ammunition personnel are in charge of accountability and handing out grenades.

NOTE: The ammunition NCO must attend an ammunition handler's class provided by the local ASP.

Tower Operator

4-97. The tower operator controls Soldier movements during range operations and maintains communications with range operations.

Guards

4-98. Guards control traffic during range operations.

Medical Personnel

4-99. Medical support (with required medical supplies) must be present before and during range operations.

Truck Driver

4-100. The truck driver transports personnel to and from the range and provides support as needed (for example, water, food, guard.).

SURFACE DANGER ZONE

WARNING

Observe caution when using hand grenades or pyrotechnic signals with igniting type fuzes. These grenades and pyrotechnic signals ignite with a flash and should be thrown at least 10 meters from all friendly personnel to avoid hazardous conditions.

4-101. The surface danger zone (SDZ, shown in Figure 4-18) should be clear of all nonessential personnel before conducting LFXs. The impact area should also be level and free of debris.

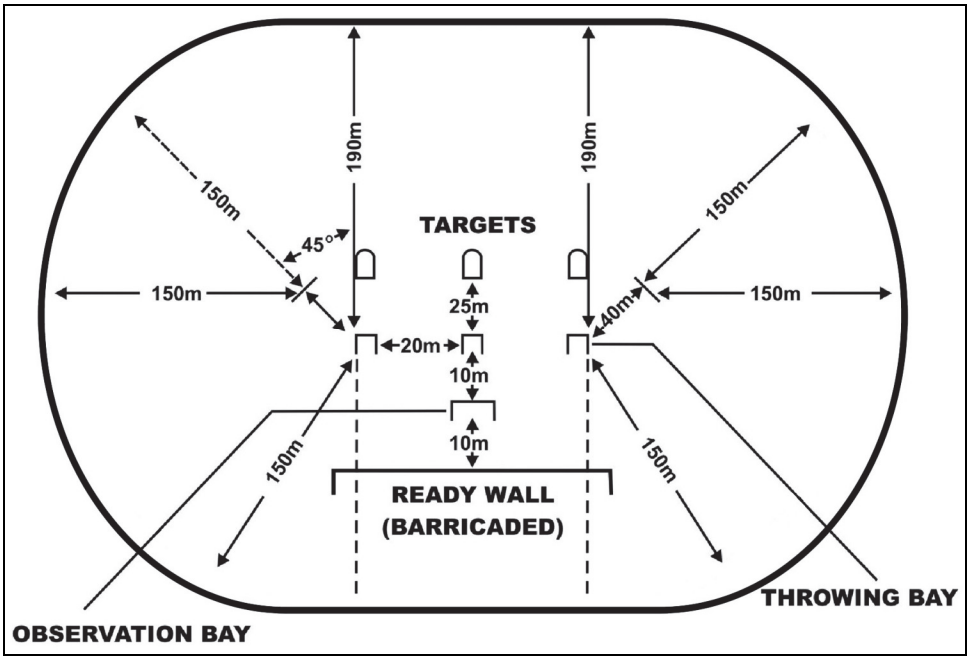

Figure 4-18. Surface danger zone for live-bay

DUDS

4-102. Soldiers should treat any thrown grenade that fails to detonate as a dud, regardless of safety pin, safety clip, or safety lever status. Duds must be regarded as dangerous. During training, the pit safety NCO determines a dropped grenade's status (Table 4-2).

Table 4-2. Status of dropped grenade

STATUS	*DESCRIPTION*
SAFE	A grenade with all safety devices intact.
LIVE	A thrown grenade from the instant it is released until the expected fuze time has elapsed.
DUD	A thrown grenade that failed to detonate after the expected fuze time has elapsed.

CAUTION

Soldiers should wear leather gloves when refusing practice grenades. The M228 practice fuze has a possibility of initiating during defuzing.

Practice Grenade

4-103. If a practice grenade does not detonate—

- Wait 5 minutes before defuzing the M69 TPG.
- Keep the bottom of the grenade oriented away from your body and pointed directly at the ground.
- Place the dud fuze in a sand-filled container, and return it to the issuing facility or dispose of it according to the unit SOP.

CAUTION

Other than practice grenades, DO NOT handle, approach, recover, or otherwise tamper with dud grenades. Let explosive ordnance disposal (EOD) personnel handle dud grenades.

Fragmentation Grenade

4-104. If a fragmentation grenade does not detonate in training—

- The thrower and pit safety NCO wait in the throwing pit for 5 minutes before returning to a covered area.
- The OIC or NCOIC notifies EOD immediately.

4-105. Until the dud is neutralized, Soldiers should not throw grenades in the area.

NOTE: If range facilities provide, continue training on an adjacent impact area that is separated by protective berms.

SECTION IV. TRAINING CONDUCT

4-106. Training conduct involves four steps, see below:

(1) Occupy, inspect, and set up the range.
(2) Prepare for training.
(3) Conduct the training.
(4) Complete the training mission.

OCCUPY, INSPECT, AND SET UP RANGE

4-107. The OIC must establish communication with the installation's range operations and request permission to occupy the range before personnel, materiel, or supplies arrive. Once this has been accomplished, the OIC and NCOIC should—

- Set up ammunition points and post guards.
- Establish locations for medical station.
- Designate Soldier holding areas.
- Establish water points.
- Designate parking areas.
- Inspect the range for operational conditions.
  - Check all throwing pits for sharp edges or unleveled throwing surfaces.

  - Ensure throwing pits meet standards.
  - Check the tower and tower public address (PA) system, if applicable.
- Request an opening code from range operations, if applicable.
- Raise the range flag.

PREPARATION FOR TRAINING

4-108. The OIC and NCOIC should greet unit leaders and Soldiers as they arrive and direct them to the holding area. Actions at the holding area include—

- Ensuring all Soldiers attending training have a helmet, a body armor, ear protection, and eye protection. Additionally, units may require the Soldier to wear their assigned load-bearing equipment and carry their assigned weapon.
- Identifying Soldiers to be trained.

CONDUCTING A SAFETY BRIEFING

4-109. Conducting a safety briefing includes briefings from administrative personnel (for example, range OIC/NCOIC, range safety officer (RSO), and medical personnel).

NOTE: The OIC should monitor all training activities.

4-110. The two types of training are initial training for introducing Soldiers to hand grenades and pyrotechnic signals, and sustainment training of learned skills. The level of instruction dictates the length and pace of training.

INITIAL TRAINING

4-111. Initial training involves the completion of the following five tasks:

(1) Participate in initial hand grenade training.
(2) Participate in distance and accuracy training.
(3) Participate in mock-bay training.
(4) Participate in live-bay training.
(5) Complete the hand grenade qualification course.

Participate in Initial Hand Grenade Training

4-112. The safety NCOs should take charge of the trainees and move them to the practice grenade training site. During the initial hand grenade training, the safety NCOs demonstrate the proper techniques for employing hand grenades. Training includes—

- Hand grenade safety, inspection, and maintenance procedures.
- Proper hand grenade storage on Soldier equipment.
- Proper hand grenade throwing grip (left/right-hand grips).
- Proper hand grenade safety device removal.
- Proper hand grenade throwing positions and techniques.
- Demonstrations of pyrotechnic signals.

Participate in Distance and Accuracy Training

WARNING

DO NOT use live grenades for practicing distance and accuracy.

NOTE: During the practice events and for qualification, each Soldier must throw several M69 practice hand grenades armed with the M228 detonating fuze. Although it takes only about a minute or less to install or replace a used M228 fuze, a company-size element uses several hundred. Preparing practice grenades for all participants is not feasible. Therefore, units should give Soldiers instruction on installing and removing a fired M228 fuze. See Chapter 2 for more information.

4-113. The distance and accuracy course is designed to develop the Soldier's proficiency in gripping and throwing hand grenades. When conducting the training, instructors should clarify the task, conditions, and standards for the course (Table 4-3), and demonstrate the task.

Table 4-3. Distance and accuracy course—task, condition, and standard

TASK	Engage a variety of targets at varying ranges up to 40 meters.
CONDITION	Given 10 practice grenades (with or without fuzes dependant on allocation), individual equipment, and a four-station course with a variety of targets at distances of 20-, 30-, and 40-meters.
STANDARD	The Soldier must successfully engage targets at each station with two out of three grenades. The Soldier must throw from the alternate prone, prone-to-kneeling, and prone-to-standing positions. A target is successfully engaged when the grenade detonates within 5 meters of the target.

4-114. To develop good safety habits, supervisors and instructors must ensure the Soldiers use proper throwing techniques.

NOTE: During the initial practical exercise, allow Soldiers to observe the strike of the grenade so they can gain an appreciation for the weight of the grenade and the amount of force must throw it accurately. After initial training, however, Soldiers should follow the proper procedures for seeking cover after throwing a grenade.

Participate in Mock-Bay Training

WARNING

DO NOT use live grenades for mock-bay training.

CAUTION

MANDATORY: Mock-bay training is a mandatory event for all Soldiers before training with live hand grenades. Failure to conduct mock-bay training prevents identification of avoidable dangerous errors with grenade employment procedures.

4-115. Mock-bay training enables Soldiers to learn the proper techniques of throwing a hand grenade before moving to a live-bay, where Soldiers experience realistic blast effects.

NOTE: Cadre/trainers use mock-bay training to identify Soldiers who require additional training and exhibit techniques that may be dangerous (to the Soldier and other personnel) in the live-bay environment.

Safety Precautions

4-116. For the safe and effective conduct of mock-bay training, Soldiers must—

- Wear body armor, ear protection, helmets, and eye protection.
- Receive a safety briefing before throwing training grenades.
- Carry the hand grenades to the throwing pits using proper right- or left-hand grips.
- Exhibit proper gripping procedures, throwing techniques, and throwing positions.
- Be properly supervised by a mock-bay safety NCO.

Conduct

4-117. At the mock-bay, cadre/trainers must—

- Reinforce hand grenade safety.
- Explain live-bay conduct.
  - Safety precautions.
  - Throwing order.
  - Issue of hand grenades.
  - Commands to prepare, throw, and take cover.
  - Throwing position.

NOTE: Soldiers throw from the standing position during mock-bay and live-bay training.

  - Precautions taken in the event a Soldier drops a hand grenade after pulling the safety pin.

NOTE: The pit safety NCO is responsible for the safety of the thrower. The cadre/trainer demonstrates the techniques he uses to protect the Soldier in the event a Soldier fails to take immediate cover behind the knee wall.

  - Precautions taken in the event a Soldier refuses to throw a live hand grenade.

NOTE: If a Soldier refuses to throw a live hand grenade while in the live-bay pit, the pit safety NCO directs the Soldier to remain behind cover and throws the grenade. Then remove the Soldier from the remainder of training, and the Soldier's name is given to the chain of command.

4-118. Conduct training as follows:

- Each Soldier is issued two M69 hand grenades with the M228 fuze for each rotation. The Soldiers install the M228 fuze before entering the mock-bay.
- Soldiers are rotated twice through mock-bay:
  - The first rotation is for observing Soldier actions and correcting throwing deficiencies.

