FM 4-30.51 (FM 21-16)
MCRP 3-17.2A

UNEXPLODED ORDNANCE (UXO) PROCEDURES

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HEADQUARTERS,
DEPARTMENT OF THE ARMY

***FM 4-30.51 (FM 21-16)**
MCRP 3-17.2A

Field Manual
No. 4-30.51 (21-16)

MCRP 3-17.2A

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UNEXPLODED ORDNANCE (UXO) PROCEDURES

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Preface

PURPOSE

Field Manual (FM) 4-30.51/Marine Corps (MCRP) 3-17.2A prescribes the doctrine for dealing with the unexploded ordnance (UXO) hazards on the battlefield. Use the information in this manual to teach military personnel, Department of Defense (DOD) civilians, and contractors about the UXO hazards they could meet and the procedures they can use to protect themselves. This manual also gives guidance on how to get help to take care of the hazards that affect mission capabilities.

When personnel find UXO, they must follow these steps:

- Note characteristics of the UXO hazard for purposes of identification.
- Take immediate action (mark and evacuate).
- Report the UXO hazard using the Explosive Hazards (EH) Spot Report (See chapter 4).
- Use protective measures against the UXO hazard, if required.

Based on these steps, FM 4-30.51/MCRP 3-17.2A serves as a general guideline for including UXO hazard procedures in unit standing operating procedures (SOPs). This manual provides information for transmitting and monitoring UXO reports throughout any battlefield functional area (BFA).

SCOPE

UXO on the battlefield affects the mobility and mission aspects of all units. Battlefields are littered with UXO hazards from two sources: ordnance that has either failed to function or ordnance designed to be used for area denial, such as conventional land mines and the family of scatterable mines (FASCAM). With the sophistication of modern weapons systems, battlefield commanders can target anything within their theater of operations. After these attacks are completed, UXO hazards will be left on the battlefield.

UXO hazards may not always pose an immediate threat to unit mission or mobility, but they are hazards that have in the past caused needless loss of life and materiel. Battlefield commanders need to know where UXO hazards are, as these hazards can affect the mobility of follow-on elements. This manual teaches personnel about the UXO hazard and how this hazard affects mission capabilities and what procedures are used to report and protect personnel and equipment. All units should be able to react to the UXO hazard effectively and to report and protect against it.

During mission planning, leaders must coordinate with supporting artillery and air liaison personnel to find out what areas are expected to contain large numbers of UXO. These areas should be avoided if possible. This type of planning makes a unit more mission capable.

There are two types of UXO threats on the battlefield: passive (UXO that is found during unit movement) and active (UXO that results from an attack). All units must be able to react to both of these types of threats in order to survive on the modern battlefield. Chapter 6 of this manual covers procedures for reacting to these threats. Additional information can be found in FM3-34.119 IED Defeat and FM 3-34.210 Explosive Hazards Operations.

All military personnel, DOD civilians, and contractors risk injury or death from UXO. Therefore, all of these personnel need to understand how to identify, report, mark and, if necessary, apply protective measures against UXO. This manual was designed to be used by all of these personnel. All users of this manual are referred to as personnel in the text.

This manual implements the following NATO standardization agreements (STANAGs):

- STANAG 2002 (Edition 7). Marking of Contaminated or Dangerous *Land Areas, Complete Equipment, Supplies, and Stores.*

- STANAG 2143 (Edition 4). Explosive Ordnance Reconnaissance/Explosive Ordnance Disposal (EOR/EOD).

TRAINING STRATEGY

For training to be effective, users of this manual must adopt the procedures outlined into their combat training and unit SOPs. UXO training can be conducted concurrently with all common and collective training. It can be incorporated into training in the same way as chemical, biological, radiological, nuclear, and explosive (CBRNE) training. Using the full-scale training aid package listed below, training can be conducted during land navigation, road marches, defensive/offensive operations, or force-on-force training. Preparation time is minimal; just place the training items where personnel will encounter them during normal training operations.

Evaluation of the training will depend on current mission and unit SOPs. The three most important points for the trainee to remember are the following:

- If possible, avoid the item and continue the mission.
- If avoidance is not possible, take protective measures to reduce the hazard to personnel and equipment.
- Always report the hazard using the EH spot report (see Chapter 4).

USER INFORMATION

The following training items are available at your local training aids support center (TASC) for you to use in your unit's UXO training program:

- Graphic Training Aid (GTA) 9-12-1, Unexploded Ordnance (UXO) Procedures.
- DVC-T 5-47, Full-scale UXO training-aid package.
- Safety Video 709919, "Danger UXO."
- Instructional Video 710288, "The UXO Hazard."