NOTE: DO NOT allow Soldiers to stand and observe a thrown hand grenade. Direct them to drop to a kneeling position behind cover after throwing the hand grenade.

  - The second rotation ensures Soldiers are performing as taught and serves to identify Soldiers who demonstrate weak or dangerous technique. Soldiers who fail to meet standards during the second rotation are identified as high-risk and sent back for reinforcement training.
  - A third rotation will be conducted upon completion of reinforcement training. Soldiers who fail this retest will not be allowed to throw a live grenade.

NOTE: Soldiers identified as high-risk should be tagged (with something that can be seen from a distance). These Soldiers should be placed at the end of the throwing order to ensure that training is not hindered and to minimize exposing other Soldiers to potential risks.

Participate in Live-Bay Training

NOTE: Soldiers going to the live-bay must have first practiced all the procedures in the mock-bay.

4-119. After inspection of all grenades, the NCOIC should take charge and move the Soldiers to the live-bay throwing site. Live-bay training gives Soldiers the opportunity to experience throwing a live fragmentation hand grenade.

Safety Precautions

4-120. Throwing of live hand grenades can be done in a safe manner if the range safety procedures are followed. These procedures include identification of high-risk Soldiers who had problems throwing grenades during the initial training block of instruction.

NOTE: Live-bay range personnel must be completely alert at all times and prepared to take appropriate actions for any given situation. The range OIC positions himself to observe the throw phase and count grenade explosions for purposes of grenade accountability and duds.

4-121. For the safe conduct of live-bay training, Soldiers must—

- Complete mock-bay training before throwing live grenades.
- Wear body armor, ear protection, helmets, and eye protection.
- Receive a safety briefing before throwing live grenades.
- Carry the hand grenades to the throwing pits using proper right- or left-hand grips.
- Be properly supervised by RSO before moving to the throwing pit and by the pit safety NCO while at the throwing pit.
- Be behind protective barriers, where they stay until called forward.

CAUTION

All Soldiers, to include range personnel, and visitors to the range must be behind protective barriers and wear appropriate safety gear.

4-122. The OIC and NCOIC must take the appropriate safety precautions before conduct of live-bay training. This includes—

- Ensure all guards are posted and roadblock barriers are in place before moving Soldiers to the live-bay.
- Ensure communication between roadblocks, the RSO, and the tower is confirmed before live throwing.
- Ensure Soldiers are shown the live-bay training area and a safety briefing is given on the operating procedures of the live-bay.

NOTE: Range safety personnel must reinforce in live-bay DO NOT cook off hand grenades. Brief Soldiers on the actions to take for a dropped grenade.

- Ensure the range is in a HOT status before beginning live bay training.

Conduct

4-123. During conduct of live-bay training—

- After the live-bay safety briefing, the RSO moves the Soldiers to the holding area and then lines them up in throwing order. The holding area must provide frontal and overhead cover or be positioned a safe distance behind the throwing line.
- The RSO then moves Soldiers forward to the ready line in groups equivalent to the number of throwing pits. On the ready line, the ammunition NCO gives the Soldiers instructions about which

pits they move to and issues each Soldier two grenades, ensuring that they are holding them using proper right- and left-hand grip and at chin/chest level.

- When the tower says "NEXT FIRING ORDER MOVE OUT," the ammunition NCO tells the Soldiers on the ready line to move out.
- As the Soldiers move forward to the throwing pits, they sound off with their throwing hand (for example, "RIGHT HAND" or "LEFT HAND"). While they move, the pit safety NCOs observe that the Soldiers are moving with their hands in the chin/chest working area and that they are maintaining proper grip on the grenades.
- When each Soldier gets to the throwing pit, the pit safety NCO has them move into the proper position in the pit, according to their throwing hand, and takes the grenade from their nonthrowing hand.
- When the tower operator gives the command "**PREPARE TO THROW**," each pit safety NCO tells the Soldiers to prepare to throw, allowing them to remove the safety clip, disengage the pull ring from the confidence clip (if equipped), pull the safety pin, and assume a good throwing position. The pit safeties then signal to the tower that they are ready to throw by holding up his right or left hand.

NOTE: From this point on, the pit safety NCO does not divert his eyes from the throwing hand until completion of the throw.

- When all pit safeties have indicated that they are ready by holding up his right or left hand, the tower operator gives the command "**THROW**." The pit safeties then tell the Soldiers to throw, while observing for proper technique. All Soldiers should throw at the same time.

WARNING

Each Soldier throws their grenade and then takes a knee behind cover.

- The pit safety NCO watches the thrown grenade to observe whether the safety lever separates from the fuze head. He then takes cover next to the Soldier and ensures that he remains down until the tower operator gives the command "ALL CLEAR."
- When the tower operator observes that all grenades have detonated, he announces "ALL CLEAR." The pit safety NCO then tells the Soldier to stand and hands the Soldier the second grenade. When the Soldier is ready, the pit safety NCO signals the tower with his right or left hand up.
- When all pits are ready, the tower operator announces "**PREPARE TO THROW**" and the required steps above are repeated.
- After the second grenades have detonated, the tower operator announces "ALL CLEAR, ALL CLEAR, NEXT FIRING ORDER MOVE OUT." Then, the Soldiers in the pits move back from the throwing line to behind cover and the next group of throwers move from the ready line forward to the throwing pits.

Complete the Hand Grenade Qualification Course

NOTE: DO NOT attempt this course until completion of all initial training.

4-124. The purpose of the qualification course is to measure and evaluate the Soldier's ability to engage a variety of targets in natural terrain under simulated combat conditions. The qualification course allows the Soldier to gain confidence in arming and throwing hand grenades in a simulated tactical scenario.

Stations

NOTE: For IET Soldier training requirements refer to TRADOC Regulation 350-6, Hand Grenade Training Requirements, and U.S. Weapons Training (Hand Grenades) BT 07108.

Active duty Soldiers in Infantry and reconnaissance units must qualify on the hand grenade qualification course every six months according to DA PAM 350-38. All other active duty Soldiers and those in Army Reserve and National Guard units must qualify according to the unit hand grenade training requirements in DA PAM 350-38, Chapters 1 through 9.

4-125. The hand grenade qualification course (Figures 4-10 through 4-17) is standardized throughout the Army. It comprises seven stations (Table 4-4), with at least one grader at each station. Each participant is issued ten hand grenades and must successfully engage targets at six stations (with no more than two grenades used at any one station) and correctly identify hand grenades at the seventh station.

NOTE: See TC 25-8 for more information about the hand grenade qualification course.

Table 4-4. Hand grenade qualification course stations

STATION	*TASK*	*CONDITION*	*STANDARD*
1	Engage a group of F-type silhouette targets in the open from a two-man fighting position.	The targets are located 35 meters to the front of the fighting position, simulating enemy movement through and beyond the squad's protective wire.	Soldier must throw grenade so that is lands, or the fuze detonates, within 5 meters of enemy targets.
2	Engage a bunker using available cover and concealment.	The bunker can have one or two firing portholes oriented toward the direction of the buddy team's movement and a rear exit.	Soldier must use proper technique to approach the bunker, cook of the grenade, and employ the grenade inside the bunker.
3	Engage a fortified enemy mortar position.	The fortified enemy mortar position must be located 20 meters away.	Soldier must throw grenade so that it lands inside the mortar position.
4	Engage a group of enemy targets.	The group of enemy targets must be behind cover and located 20 meters away.	Soldier must throw grenade so that it lands, or the fuze detonates, within 5 meters of enemy targets.
5	Clear an entry point to a trench line.	The trench line must be located 25 meters away.	Soldier must throw grenade so that it lands inside or rolls into the trench.
6	Engage enemy troops in a halted, open-type wheeled vehicle.	The halted, open-type wheeled vehicle must be located 25 meters away.	Soldier must throw grenade so that it lands, or the fuze detonates, within 5 meters of the enemy vehicle.
7	Identify hand grenades.	All grenades must present proper shape, color, and markings.	Soldiers must be able to identify grenades by type and purpose, using the shape, color and markings, depicted by the training aid.

NOTE: All targets must be successfully engaged with no more than two grenades to receive a "GO." If the Soldier is successful with the first grenade, a second one is not thrown.

Scoring

4-126. Although no two hand grenade qualification courses are alike, the standards must be consistent. Qualification must be awarded only to those Soldiers who meet these standards. The minimum course standards should include live-bay training and the hand grenade qualification course.

NOTE: The evaluator at each station determines scoring according to DA Form 3517-R shown in Figures 4-19 and 4-20.

NOTE: Units should maximize opportunities like the qualification course to place an emphasis on hand grenade familiarization training, based on unit STRAC and mission requirements. There have been numerous reports of Soldiers being injured due to misidentification or mishandling of hand grenades. The hand grenade qualification is recommended to enhance Soldiers employment proficiency.

HAND GRENADE QUALIFICATION SCORECARD

For use of this form, see TC 3-23.30; the proponent agency is TRADOC

NOTE: In addition to the requirements on the scorecard, the Soldier must throw one live fragmentation grenade to qualify.

A. NAME *(Last, First, Middle Initial)*	B. UNIT	C. DATE *(YYYYMMDD)*
Domingo, Edmar E. SFC	A 2/29	20121120

D. EVALUATOR'S NAME	E. DATE LIVE GRENADES WERE THROWN *(YYYYMMDD)*
Doucet, Philip, D. MSG	20121120

F. STATION	G. TYPE TARGET	H. GO	I. NO-GO	J. EVALUATOR'S INITIALS
1	Engage Enemy from Fighting Position at 35 Meters *(Standing)*	X		
2	Engage Bunker *(Prone)*	X		
3	Engage Enemy Mortar Position at 25 Meters *(Kneeling)*		X	
4	Engage Enemy Behind Cover at 20 Meters *(Alternate Prone)*	X		
5	Engage Trench at 25 Meters *(Standing)*	X		
6	Engage Wheeled Vehicle at 25 Meters *(Kneeling)*	X		
7	Identify Hand Grenades	X		

K. QUALIFICATION STANDARD		CHECK ONE
PASSED 7	EXPERT	
PASSED 6	FIRST CLASS	X
PASSED 5	SECOND CLASS	
PASSED 4 OR LESS	UNQUALIFIED	

L. DATE INITIALED *(YYYYMMDD)*	M. SCORER'S INITIALS
20121120	NAH
N. DATE INITIALED *(YYYYMMDD)*	**O. SCORER'S INITIALS**
20121120	PDD

DA FORM 3517-R, NOV 2009 PREVIOUS EDITION IS OBSOLETE. APD PE v1.00

Figure 4-19. Example of a completed DA Form 3517-R (Hand Grenade Qualification Scorecard) (front)