This manual is the reference for the following soldier training publication (STP) common tasks:

- STP 21-1 -SMCT (new edition published 11 Oct 2005), React to Unexplored Ordnance Hazards 093-401-5040 and React to a Possible Improvised Explosive Device (IED) 093-401-5050.

Any reference made in this manual to the former Soviet Union, or to Soviet-style ordnance, refers to the type of ordnance that was produced and distributed by the Soviet-block countries. This type of ordnance is still found stockpiled and is being sold throughout the world. United States (US) forces will find this type of ordnance on future battlefields.

While personnel are not expected to determine ordnance fillers, the color codes on the ordnance (US and Soviet-style) help to identify the types of UXOs. See Appendix A.

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

The proponent of this publication is the United States Army Training and Doctrine Command (TRADOC). Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, United States Army Ordnance Missile and Electronics Maintenance School, Attention: ATSK-EODT, Redstone Arsenal, Alabama 35897-6500.

Chapter 1

The Unexploded Ordnance (UXO) Hazard

UXOs may or may not always pose an immediate threat to unit mission or mobility, yet it is imperative that all personnel on the battlefield have the ability to recognize and react to the UXO threat. Additionally, it is the responsibility of leaders at all levels to ensure that all personnel are aware and trained to deal with UXO. UXO response should be included in unit training plans (Predeployment and day to day), as well as included in operational orders. Failure to do so can, will, and has caused numerous deaths and/or injuries. Training and operation orders (OPORDs) should include UXO, Identification, Reporting, Marking, and Immediate Action procedures.

UXO LOCATIONS AND THREATS

1-1. UXOs are an explosive hazard which has been primed, fuzed, armed, or otherwise prepared for action, and which has been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remains unexploded either by malfunction or design or for any other cause. Whatever the reason, UXO poses the risk of injury or death to all personnel.

1-2. The EOD mission is to eliminate or reduce the threat of EH. In order to provide additional clearing capability, some combat engineer soldiers have been trained by EOD as Explosive Ordnance Clearance Agents (EOCA) and have limited UXO destruct capability. Units must recognize the threat from UXO and plan for support from EOD or EOCA to clear the hazard.

1-3. Designated impact areas are marked on all military maps, and they are also marked on the ground by warning signs and fences. Personnel are not allowed in these areas because of the UXO hazards.

GENERAL SAFETY GUIDELINES

1-4. Stay away from UXOs. This is the best way to prevent accidental injury or death.

1-5. Personnel can lessen the danger by being able to recognize a UXO hazard and strictly follow the basic safety guidelines listed below.

DO NOT continue to move towards a suspected UXO. Some types of ordnance have magnetic or motion sensitive fuzing and will not detonate until they sense a target.

1-6. Others may have self-destruct timers built in. Once you recognize a UXO hazard, stop and make any further observations with binoculars if necessary. Refer to Chapter 2 for additional information on the recognition of UXO.

DANGER

UXOs are highly susceptible to electromagnetic radiation (EMR) and may explode. This could come from communication and transmitting devices.

1-7. Make all radio transmissions at least 100 meters away from a UXO hazard. When transmitting, radios send out electricity from their antennas. This electricity can make a UXO detonate.

DANGER

Never move, jar, strike, or touch a UXO. Do not move or remove anything on or near a UXO. UXOs can be extremely sensitive and can cause serious injury or death if disturbed in any way.

1-8. Do not move or disturb a UXO. It could detonate.

DANGER

Avoid the area where a UXO is located unless absolutely necessary. When a submunition is identified, leave the area by the same path you entered. There may be many more submunitions in the same area. Small size does not diminish the danger of submunitions.

1-9. Mark a UXO hazard area as outlined in para. 3-15 so that other personnel will stay away from it. Proper marking also helps EOD find the area when they respond to your report. Refer to Chapter 3 for additional information.

1-10. Evacuate all nonessential personnel and equipment from a UXO hazard area. If personnel and equipment cannot be evacuated, you must take protective measures to reduce the risk to them. Refer to Chapter 3 for additional information.

1-11. Use extreme caution until the type of ordnance and fuzing is confirmed.

1-12. Report all UXO hazards on the EH Spot Report. Reporting UXO hazards will get your unit the help it needs. Refer to Chapter 4 for additional information.

1-13. If necessary, extract the unit from a hazardous area. Refer to Chapter 5 for additional information.

Chapter 2

Recognize UXO

Being able to recognize a UXO is the first and most important step in reacting to a UXO hazard. There is a multitude of ordnance used throughout the world, and it comes in all shapes and sizes. This chapter explains and shows the general identifying features of the different types of ordnance, both US and foreign. In this chapter, ordnance is divided into four main types: dropped, projected, thrown, and placed.

DANGER

Avoid the area where a UXO is located unless absolutely necessary. When a submunition is identified, leave the area by the same path you entered. There may be many more submunitions in the same area. Small size does not diminish the danger of submunitions.

DROPPED ORDNANCE

2-1. Regardless of its type or purpose, dropped ordnance is dispensed or dropped from an aircraft. Dropped ordnance is divided into three subgroups: bombs; dispensers, which contain submunitions; and submunitions. Photographs of dropped ordnance and their net explosive weights (NEW) are in Appendix B.

DANGER

Many types of UXO may contain an incendiary (fire producing), chemical, biological, or radiological hazard in addition to explosives.

BOMBS

2-2. As shown in Figure 2-1, general-purpose bombs come in many shapes and sizes depending on the country that made them and how they are to be used. Generally, all of these bombs are built the same and consist of a metal container, a fuze, and a stabilizing device. The metal container (called the bomb body) holds explosive or chemical filler. The body may be in one piece or in multiple pieces. The bombs shown in Figure 2-2 are Soviet-style, general-purpose bombs.

2-3. Chemical-agent filled bombs are built the same as general purpose bombs. In Figure 2-3, the US chemical bombs are general-purpose bombs. They have chemical filler in place of explosive filler. The color codes and markings shown in Appendix A may be used to identify chemical bombs. For example, the US and North Atlantic Treaty Organization (NATO) color code for chemical munitions is a gray background with a dark green band. The former Soviet Union used the same bombs as shown in Figure 2-2, and added a combination of green, red, and blue markings to the nose and tail sections to indicate chemical agents. Soviet bombs generally have a gray background.

NOTE: Many countries do not follow these color code standards, so you may see a wide variety of colors and markings. See Appendix A.