PERFORMANCE MEASURES	GO	NO-GO
STATION 1. Engage Enemy From Fighting Position at 35 Meters *(Standing)*		
A. Detonated at least one grenade within 5 meters of the center of target.	X	
B. Kept exposure time under 3 seconds.	X	
C. Returned to covered position after each throw.	X	
D. Used proper grip.	X	
E. Used proper throwing techniques.	X	
F. Completed performance measures 1A through 1E within 15 seconds.	X	
STATION 2. Engage Bunker *(Prone)*		
A. Approached from blind side.		X
B. Checked for bunker opening.	X	
C. Detonated grenade in bunker.	X	
D. Rolled away from bunker.	X	
E. Used proper grip.	X	
F. Used cook-off technique.	X	
G. Completed performance measures 2A through 2F within 15 seconds.	X	
STATION 3. Engage Mortar Position at 25 Meters *(Kneeling)*		
A. Detonated at least one grenade inside mortar position.	X	
B. Kept exposure time under 3 seconds.	X	
C. Returned to covered position after each throw.	X	
D. Used proper grip.	X	
E. Used proper throwing techniques.	X	
F. Completed performance measures 3A through 3E within 15 seconds.	X	
STATION 4. Engage Enemy Behind Cover at 20 Meters *(Alternate Prone)*		
A. Detonated at least one grenade within 5 meters of the center of target.	X	
B. Kept exposure time under 3 seconds.	X	
C. Returned to covered position after each throw.	X	
D. Used proper grip.	X	
E. Used proper throwing techniques.	X	
F. Completed performance measures 4A through 4E within 15 seconds.	X	

PERFORMANCE MEASURES	GO	NO-GO
STATION 5. Engage Trench at 25 Meters *(Standing)*		
A. Detonated at least one grenade inside trench.	X	
B. Kept exposure time under 3 seconds.	X	
C. Returned to covered position after each throw.	X	
D. Used proper grip.	X	
E. Used proper throwing techniques.	X	
F. Completed performance measures 5A through 5E within 15 seconds.	X	
STATION 6. Engage Wheeled Vehicle at 25 Meters *(Kneeling)*		
A. Detonated within 1 meter of vehicle or within 5 meters of dismounting troops.	X	
B. Kept exposure time under 3 seconds.	X	
C. Returned to covered position after each throw.	X	
D. Used proper grip.	X	
E. Used proper throwing techniques.	X	
F. Completed performance measures 6A through 6E within 15 seconds.	X	
STATION 7. Identify Hand Grenades		
A. Identified M67 grenade as "fragmentation grenade" and "kill or disable personnel" as the purpose.	X	
B. Identified M83 grenade as "white smoke" and "screening and concealment" as the purpose.	X	
C. Identified M18 grenade as "colored smoke" and "signaling and marking" as the purpose.	X	
D. Identified M7A3 grenade as "CS" and "riot control and crowd dispersal" as the purpose.	X	
E. Identified M14 grenade as "incendiary" and "start fires and destroy equipment" as the purpose.	X	

NOTES:

EACH PERFORMANCE MEASURE AT EACH SECTION IS GRADED ON A PASS / FAIL STANDARD. A SOLDIER MUST PASS ALL OF THE STANDARDS TO RECEIVE A "GO" ON THAT STATION.

IN ADDITION TO THE REQUIREMENTS ON THE SCORE CARD, TRADOC IET UNITS WILL THROW TWO LIVE GRENADES PER TRADOC REG 350-6. ALL OTHER UNITS WILL REFER TO DA PAM 350-38 STRAC FOR LIVE GRENADE REQUIREMENTS.

Page 2, DA Form 3517-R, NOV 2009 APD PE v1.00

Figure 4-20. Example of a completed DA Form 3517-R (Hand Grenade Qualification Scorecard) (back)

SUSTAINMENT TRAINING

4-127. Units should integrate the use of grenades into collective tasks, rather than training these skills as a separate event. Leaders at all levels should study the employment of grenades with the unit mission and implement a training program that supports that mission.

4-128. Units should make a distinct effort to train beyond the hand grenade qualification course. The following generic tasks can assist units in training and evaluating proficiency:

- Identify hand grenades and pyrotechnic signals.
- Inspect and maintain hand grenades and pyrotechnic signals.
- Employ a pyrotechnic signal.
- Complete the distance and accuracy course.
- Complete the bunker complex course.
- Complete the trench complex course.
- Complete the building complex course.
- Participate in mock-bay training.

Identify Hand Grenades and Pyrotechnic Signals

4-129. The purpose of this training is to develop and at a later time, test the Soldier's knowledge in identifying and explaining the use of hand grenades and pyrotechnic signals, to include those not covered during the qualification course. When conducting the training, instructors should clarify the task, conditions, and standards (Table 4-5).

Table 4-5. Identify hand grenade and pyrotechnic signals—task, condition, and standard

TASK	Identify a variety of hand grenades and pyrotechnic signals.
CONDITION	Given individual equipment, and hand grenade/pyrotechnic mock-ups training aids, or photos that reflect the proper shape, color, and markings for each grenade/pyrotechnic.
STANDARD	The Soldier must successfully identify each grenade/pyrotechnic by stating the correct type and purpose.

Inspect and Maintain Hand Grenades and Pyrotechnic Signals

4-130. Soldiers inspect hand grenades and pyrotechnic signals on a regular basis to ensure serviceability due to prolonged exposure to environmental conditions, damage in shipping or in storage, or missing safety devices. Maintenance requirements are minimal (Table 4-6). Refer to TM 9-1330-200-12 and TM 9-1370-206-10 for more information.

Table 4-6. Inspect and maintain hand grenades and pyrotechnic signals—task, condition, and standard

TASK	Perform preventive maintenance checks and services (PMCS) of hand grenades and pyrotechnic signals.
CONDITION	Given individual protective equipment; a clean lint-free cloth; an oil-free camel hair brush; cleaner, lubricant, and preservative (CLP); and an M67 or M69 hand grenade, a smoke grenade, and a signal flare.
STANDARD	The Soldier must inspect, clean, and store M67 or M69 hand grenades and pyrotechnic signals without causing damage to the hand grenade or pyrotechnic signal or cause injury to friendly personnel, according to TM 9-1330-200-12 and TM 9-1370-206-10.

Employ a Pyrotechnic Signal

4-131. To successfully employ pyrotechnic signals, Soldiers must (Table 4-7)—

- Be familiar with the type of pyrotechnic signal used.

- Know how to properly hold, prepare, and throw or launch the pyrotechnic signal from various positions.

NOTE: See Chapter 3 for employment and safety considerations.

Table 4-7. Employ a pyrotechnic signal—task, condition, and standard

TASK	Employ a pyrotechnic signal.
CONDITION	Given individual protective equipment, an M106, M83, and M18 smoke grenade, a handheld flare, and a 20-meter target.
STANDARD	The Soldier must provide a complete smoke screen that cannot be observed from the target area, and successfully launch a handheld flare (by hand or from the ground) to communicate withdrawal or shifting of friendly fires.

Complete the Distance and Accuracy Course

WARNING

DO NOT use live grenades for practicing distance and accuracy.

4-132. The distance and accuracy course develops the Soldier's proficiency in gripping and throwing hand grenades. When conducting the training, instructors should clarify the task, conditions, and standards for the course (Table 4-8), and demonstrate the task.

Table 4-8. Distance and accuracy training—task, condition, and standard

TASK	Engage a variety of targets at varying ranges up to 40 meters.
CONDITION	Given 3 practice grenades, individual equipment, and a variety of targets at distances of 20-, 30-, and 40-meters.
STANDARD	The Soldier must successfully engage targets from the standing positions. A target is successfully engaged when the grenade detonates within 5 meters of the target.

4-133. To develop good safety habits, supervisors and instructors must ensure the Soldiers use proper throwing techniques.

NOTE: During the initial practical exercise, allow Soldiers to observe the strike of the grenade so they can gain an appreciation for the weight of the grenade and the amount of force required to throw it accurately. After initial training, however, Soldiers should follow the proper procedures for seeking cover after throwing a grenade.

Complete the Bunker Complex Course

WARNING

When using M106 SOD-Vr, DO NOT "COOK OFF" or "MILK" the grenade. This smoke grenade has a flash-bang grenade type fuze with a 1.0- to 2.3-second time delay but can function as early as 0.7 seconds after the safety lever has been released.

WARNING

DO NOT use live grenades for practicing the bunker complex course.

4-134. The bunker complex course exercise develops the Soldier's proficiency in properly attacking a bunker complex from a covered and concealed location while using obscuration and proper movement techniques. When conducting the training, instructors should clarify the task, conditions, and standards for the course (Table 4-9), and demonstrate the task. (Refer to Chapter 2 for proper "COOK OFF" technique.)

Table 4-9. Bunker complex course—task, condition, and standard

TASK	Engage an enemy bunker complex.
CONDITION	Given an individual weapon, helmet, load bearing equipment and body armor, cover and concealment, and two M69 hand grenades with M228 fuze, or MK3A2 offensive (concussion) grenades, or M84 stun grenades (flash-bang), and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully engage and disable a bunker. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the bunker from the blind side; properly "COOK OFF" a M69 grenade, put the grenade into the firing port of the bunker, roll away from the bunker, and turn 180 degrees to cover the rear exit of the bunker. The grenade must detonate in the bunker.
NOTE: See Chapter 2 for proper M69 "COOK OFF" technique.	

Complete the Trench Complex Course

WARNING

When using M106 SOD-Vr, the MK3A2, or the M84 DO NOT "COOK OFF" or "MILK" the grenade or any type of smoke or special purpose grenade. These grenades have short fuze delays and can function as early as 0.7 seconds after the safety lever is released, causing serious injury to personnel.

WARNING

DO NOT use live grenades for practicing the trench complex course.

4-135. The trench complex course exercise develops the Soldier's proficiency in properly attacking a trench complex from a covered and concealed location while using obscuration and proper movement techniques. When conducting the training, instructors should clarify the task, conditions, and standards for the course (Table 4-10), and demonstrate the task.

Table 4-10. Trench complex course—task, condition, and standard

TASK	Engage an enemy trench complex.
CONDITION	Given an individual weapon, helmet, load bearing equipment and body armor, cover and concealment, and two M69 hand grenades with M228 fuze, or two MK3A2 offensive grenades, and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully enter a trench and engage enemy personnel. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the trench from the blind side, properly ”COOK OFF” a M69 grenade, or prepare (DO NOT “COOK OFF”) a MK3A2 offensive grenade. Throw or roll the grenade into the trench, roll away from the mouth of the trench, wait for the explosion, and enter and clear the trench. The grenade must detonate in the trench.
NOTE: See Chapter 2 for proper M69 “COOK OFF” technique.	

Complete the Building Complex Course

4-136. The building complex course exercise develops the Soldier's proficiency on how to properly attack and clear a building from a covered and concealed location while using obscuration and proper movement techniques. When conducting the training, instructors should clarify the task, conditions, and standards for the course (Table 4-11), and demonstrate the task.

WARNINGS

When using M106 SOD-Vr, the MK3A2, or the M84 DO NOT “COOK OFF” or “MILK” the grenade or any type of smoke or special purpose grenade. These grenades have short fuze delays and can function as early as 0.7 seconds after the safety lever is released, causing serious injury to personnel.

DO NOT use M18, M83, or AN-M8 smoke grenades in enclosed or confined spaces. Burning-type grenades burn oxygen. Standard protective masks filter particles but DO NOT supply oxygen.