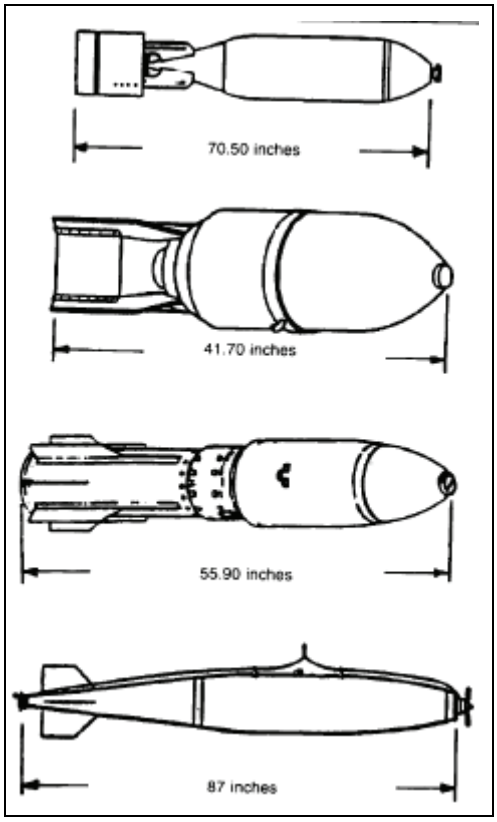

Figure 2-1. General-purpose bombs

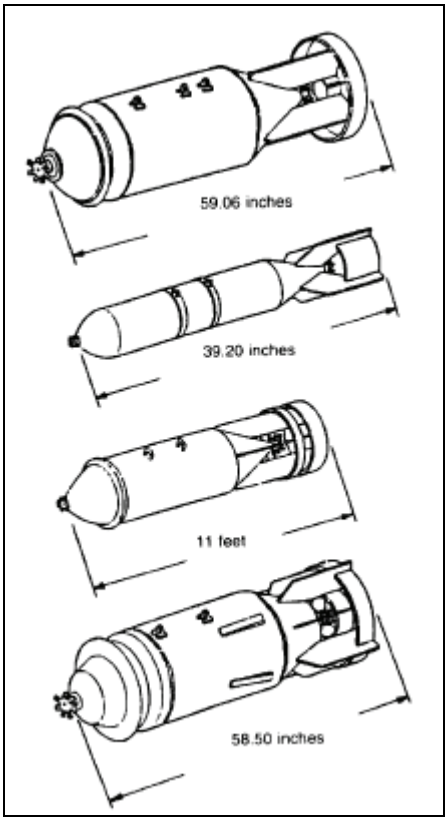

Figure 2-2. Soviet-style, general-purpose bombs

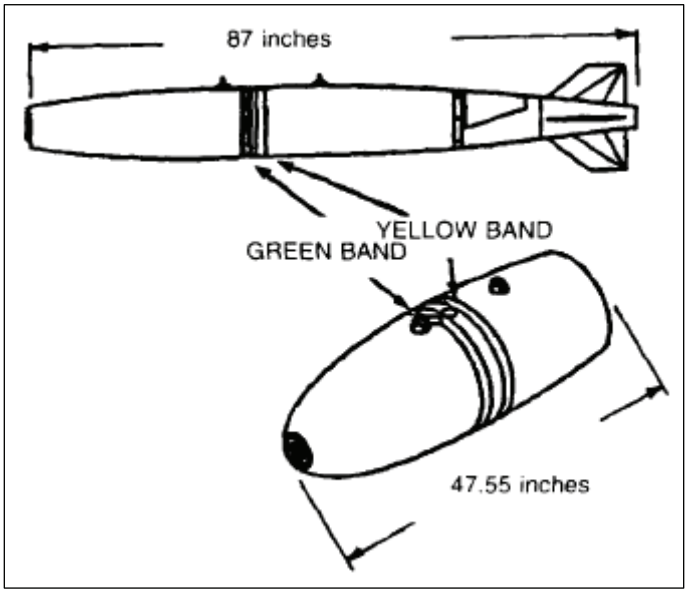

Figure 2-3. US chemical bombs

FUZES

2-4. Fuzes used to initiate bombs are either mechanical or electrical, They are generally placed in the nose or tail section, internally or externally. The fuzes may not always be visible, as they are often covered by the fin assembly. As shipped, fuzes are in a safe (unarmed) condition and cannot function until armed.

2-5. Mechanical fuzing, whether in the nose or in the tail, is generally armed by some type of arming vane as shown in Figure 2-4.

2-6. The arming vane assembly operates like a propeller to line up all of the fuze parts so the fuze will become armed.

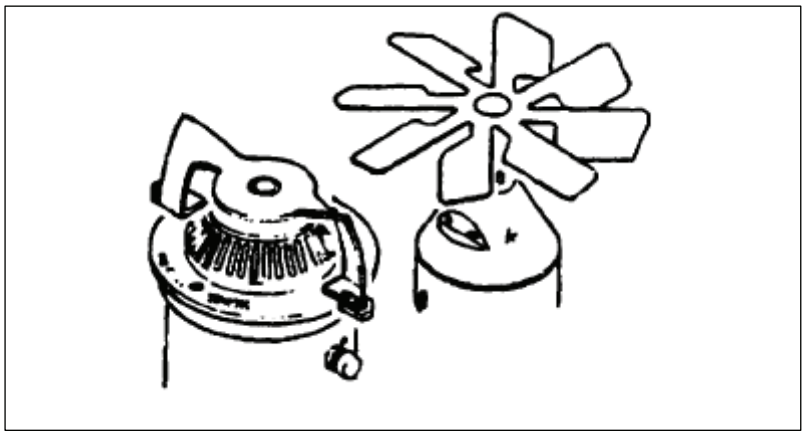

Figure 2-4. Arming vane assemblies

2-7. Electrical fuzes have an electric charging assembly in place of an arming vane. They are armed by using power from the aircraft. Just before the pilot releases the bomb, the aircraft supplies the required electrical charge to the bomb's fuze.

2-8. Action of the fuze may be impact, proximity, or delay. Impact fuzes function when they hit the target. Proximity fuzes function when bombs reach a predetermined height above the target. Delay fuzes contain an element that delays explosion for a fixed time after impact.

2-9. To be safe, personnel should consider that all bombs have the most dangerous kind of fuzing, which is proximity or delay. Approaching a proximity- or delay -fuzed bomb causes unnecessary risk to personnel and equipment. Although it should function before it hits the target, proximity fuzing may not always do so. Once the bomb hits the ground, the proximity fuze can still function. It can sense a change in the area around the bomb and detonate. Delay fuzing can be mechanical, electrical, or chemical. Mechanical- and electrical-delay fuzes are nothing more than clockwork mechanisms. The chemical-delay fuze uses a chemical compound inside the fuze to cause a chemical reaction with the firing system. Delay fuzing times can range from milliseconds to days.

STABILIZING DEVICES

2-10. Bombs are stabilized in flight by either fin or parachute assemblies. These assemblies attach to the rear section of the bomb and keep the bomb nose-down during its descent. These assemblies can separate from the bomb after the bomb hits the ground. As shown in Figure 2-5, two common types of fin assemblies used by foreign countries are the conical- and box-fin assemblies. The retarding-fin assembly shown in Figure 2-6 is used by the US for most of its general-purpose bombs.

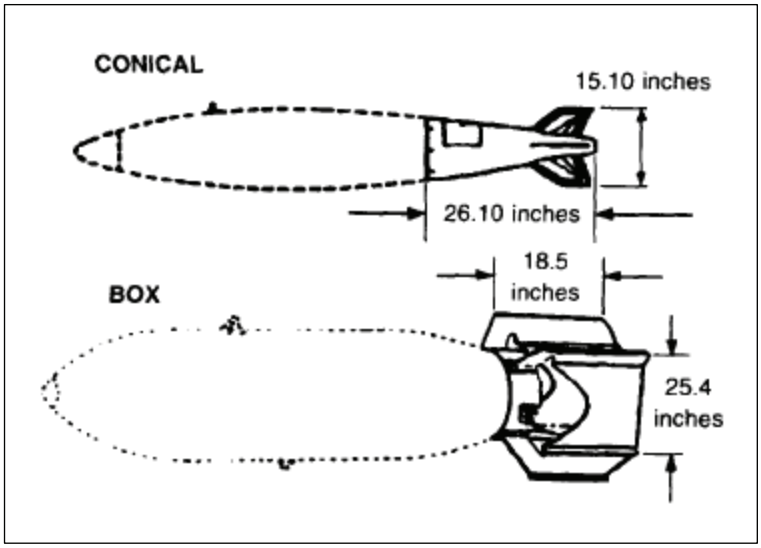

Figure 2-5. Conical- and box-fin assemblies

2-11. Some bombs are stabilized by a parachute assembly as shown in Figure 2-7. The parachute assembly opens after the bomb is released from the aircraft. Even though the parachute may separate from the bomb after it hits the ground, you should never try to recover a parachute assembly found lying on the ground. The bomb may have become buried, and the parachute could still be attached to the bomb. As shown in Figure 2-8, former Soviet Union bombs have fins that are welded to the bomb body. Therefore, the fins cannot become separated from the bomb. However, the fins can wrap around the rear section of the bomb after it hits the ground and obscure the tail fuze from view.

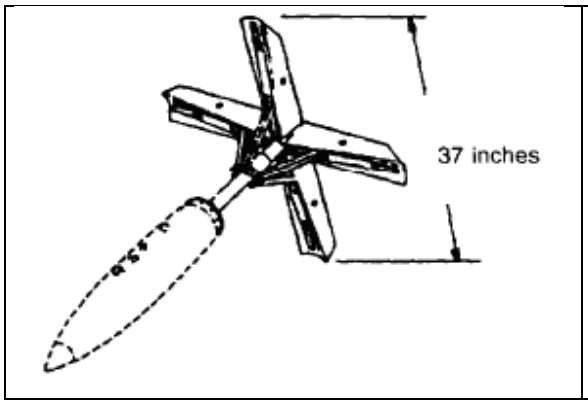

Figure 2-6. Retarding-fin assembly (opens after release)