CAUTION

M18 and M83 smoke grenades have the potential to start fires when thrown on dry tender.

Table 4-11. Building complex course—task, condition, and standard

TASK	Enter and clear a building complex.
CONDITION	As a member of a clearing team. Given an individual weapon, helmet, load bearing equipment and body armor, cover and concealment, and two M69 hand grenades with M228 fuze, or MK3A2 offensive grenades, or M84 stun grenades (flash-bang), and one M106 or M83 smoke grenade.
STANDARD	The Soldier must successfully enter a building and engage enemy personnel. The Soldier must provide a smoke screen (M106 or M83) to cover the approach to the building from a covered and concealed position, properly prepare the grenade ["COOK OFF" a M69 or use (DO NOT "COOK OFF") the MK3A2 offensive grenade, or M84 stun grenade (FLASHBANG)]. Throw the grenade into a designated building entry point, take cover, wait for the explosion, and enter and clear the entry point. The grenade must detonate in the building/room.
NOTE: See Chapter 2 for proper M69 "COOK OFF" technique.	

Participate in Mock-Bay Training

WARNING

DO NOT use live grenades for mock-bay training.

4-137. In mock-bay training, Soldiers practice throwing grenades before moving to live-bay training. This training introduces the Soldier to throwing commands and provides additional throwing practice. Instructors should orient the Soldiers to the mock-bay training pit and explain the commands used during actual throwing. When conducting the training, instructors should clarify the task, conditions, and standards for the training (Table 4-12), and demonstrate the task. Soldiers should also practice the procedures used during live-bay training.

NOTE: The instructor must reinforce correct throwing and safety procedures.

Table 4-12. Mock-bay training—task, condition, and standard

TASK	Engage targets in the open with hand grenades.
CONDITION	Given individual equipment, to include helmet, body armor, and two M69 hand grenades with M228 fuze, a mock-bay pit that replicates a live-bay pit, ear protection, and an orientation and safety briefing.
STANDARD	Soldiers must safely carry, arm, and throw two practice hand grenades from the mock-bay pit while following the commands from the instructor or NCOIC. Soldiers must not move from the cover of the pit until the command "CLEAR", "ALL CLEAR" is given.

NOTE: Be sure the physical layout of the mock-bay pit replicates the live-bay pit. This not only gives the Soldier the sensation of throwing a live fragmentation hand grenade, but also instills confidence in his ability to throw the hand grenade.

Participate in Live-Bay Training

NOTE: Soldiers going to the live-bay must have first practiced all the procedures in the mock-bay.

4-138. After inspecting all grenades, the NCOIC takes charge and move the Soldiers to the live-bay throwing site. Live-bay training gives Soldiers the opportunity to experience throwing a live fragmentation hand grenade (Table 4-13).

Table 4-13. Live-bay training—task, condition, and standard

TASK	Engage targets in the open with hand grenades.
CONDITION	Given individual equipment, to include helmet, body armor, and two M67 fragmentation hand grenades, a live-bay pit, ear protection, and an orientation and safety briefing.
STANDARD	Soldiers must safely carry, arm, and throw two M67 fragmentation hand grenades from the live-bay pit while following the commands from the instructor or NCOIC. Soldiers must not move from the cover of the pit until the command "CLEAR", "ALL CLEAR" is given.
NOTE: For more information about live-bay training, see the initial training segment of this chapter.	

COLLECTIVE TRAINING

NOTE: Soldiers should use the M69 practice hand grenades against realistic targets while practicing the collective tasks. Use the MK3A2 offensive grenade or M84 hand grenades during urban operations, if available. However, Soldiers can use the M69 in lieu of the MK3A2 and M84.

Squad Situational Training Exercise

4-139. Leaders should present Soldiers with tactical situations in a realistic squad STX integrating the use of hand grenades and pyrotechnics with other fire team or squad weapons to force Soldiers to make sound tactical decisions and improve their skills.

4-140. Leaders should consider integrating hand grenade tasks that are best suited to the unit's METL into the tactical scenario. Figure 4-21 is an example squad STX that tests the squad's weapon proficiency.

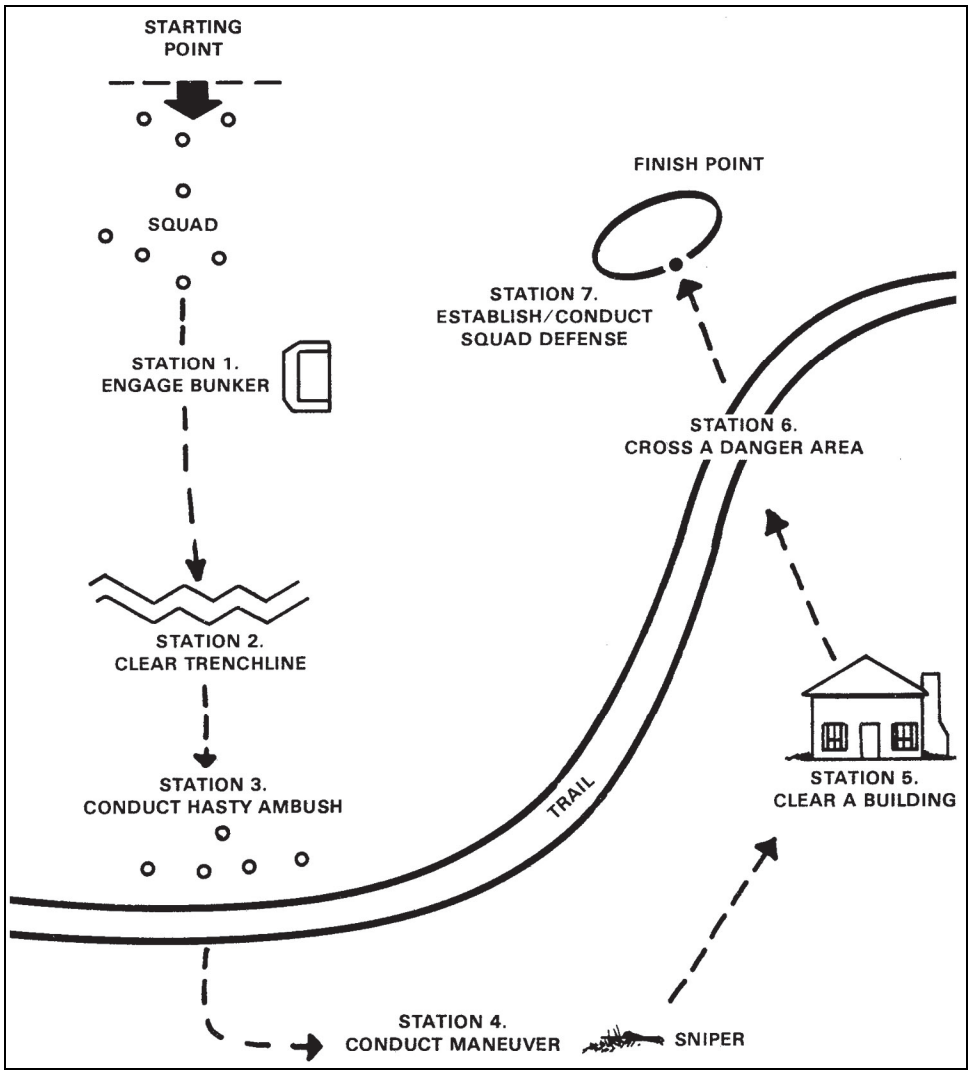

Figure 4-21. Example of squad situational training exercise with hand grenades

COMPLETE THE TRAINING MISSION

4-141. At the completion of training, account for all equipment, range material, and ammunition, to include the completion of range maintenance, the OIC and RSO can close the range. This includes—

- Request a closing code from range operations.
- Range/Unit cadre conduct physical equipment and personnel check for live, dud, or ammunition residue.
- Release unit Soldiers.
- Remove all equipment and ammunition from the range.

NOTE: Turn in all unexpended grenades in original grenade individual container and wooden box to the ASP, along with all safety levers and safety pull rings/pins that can be found safely within the impact training area and packing residue from all detonated grenades.

- Have EOD find and clear any duds and grenades thrown with the safety pin pulled.

- Police the range, fill in all holes with sand, rake the impact area, and perform other range maintenance when necessary by local SOP.
- Request a range inspection from range operations when ready to clear.
- Turn in paperwork and equipment.
- Submit after action report to headquarters.
- Report any noted safety hazards to proper authorities.

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Chapter 5
Employment Considerations

Soldiers employ hand grenades and pyrotechnics throughout the spectrum of warfare to conceal positions and to inflict greater casualties.

APPLICATION

5-1. Hand grenades and pyrotechnics provide the individual Soldier with a number of highly versatile and effective weapon and signaling systems. Each system is designed for a specific application (Tables 5-1 and 5-2).

Table 5-1. Types of hand grenades and their applications

TYPE	*APPLICATION*
Fragmentation hand grenades	Supplement small arms fire against enemies in close combat. Wound or kill the enemy, 5 meter kill zone at point of impact, 15 meter wound zone from point of impact.
	Destroy or disable equipment.
Offensive hand grenades (concussion grenades)	Destroy above and below ground man-made structures.
	Kill or stun enemy divers during waterborne operations.
	Kill or incapacitate enemy personnel in the open, confined space, or during urban operations.
Stun hand grenades	Confuse, disorient, or momentarily distract a potential threat in forced entry scenarios, selected urban operations, or crowd control operations.
Incendiary hand grenades	Destroy equipment and weapon systems.
	Destroy munitions and start fires.

Table 5-2. Types of pyrotechnic signals and their applications

TYPE	*APPLICATION*
Colored smoke grenades	Identify places or objects.
	Mark positions.
White smoke grenades	Conceal.
	Create a smoke screen.
Riot-control hand grenades	Control crowds or riots.
Star clusters, star parachutes, and smoke parachutes	Signal.
	Illuminate.
Surface trip flares	Provide early warning.
	Illuminate an immediate area.
Booby trap simulators (flash, illuminating, and whistling)	Early warning signals.
Ground-burst simulators and grenade simulators	Simulate battle noises and battlefield effects (such as, shells in flight and ground-burst explosions).

RULES OF ENGAGEMENT

5-2. To properly employ any type of hand grenade or pyrotechnic signal, Soldiers must know the—

- Characteristics and capabilities of the chosen grenade or pyrotechnic.
- Location of all friendly forces.
- Sector of fire.
- Projected arc or path of the grenade or pyrotechnic, ensuring that it is free of obstacles.
- Direction of the wind (when employing handheld and ground smoke signals).

5-3. Soldiers should use the buddy or team system when employing grenades and pyrotechnics. For example, one Soldier can provide covering fire, or as a combined team, Soldiers can employ grenades on the target and ground smoke within the target area.

CONSIDERATIONS

5-4. When employing any type of hand grenade or pyrotechnic signal, Soldiers must ask themselves the following questions:

- What types of grenades do the rules of engagement (ROE) permit and restrict?
- What effect is desired (for example, kill, stun, obscure, destroy equipment, and mark a location.)?
- Does the structural integrity of the room and building permit the types of grenades selected for use?