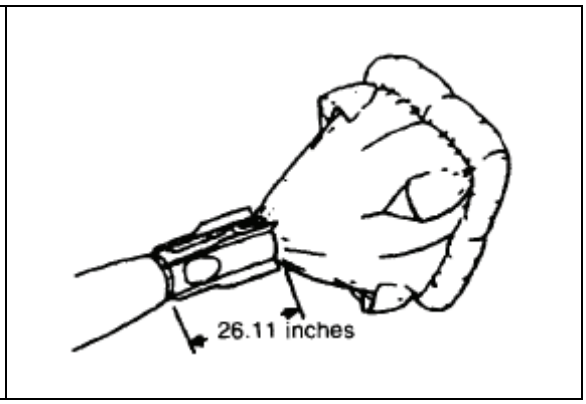

Figure 2-7. Parachute assembly

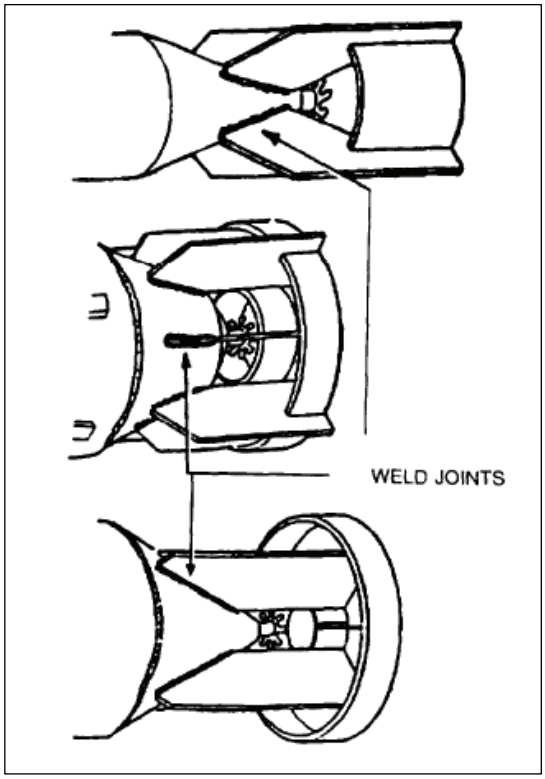

Figure 2-8. Soviet-style fin assemblies

DISPENSERS

2-12. Dispensers may be classified as another type of dropped ordnance. Like bombs, they are carried by aircraft. Their payload, however, is smaller ordnance called submunitions. Submunitions are discussed later in this chapter, In Figure 2-9, the cutaway shows the submunitions inside the dispenser body. Dispensers come in a variety of shapes and sizes depending on the payload inside. Some dispensers are reusable, and some are one-time-use items.

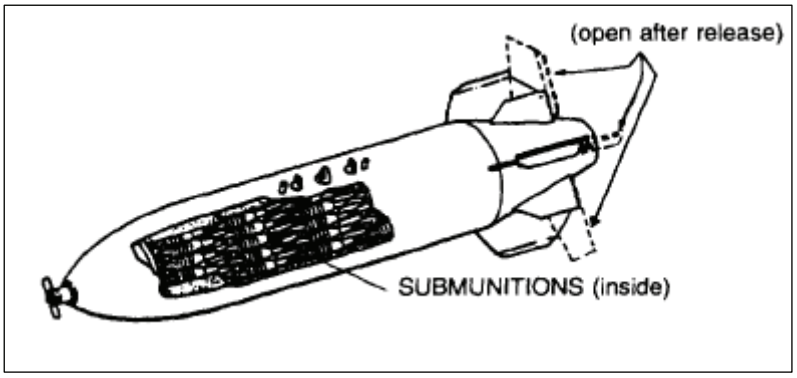

Figure 2-9. Dispenser (cutaway section)

2-13. Never approach a dispenser or any part of a dispenser you find on the battlefield. The payload of submunitions may be scattered in the area where the dispenser hit the ground.

DROPPED DISPENSERS

2-14. These dispensers (Figure 2-10) fall away from the aircraft and are stabilized in flight by fin assemblies. Dropped dispensers may be in one piece or in multiple pieces. All dropped dispensers use either mechanical time or proximity fuzing. These fuzes allow the payload to be dispersed at a predetermined height above the target. Multiple-piece dispensers open up and disperse their payload when the fuze functions. Single-piece dispensers eject their payload out of ports or holes in the body when the fuze functions.

ATTACHED DISPENSERS

2-15. These dispensers stay attached to the aircraft and can be reloaded and used again. Their payload is dispersed out of the rear or from the bottom of the dispenser. See Figure 2-11.

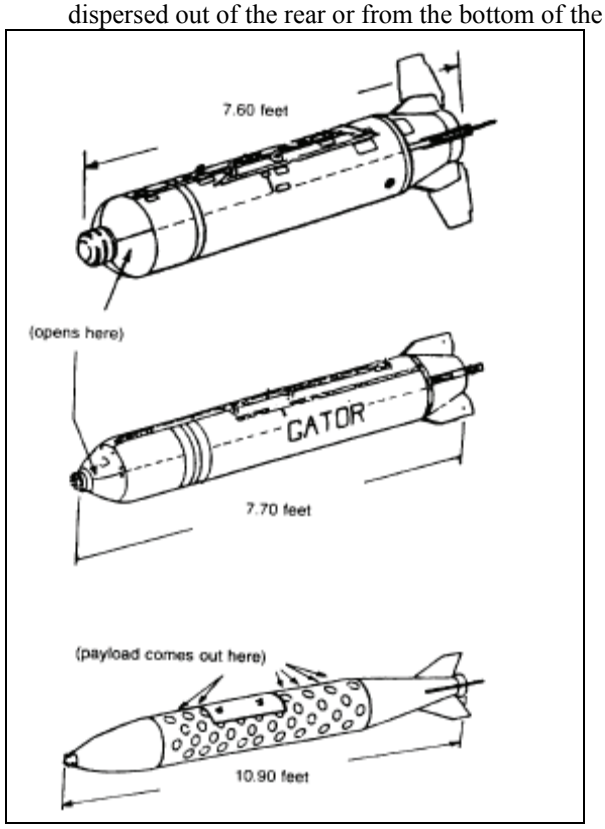

Figure 2-10. Dropped dispensers

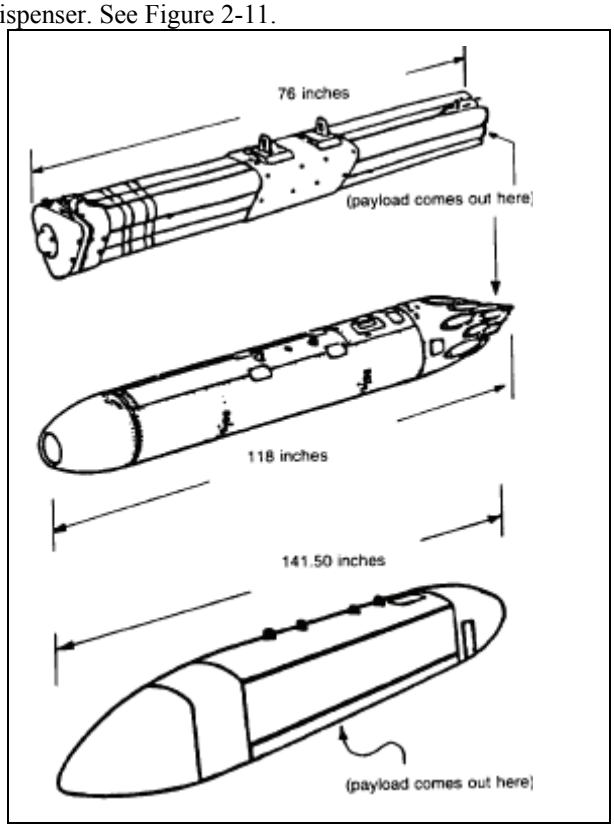

Figure 2-11. Attached dispensers

SUBMUNITIONS

2-16. Submunitions are classified as either bomblets, grenades, or mines. They are small explosive or chemical filled items designed for saturation coverage of a large area. They may be antipersonnel (AP), antimateriel (AMAT), antitank (AT), dual purpose (DP), incendiary, or chemical. Submunitions may be spread by dispensers, missiles, rockets, or projectiles. Each of these delivery systems disperses its payload of submunitions while still in flight, and the submunitions drop over the target. On the battlefield, submunitions are widely used in both offensive and defensive missions.

2-17. Submunitions are used to destroy an enemy in place (impact) or to slow or prevent enemy movement away from or through an area (area denial). Impact submunitions go off when they hit the ground. Some area-denial submunitions, including FASCAM, may have a limited active life and self-destruct after their active life has expired.

2-18. The major difference between scatterable mines and placed mines is that the scatterable mines land on the surface and can be seen. Placed mines, discussed in a later section, may be hidden or buried under the ground and usually cannot be seen.

2-19. The ball-type submunitions shown in Figure 2-12 are AP. They are very small and are delivered on known concentrations of enemy personnel. The submunition shown in Figure 2-13 is scattered across an area. Like a land mine, it will not detonate until pressure is put on the submunition.

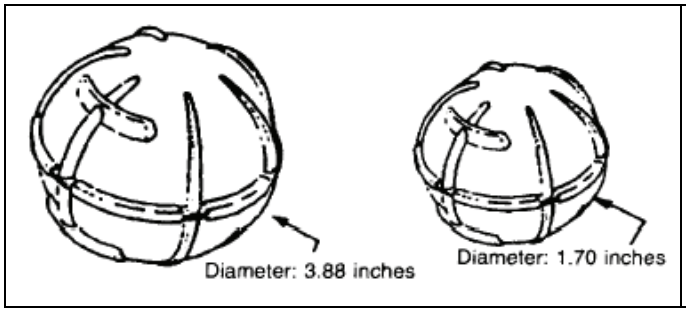

Figure 2-12. AP ball-type submunitions

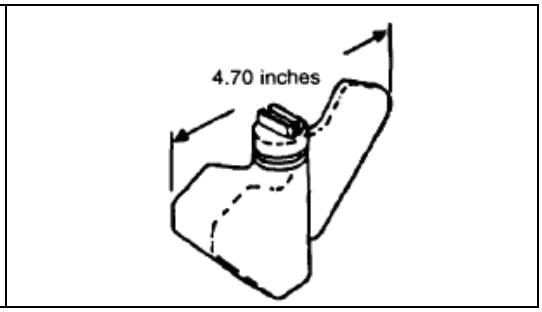

Figure 2-13. AP pressure-activated submunition

WARNING

DO NOT TOUCH OR DISTURB TRIP WIRES ASSOCIATED WITH AP SUBMUNITIONS.