WARNING

DO NOT use fragmentation or concussion grenades in buildings that have walls of thin veneer material. Fragmentation grenade particles can penetrate partitioned walls, and concussion grenades can weaken the structure of the building or cause portions of the building to collapse inward.

- Will the scheme of maneuver permit the use of fragmentation grenades and not cause fratricide?
- Will the type of grenade used cause a fire in an undesired location?

OFFENSIVE OPERATIONS

5-5. The fragmentation hand grenade is the primary type of grenade used during offensive operations; however, offensive operations can also involve the use of offensive and stun hand grenades. These operations include clearing—

- Confined spaces.
- Trenches.
- Bunkers.
- Rooms.
- Entrenched positions.

CONFINED SPACES

5-6. If the enemy is located in a confined space, such as a bunker, building, or fortified area, the offensive grenade or stun grenade may be more appropriate than the fragmentation hand grenade. These types of grenades are much less lethal than fragmentation grenades on an enemy in the open, but they are effective against an enemy within a confined space and are safer to employ in the confines of a smaller space. Selection of a grenade, however, depends upon availability and mission analysis.

WARNING

The concussion produced by offensive grenades in enclosed areas is greater than those produced by the fragmentation grenade. This may weaken or cause collapse of a structured foundation.

TRENCHES

5-7. A mix of fragmentation grenades and offensive grenades should be used to clear enemy fortified trenches: fragmentation grenades to gain and clear the enemy's trench lines, and offensive grenades to clear and destroy any fortified positions. (Refer to FM 3-21.8 for detailed instruction.)

WARNING

To ensure the safety of squad members during tactical operations, Soldiers employing fragmentation grenades must shout "FRAG OUT" before throwing the grenade.

CLEARING BUNKERS

5-8. Use a mix of fragmentation and offensive grenades to clear bunkers: fragmentation grenades to suppress enemy fires during movement, and a mix of fragmentation and offensive grenades to destroy fortified positions. (Refer to FM 3-21.8 for detailed instruction.)

WARNING

To ensure the safety of squad members during tactical operations, Soldiers employing fragmentation grenades must shout "FRAG OUT" before throwing the grenade.

CLEARING A ROOM

5-9. The following is an example of how a squad clears a room using hand grenades:

WARNING

Conduct a structural analysis before using fragmentation or concussion grenades to clear rooms of a building. Grenade fragments can penetrate walls and cause injury to the clearing team. Concussion grenades may weaken the structure, causing part or all of the building to collapse on the clearing team.

(1) The squad leader and assaulting fire team approach the room and position themselves at either side of the entrance.

(2) A Soldier of the assaulting fire team cooks off a fragmentation or concussion grenade (2 seconds maximum), shouts **"FRAG OUT"** to alert friendly personnel, and then throws the grenade into the room.

CAUTION

If a stun grenade used for room clearing, DO NOT "COOK OFF" the grenade. The stun grenade has a short time fuze (1.0 to 2.3 seconds); the thrower does not have adequate time to dispose of the grenade before it explodes. This can cause serious injury to the thrower and friendly personnel nearby.

NOTE: If stealth is a factor, the thrower alerts the team/squad of the type of grenade to be used, by holding it up so that each member can see the grenade and take appropriate actions.

DANGER

SOLDIERS MUST BE CONSCIOUS OF FEATURES WITHIN THE ROOM TO BE CLEARED. GRENADES TEND TO ROLL DOWN STAIRS. THIS CAN NULLIFY THE DESIRED EFFECT(S) OR CAUSE FRIENDLY CASUALTIES.

(3) After the grenade explodes, the lead man in the clearing team enters the room, eliminates any immediate threat, and moves to his point of domination.

(4) The remainder of the clearing team enters the room and moves to their points of domination, eliminating any threat.

(5) Once cleared, the team marks the room according to the unit SOP.

NOTE: Refer to FM 3-21.8 for detailed instruction on how a squad clears a room with the use of grenades.

ENTRENCHED POSITIONS

5-10. Against Soldiers in open trenches or fighting positions, Soldiers should throw a fragmentation grenade or an offensive concussion grenade so that it bursts over the target. If the targets are on sloping ground, Soldiers should use above-ground detonation to prevent the grenade from rolling away from the target before detonating. Above-ground detonation also prevents the enemy from securing the grenade and throwing it back within the

4- to 5-second fuze delay. (Refer to Chapter 2 for more information about above-ground detonation ("COOK OFF")).

DEFENSIVE OPERATIONS

5-11. The fragmentation grenade is the primary hand grenade used in defensive operations. It can be used with other weapons to destroy remnants of an attacking enemy force that may succeed in penetrating the more distant barriers and final protective fires. The fragmentation hand grenade further disrupts the continuity of the enemy attack, demoralizes the enemy soldier, and forces the enemy into areas covered by direct-fire weapons such as rifle and machine gun fire and Claymore munitions. Using fragmentation hand grenades on dismounted enemy forces at a critical moment in the assault can be the final blow in taking the initiative away from the enemy. (Refer to FM 3-21.8 for more information regarding the use of grenades in defensive operations.)

DEFENSE FROM INDIVIDUAL FIGHTING POSITIONS

5-12. Used from individual fighting positions, fragmentation hand grenades can cover close-in dead space. Soldiers should use these grenades with ground flares along the front of their defensive positions. Potential avenues of approach through the unit's perimeter should be marked with a reference to identify them as primary hand grenade targets.

5-13. The following rules apply when employing fragmentation hand grenades from fighting positions:

- Clear overhead obstructions that may interfere with the path of the thrown grenade. Do this at the same time direct-fire fields of fire are cleared.
- Rehearse grenade employment; know where the primary target is located.
- Keep 50 percent of the fragmentation grenades at the ready in the fighting position, leaving the remaining fragmentation grenades on the load bearing equipment.
- Rehearse actions needed if an enemy grenade lands in the fighting position.
- Employ fragmentation hand grenades against enemy soldiers located in defilade positions as first priority. This lessens the danger to friendly Soldiers and helps cover terrain not covered by direct-fire weapons.
- Reconnoiter the alternate and supplementary positions, and determine the priority for the fragmentation hand grenade target.

WARNING

Grenade fuze time delays can vary. If an enemy grenade lands in the position, immediately evacuate the fighting position, and lay flat on the ground.

RETROGRADE OPERATIONS

5-14. Most of the employment considerations applicable to the use of hand grenades and pyrotechnics in the defense are equally applicable to retrograde operations. Considerations unique to retrograde operations relate to creating obstacles, marking friendly force locations, breaking contact, and communicating.

CREATE OBSTACLES

5-15. When terrain conditions permit, Soldiers can use incendiary grenades to impede and disrupt enemy movement by initiating fires in specific areas.

MARK LOCATIONS

5-16. Soldiers can use prearranged smoke colors to mark friendly force positions and identify friendly forces.

BREAK CONTACT

5-17. During retrograde operations, some elements of the friendly force may become decisively engaged. Soldiers can use fragmentation, white smoke, and CS grenades to break contact and regain flexibility of maneuver. Use of fragmentation grenades in volley fire following the employment of white smoke is especially effective; the smoke obscures enemy observation of friendly force movement from covered positions, and the fragmentation grenades force the enemy to cover.

COMMUNICATIONS

5-18. Soldiers can use prearranged handheld pyrotechnic signals to communicate friendly force movements.

URBAN OPERATIONS

5-19. By definition, urban areas house large quantities of people and contain large numbers of buildings. The enemy may be intermingled with noncombatants, and collateral damage must be limited. Because of these factors, the ROE may be more restrictive than under other combat conditions. Table 5-3 outlines the guidelines for hand grenade employment. (Refer to ATTP 3-06.11 for use of grenades and pyrotechnics in urban areas.)

Table 5-3. Hand grenade employment during urban operations

TYPE OF HAND GRENADE	*EMPLOYMENT*
Nonlethal grenades	Use when noncombatants and friendly forces may be intermingled with threat forces. Throw into rooms before entering to cause confusion and hesitation (especially useful if the structural integrity of the building does not permit the use of fragmentation or concussion grenades).
Chemical grenades	Use during urban operations to maintain control (riot control), or incendiary purposes. Employed only when command-directed.
Fragmentation	Throw at assaulting enemy troops between buildings or on streets from windows, doors, or man-made apertures (mouse holes). Employed only when command-directed.
Offensive	Used for concussion effects, less lethal than fragmentation grenades in open areas but are effective within enclosed spaces.
Ground smoke signal	The M106 provides a near instantaneous screen of dense smoke and is safe to use inside of urban structures, subterranean locations, and caves. Use the M106 in lieu of the M83 TA white smoke hand grenade when inside of confined spaces, and when encountering enemy in close quarters.

WARNING

Use of the M83 TA white smoke hand grenade are harmful to personnel and may cause fires inside of confined spaces. These smoke grenades inside buildings may displace oxygen in poorly ventilated rooms and make breathing difficult while also rendering protective masks ineffective.

AIR OPERATIONS

WARNING

DO NOT throw fragmentation grenades from low-flying or hovering helicopters. The fragments present a hazard to the aircraft and its passengers.

5-20. Generally, throwing hand grenades from medium- or high-flying helicopters is limited to mission-critical situations.

USE UNDER ADVERSE CONDITIONS

5-21. While hand grenade procedures do not change, take special precautions when employed under adverse conditions.

CBRN

5-22. Wearing gloves, especially gloves used during CBRN, inhibits the thrower's feel and could decrease his throwing ability and range. The thrower should execute arming and throwing procedures carefully and concentrate on using the proper grip. Observing each arming action (removal of safety clip, disengagement of the confidence clip (if equipped), and safety pin) is also recommended in CBRN.

LIMITED VISIBILITY

5-23. Depth perception is generally impaired under limited visibility conditions. Throwers must have clear fields of fire with no overhead obstructions.

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Appendix A

Obsolete Hand Grenades

This appendix provides data for identifying and understanding the characteristics and capabilities of obsolete U.S. hand grenades. Although these grenades are no longer common to the U.S. inventory, they remain in available war stock, or in use by other services or nations. Therefore, U.S. Soldiers may be issued one of these munitions.

A-1. See Chapter 2 for proper procedures for inspecting, storing, carrying, gripping, preparing, and throwing grenades.

MK1 ILLUMINATING HAND GRENADE

A-2. The MK1 illuminating hand grenade is a ground signaling and illuminating item (see Figure A-1). Its uses are similar to ground pyrotechnic signals, except that the grenade burns only at ground level, whereas pyrotechnic signals burn in flight or while suspended from a parachute. DO NOT use the MK1 in deep mud or swampy ground because the grenade may become embedded in the ground, which would result in little or no illumination. The grenade burns with a hot flame and may be used as an incendiary agent. Because of its incendiary nature, exercise caution to prevent fires, which would be detrimental to tactical operations. Table A-1 outlines its components and characteristics.

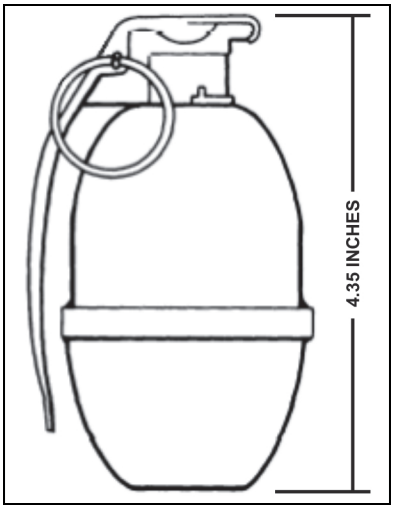

Figure A-1. MK1 Illuminating grenade

Table A-1. Components and characteristics of MK1 illuminating grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Sheet steel.
Filler	3.5 ounces of illuminating pyrotechnic composition.
Fuze	Special igniter. The special igniter differs from other igniting-type fuzes in that it contains a quick match, rather than a powder-delay train. The quick match has a burning time of 7 seconds, after which it sets off an igniter charge. The igniter charge initiates the burning process of the grenade's filler.
Safety Features	Pull ring with pin and safety lever.
Fuze Delay	7 seconds.
Total Weight	10 ounces.
Throwing Distance of Average Soldier	40 meters.
Effects	Illumination for 25 seconds. The filler illuminates an area 200 meters in diameter and produces 55,000 candlepower.
Colors and Markings	White with black markings or unpainted with black markings.

WARNING

Avoid looking directly at the illuminating grenade as it burns, the intensity of the light may damage the retina.

MK2 FRAGMENTATION HAND GRENADE

A-3. Use the MK2 fragmentation hand grenade to supplement small arms fire against the enemy in close combat (see Figure A-2). The grenade produces casualties by high velocity projections of fragments. Table A-2 outlines its components and characteristics.

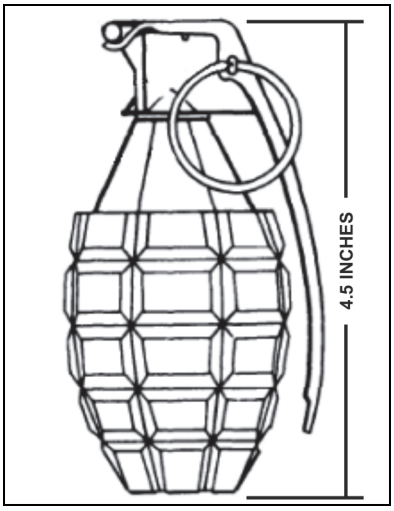

Figure A-2. MK2 Fragmentation hand grenade

Table A-2. Components and characteristics of MK2 hand grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Cast iron.
Filler	TNT (flaked or granular).
Fuze	M204A1, M204A2.
Safety Features	Safety lever and safety pin assembly.
Fuze Delay	4 to 5 seconds.
Total Weight	21 ounces.
Throwing Distance of Average Soldier	30 meters.
Effects	Bursting radius of 10 meters.
Colors and Markings	Olive drab body with a single yellow band indicates high explosive filler.

WARNING

If the fuze is loose on the MK2 hand grenade, DO NOT try to tighten it; this could set off the granular TNT in the grenade. Turn the grenade into issuing authority.

M7 AND M7A1 CN RIOT CONTROL HAND GRENADES

A-4. These grenades contain only CN (tear gas) for filler (see Figure A-3). They differ in the amount of filler they contain. Table A-3 outlines their components and characteristics.

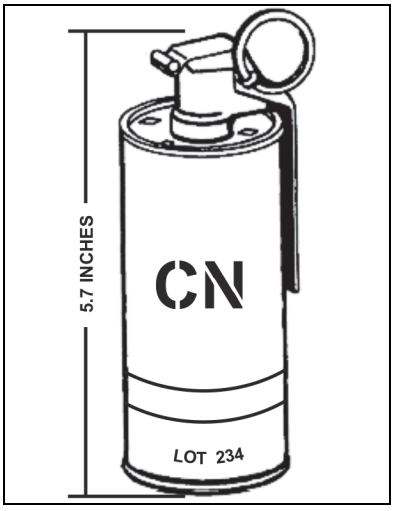

Figure A-3. M7 and M7A1 CN riot control grenades

Table A-3. Components and characteristics of M7 and M7A1 CN riot control hand grenades

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Thin sheet metal.
Filler	M7 grenade - 10.25 ounces of CN. M7A1 grenade - 12.5 ounces of CN.
Fuze	M201A1.
Safety Features	Pull ring with pin and safety lever.
Fuze Delay	0.7 to 2.0 seconds.
Total Weight	M7 grenade - 17 ounces. M7A1 grenade - 18.5 ounces.
Throwing Distance of Average Soldier	35 meters.
Effects	Emits a dense cloud of irritant agent for 15 to 30 seconds.
Colors and Markings	Gray body with a single red band and red markings.

WARNING

Friendly forces should don protective masks before using these grenades.

ABC-M7A2 HAND GRENADE

A-5. Use the ABC-M7A2 hand grenade to control counterinsurgencies and for other tactical missions (see Figure A-4). Use to simulate casualty agents during training. It looks the same as the M7A1 figure A-3. Table A-4 outlines its components and characteristics.

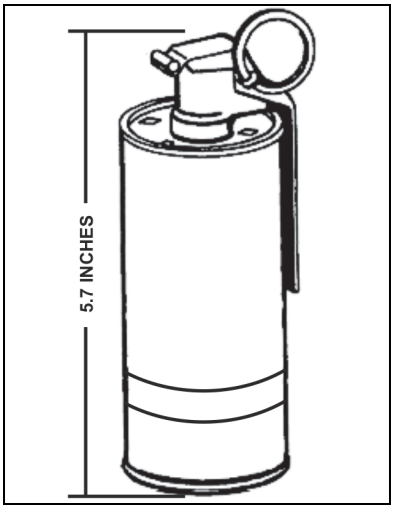

Figure A-4. ABC-M7A2 hand grenade

Table A-4. Components and characteristics of ABC-M7A2 hand grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Sheet metal.
Filler	CN-pyrotechnic composition.
Fuze	M201A1.
Safety Features	Pull ring with pin and safety lever.
Fuze Delay	0.7 to 2.3 seconds.
Total Weight	18.5 ounces.
Throwing Distance of Average Soldier	35 meters
Effects	Emits a dense cloud of irritant agent for 15 to 35 seconds.
Colors and Markings	Gray body with a single red band and red markings.

WARNING

Friendly forces should don protective masks before using these grenades.

AN-M8 HC WHITE SMOKE HAND GRENADE

A-6. The AN-M8 HC white smoke hand grenade (see Figure A-5) produces dense clouds of white smoke for screening small unit activities and signaling. Table A-5 outlines its components and characteristics.

Figure A-5. AN-M8 HC white smoke hand grenade

Table A-5. Components and characteristics of AN-M8 HC white smoke hand grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Sheet steel cylinder.
Filler	19 ounces of Type C, HC smoke mixture.
Fuze	M201A1.
Safety Features	Pull ring with pin and safety lever.
Fuze Delay	0.7 to 2.0 seconds.
Total Weight	24 ounces.
Throwing Distance of Average Soldier	30 meters.
Effects	The grenade emits a dense cloud of white smoke for 105 to 150 seconds.
Colors and Markings	Light green body with black markings and a white top.

WARNING

The AN-M8 HC hand grenade produces harmful hydrochloric fumes that irritate the eyes, throat, and lungs. DO NOT use in enclosed or confined spaces unless Soldiers are wearing protective masks.

Damaged AN-M8 HC grenades that expose the filler are hazardous. Exposure of the filler to moisture and air could result in a chemical reaction that ignites the grenade.

Use of the AN-M8 HC grenades may cause fires inside of confined space.

ABC-M25A1/ABC-M25A2 RIOT CONTROL HAND GRENADES

A-7. The ABC-M25A1 riot control hand grenade is a bursting munition with an integral fuze (see Figure A-6). The M25A2 grenade is an improved version of the M25A1 grenade. The two types of grenades differ primarily in body construction. Use to deliver three types of riot control agents. Table A-6 outlines their components and characteristics.

A-8. The ABC-M25 series grenades use an integral fuze. It functions as follows:

- When the safety pin is removed, the arming sleeve is held in place with the thumb.
- When the arming sleeve is released, the slider assembly is forced downward toward the firing pin under pressure of the firing spring.
- At the bottom of the fuze well, the slider strikes the firing pin and ignites the delay element which, in turn, sets off the detonator.
- The detonator bursts the grenade body and disperses the riot control agent over an area about 5 meters in diameter.

WARNING

When the ABC M25A1 grenade is employed, DO NOT drop it because it may immediately go off.

DO NOT attempt to replace a pulled safety pin and DO NOT relax thumb pressure on the arming sleeve after the safety pin is pulled.

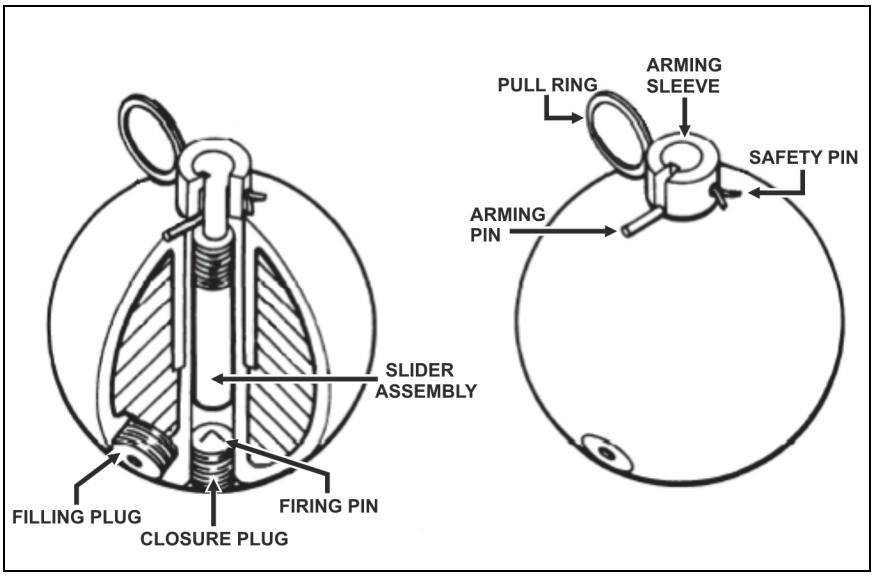

Figure A-6. The ABC-M25A1/ABC-M25A2 riot control hand grenade

Table A-6. Components and characteristics of ABC-M25A1/ABC-M25A2 riot control hand grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Plastic sphere.
Filler	The fillers of the M25-series of riot control hand grenades vary in weight and composition according to the type of agent contained in the grenade. All fillers are mixed with silica aerogel for increased dissemination efficiency.
Fuze	Integral fuze.
Safety Features	Arming sleeve, slider assembly, and pull ring with pin.
Fuze Delay	1.4 to 3 seconds.
Total Weight	7.5 to 8 ounces, depending on the type of filler.
Throwing Distance of Average Soldier	40 meters.
Effects	Radius burst (visible cloud agent) of approximately 5 meters, but fragments of the grenade are occasionally projected 25 meters.
Colors and Markings	Gray body with a single red band and red markings.

WARNING

Friendly forces should don protective masks before using these grenades.

M26 AND M26A1 FRAGMENTATION HAND GRENADES

A-9. Use these grenades to supplement small arms fire against the enemy in close combat (see Figure A-7). The grenade produces casualties by high velocity projection of fragments. Table A-7 outlines their components and characteristics.

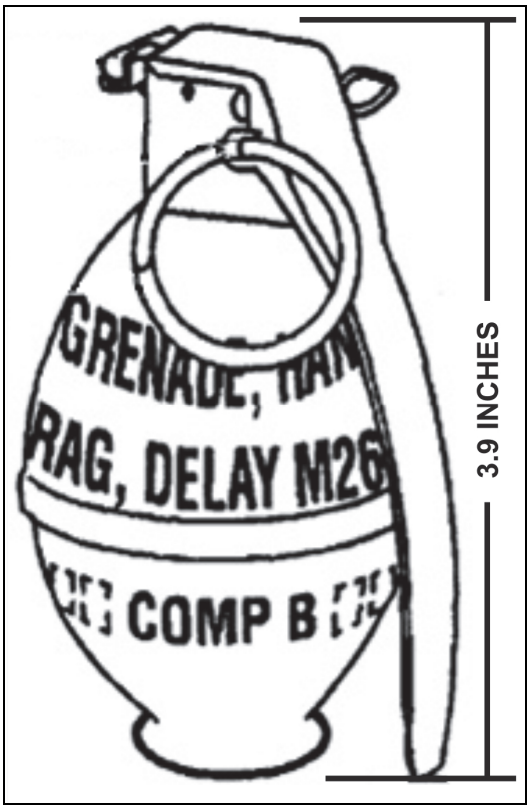

Figure A-7. M26 and M26A1 fragmentation hand grenades

Table A-7. Components and characteristics of M26 and M26A1 fragmentation hand grenades

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Thin wall sheet steel, with inner fragmentation coil.
Filler	5.8 ounces of Comp B.
Fuze	M204A1, M204A2.
Safety Features	Safety lever and pull ring with pin.
Fuze Delay	4 to 5 seconds.
Total Weight	16 ounces.
Throwing Distance of Average Soldier	40 meters.
Effects	Effective casualty radius of 15 meters.
Colors and Markings	Olive drab body with a single yellow band at the top and yellow markings, which indicate high explosive filler.

M34 WHITE PHOSPHOROUS HAND GRENADE

A-10. The M34 white phosphorous (WP) also referred to as M34 chemical smoke grenade is a versatile hand grenades (see Figure A-8). The grenade can be used for signaling, screening, or incendiary missions, or for producing casualties. The use of this grenade also has a psychological impact on the enemy. Table A-8 outlines its components and characteristics.

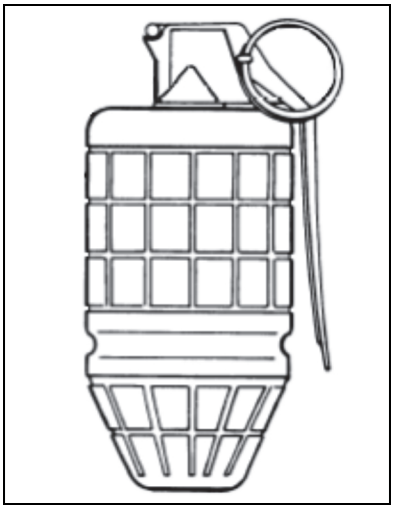

Figure A-8. M34 white phosphorous hand grenade

WARNING

The M34 has a busting radius of 35 meters, which is farther than the average Soldier can throw it; therefore, the thrower must be in a covered or protected position.

Table A-8. Components and characteristics of M34 white phosphorous hand grenade

COMPONENTS AND CHARACTERISTICS	*DETAILS*
Body	Rolled steel (serrated to facilitate fragmentation).
Filler	15 ounces of white phosphorous.
Fuze	M206A2.
Safety Features	Pull ring with pin, safety lever, and safety clips (new models only).
Fuze Delay	4 to 5 seconds.
Total Weight	24 ounces.
Throwing Distance of Average Soldier	30 meters.
Effects	Bursting radius of 35 meters, WP filler burns for approximately 60 seconds at a temperature of 5,000 degrees Fahrenheit.
Colors and Markings	Light green with a single yellow band and light red markings.

M47 CS RIOT-CONTROL HAND GRENADE

A-11. The M47 CS riot-control hand grenade (see Figure A-9) is a CS-filled, special purpose, burning type grenade. Discharging the CS results in erratic "skittering" of the grenade on the ground making it difficult for rioters to recover and throw it back. The grenade causes fragmentation and reduces the possibility of starting a fire. Table A-9 outlines its components and characteristics.

A-12. The M47 grenade uses an integral fuze. It functions as follows:

- The grenade has an exhaust port seal pull tab, which is removed and discarded immediately before pulling the safety cotter pin.
- When the safety cotter pin is removed and the safety latch is pushed rearward from the locking pin, the handle is unlocked and the grenade is armed.

A-13. Releasing the handle causes the arming pin spring to eject the arming pin. This releases the firing pin, allowing the firing pin to activate the primer. The primer ignites the first-fire mixture, which flashes and ignites the delay mixture. This, in turn, ignites the ignition mixture. The ignition mixture burns through an aluminum foil shield on the bottom of the fuze and ignites the granulated CS pyrotechnic mixture in the grenade body. The burning mixture builds up pressure and opens the tape covering the exhaust port. This pressure also forces release of CS from the grenade, while jet action causes the grenade to move quickly and erratically along the ground.

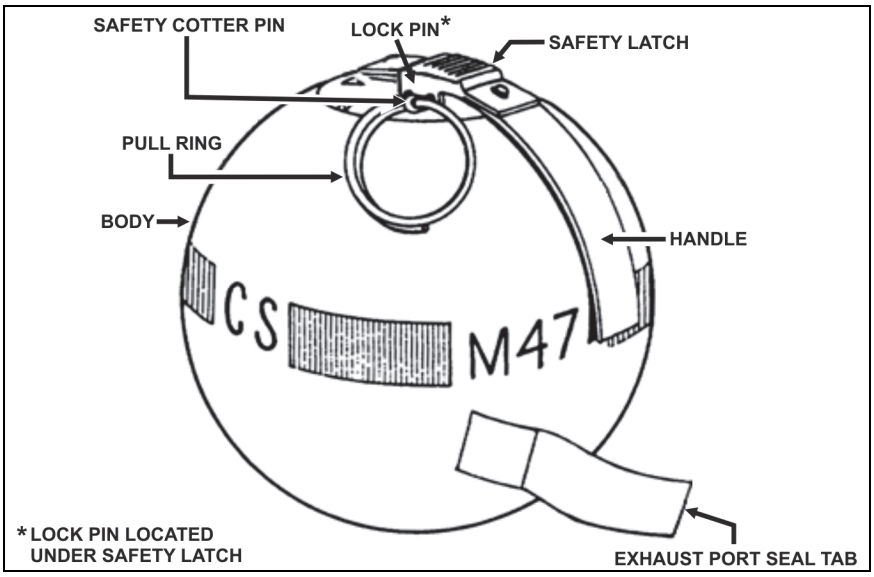

Figure A-9. M47 CS riot-control hand grenade

Table A-9. Components and characteristics of M47 CS riot-control hand grenade

COMPONENTS AND CHARACTERISTICS	***DETAILS***
Body	Spherical rubber body assembly.
Filler	6.5 ounces CS pyrotechnic granulated mixture.
Fuze	M227.
Safety Features	Safety latch, safety cotter pin, and lock pin.
Fuze Delay	2.5 to 3.5 seconds.
Total Weight	14.4 ounces.
Throwing Distance of Average Soldier	35 meters.
Effects	Upon ignition it burns for approximately 5 to 25 seconds covering a 150-square meter area.
Colors and Markings	Gray with a red band and red markings.

SAFETY CLIPS

A-14. Improvements have also been made in safety clips. The four types of safety clips that might be encountered on the obsolete grenades are depicted in Figure A-10.

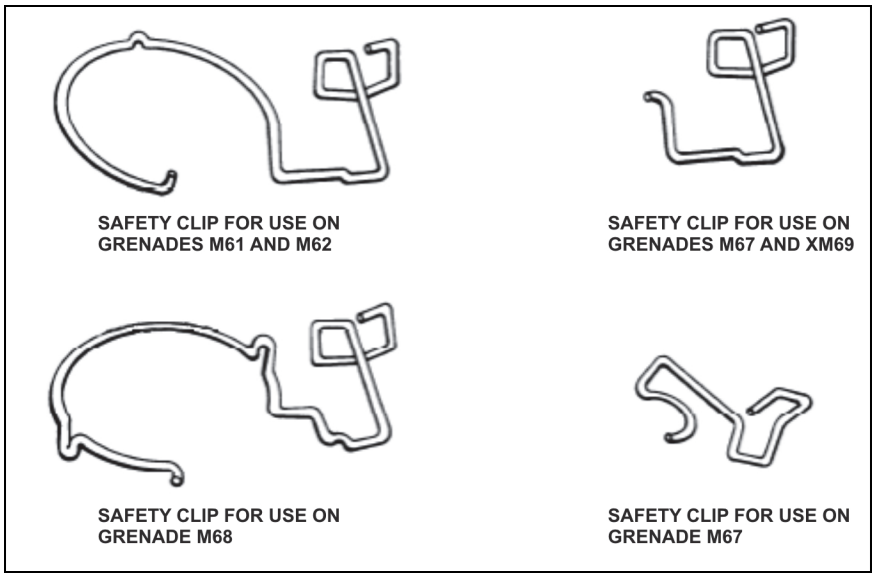

Figure A-10. Safety clips on obsolete grenades

Appendix B

Recommended Training Task

This appendix provides data for alternate training with hand grenades.

ENGAGE TARGETS THROUGH A WINDOW WITH HAND GRENADE

B-1. An urban environment could require precise application of firepower, especially where the enemy is mixed with civilians. The presence of civilians can restrict the use of fires and available combat power. Soldiers might have to operate around "no fire" areas. The rules of engagement (ROE) can prohibit or limit the use of some direct fire weapons. All Soldiers must know the ROE.

TASK	Employ offensive hand grenades.
CONDITION	As a member of a unit operating in an urban environment, having received the order to engage targets; given a fragmentation, concussion, smoke, or incendiary grenade(s) with time-delay fuses, load-carrying equipment and given a restrictive ROE.
STANDARD	Killed, captured, or forced the withdrawal of all enemies engaged. Maintain compliance with the ROE.

WHEN THROWING A GRENADE INTO AN UPPER-STORY OPENING WHILE MOVING ALONG A BUILDING

B-2. First, determine the target and then step out far enough to lob the grenade. Lobbing can be underhand or overhand. Only use this technique when the window has been broken. Otherwise, the chances are high that the thrown grenade will fall back onto the ground without going into the room. Consideration should be given to the use of other than fragmentation grenades in case of such an event.

NOTE: The technique of throwing a second grenade immediately after the first could catch the enemy off guard.

B-3. At all times, the individual throwing the grenade and the rest of his element should have a planned area to move to for safety if the grenade does not go where intended or if it rolls or falls back toward friendly troops.

B-4. Use the M67 fragmentation grenade to disable or kill personnel. It explodes 4.0 to 5.5 seconds after release of the safety lever. Although the killing radius is 5 meters and the casualty radius on this grenade is 15 meters, fragments can disperse as far away as 230 meters.

NOTE: Consider the composition of the target when employing grenades. The inside walls of a building are usually not heavily constructed and can be easily penetrated by the fragments of an M67 fragmentation grenade.

WARNING

All types of grenades can start fires if the target is composed of flammable items.

B-5. Attain the best body target alignment possible. Other unit members must provide security for the thrower. The thrower must maintain positive control of their weapon for use, if needed. Never lay down the individual weapon in an urban environment, where the possibility of enemy fire is so great.

B-6. Prepare the grenade for throwing. Remove the grenade's secondary safety clip (if applicable), disengage the pull ring from the confidence clip (if equipped), and pull the pull ring assembly.

B-7. Cook off the grenade, if needed. Different types of grenades have different detonation delays. Table 2-10 provides a listing of detonation delay times and paragraph 2-37 provides cook off procedures. The cook off delay prevents the enemy from grabbing the grenade and tossing it back.

WARNING

Grenades should be cooked off only in combat situations, where a thrown grenade might be picked up by opposing forces and thrown back at friendly personnel. Not all grenades can or should be cooked off.

B-8. Throwing the grenade is dependent upon the type of target, grenade, and safety requirements for friendly forces. Training for combat the delivery method is determined by position and ability to effectively engage the enemy. Throwing styles used may include any of the following methods: over arm throwing, throwing using low cover, underarm lobbing, throwing like a stone or skipping a stone, sidearm delivery, flipping, or dropping in place.

WARNING

After throwing a fragmentation grenade, the Soldier must immediately announce "FRAG OUT" to indicate that a grenade has been thrown. He then takes cover since the grenade may bounce back, be thrown back, or the enemy may fire at him.

B-9. Depending on which window (Figure 1) the Soldier is receiving contact from determines which movement position (Figure 2) location he throws from.

B-10. The recommendation is if the Soldier is receiving contact from the bottom window, the Soldier engages from the first movement position because he is in direct line of sight with the enemy

B-11. If the Soldier is receiving contact from the top window, the Soldier moves to the last movement position no closer than ten meters.

B-12. The first movement position is 15 meters away from the build-up. The last movement position is 10 meters away from the build-up. The Soldier takes into consideration if the grenade fails to go into the window it will bounce back and the M67 hand grenade has a kill radius of five meters.

B-13. Figures B-1 and B-2 depict the standard two story window engagement build-up

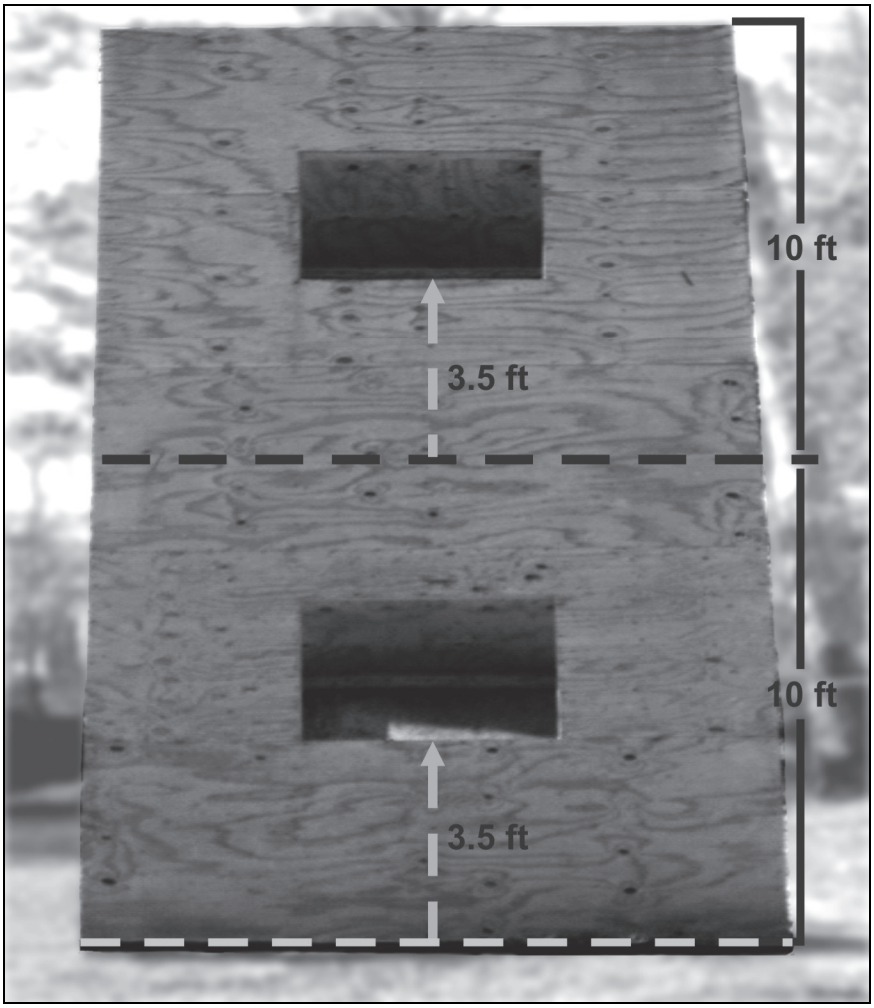

Figure B-1. Two story grenade window engagement build-up

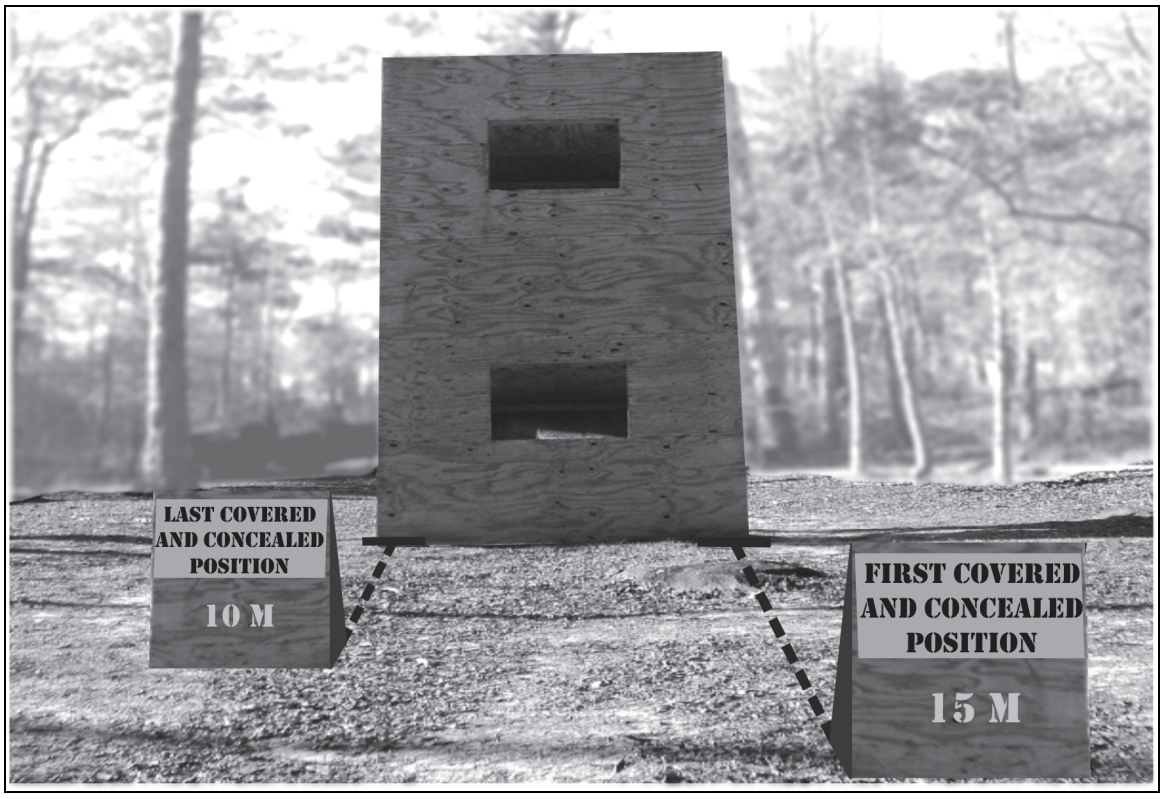

Figure B-2. Window engagement build-up with covered positions

Glossary

Acronym	*Definition*
	A
ABC	atomic, biological, and chemical
AR	Army regulation
ARNG	Army National Guard
ARNGUS	Army National Guard of the United States
ASP	ammunition supply point
	C
CALFEX	combined arms live-fire exercise
CBRN	chemical, biological, radiological, nuclear
CLP	cleaning, lubricant, and preservative
CRM	composite risk management
CS	ortho-cholorobenzalmalomonitril (irritant agent or tear gas)
	D
DA	Department of the Army
	E
EOD	explosive ordnance disposal
	F
FM	field manual
	G
GP	general purpose
GTA	graphic training aid
	H
HC	hexacholorethane-zinc (burning type white smoke compound)
HE	high-explosive
	I
IET	initial entry training
	L
LCE	load-carrying equipment
LFX	live-fire exercise
	M
METL	mission-essential task list
METT-TC	mission, enemy, terrain (and weather), troops, time available, civil considerations
mm	millimeter
	N
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NSN	national stock number
NVD	night vision device
	O

Acronym	*Definition*
OIC	officer in charge
	P
PA	public address
PMCS	preventive maintenance checks and services
	R
ROE	rules of engagement
RP	red phosphorous (casualty producing, burning-type red smoke compound)
RSO	range safety officer
	S
SDZ	surface danger zone
SOI	signal operating instructions
SOP	standard operating procedure
STX	situational training exercise
	T
TA	terephthalic acid (burning-type white smoke compound)
TC	training circular
TH3	thermite (burning-type incendiary compound)
TM	technical manual
TNT	trinitrotoluene (dynamite)
TPF	training practice fuze
TPG	training practice hand grenade
TRADOC	United States Training and Doctrine Command
	U
USAIS	United States Army Infantry School
USAR	United States Army Reserve
	W
WP	white phosphorous (casualty-producing, bursting-type white smoke compound)

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DOCUMENTS NEEDED

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

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*This source was also used to develop this publication.

WEBSITES

Most Army doctrinal publications and regulations are available online at: http://www.apd.army.mil.
Central Army Registry at (www.atiam.train.army.mil).
Army Knowledge Online (AKO): https://www.us.army.mil.
Army Training (and Education) Network, http://www.adtdl.army.mil/
Warrior University at: https://www.warrioruniversity.army.mil

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22 November 2013

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