2-20. The AP submunition shown in Figure 2-14 can be delivered by aircraft or by artillery. When it hits the ground, a small fragmentation ball shoots up and detonates about 6 feet above the ground. The submunitions shown in Figure 2-15, are area-denial AP submunitions (FASCAM). These submunitions are delivered into areas for use as mines. When they hit the ground, trip wires kick out up to 20 feet from the mine. Most area-denial submunitions use antidisturbance fuzing with self-destruct fuzing as a backup. The self-destruct time can vary from a couple of hours to as long as several days.

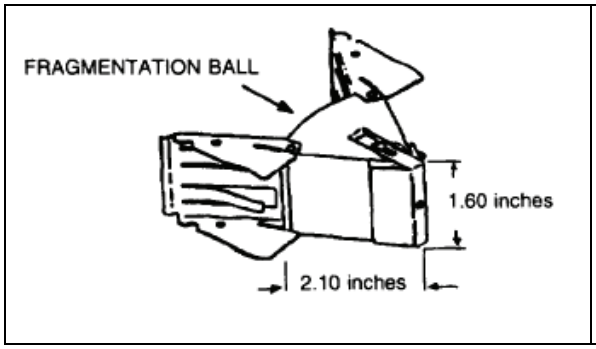

Figure 2-14. AP bounding-fragmentation submunition

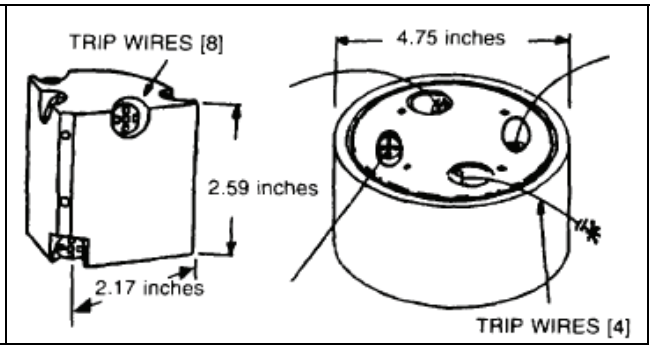

Figure 2-15. AP area-denial submunitions (FASCAM)

2-21. The DP submunition shown in Figure 2-16 has a shaped charge for penetrating hard targets but is also used against personnel. These submunitions are delivered by projectiles or rockets. The arming ribbon serves two purposes: it not only arms the fuze as the submunition comes down, but it also stabilizes the submunition so that it hits the target straight on.

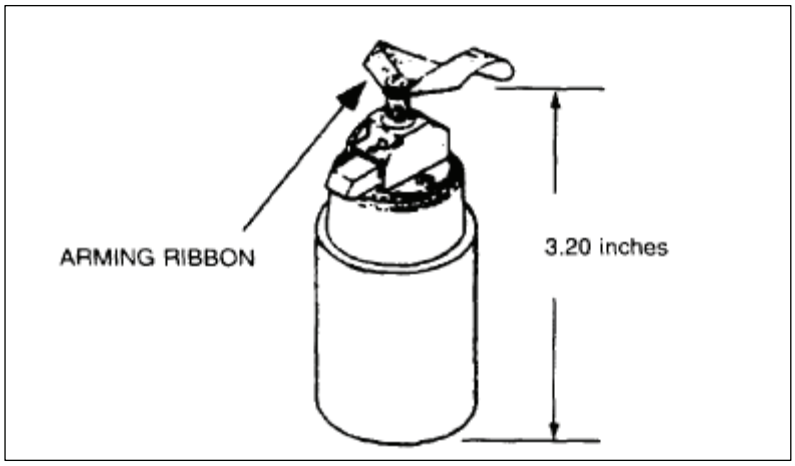

Figure 2-16. DP submunition

2-22. The AMAT and/or AT submunitions shown in Figure 2-17 are designed to destroy hard targets such as vehicles and equipment. They are dispersed from an aircraft-dropped dispenser and function when they hit a target or the ground. Drogue parachutes stabilize these submunitions in flight so they hit their targets straight on. The submunitions shown in Figure 2-18 are also used to destroy hard targets such as vehicles and equipment. The only difference is that the fin assembly stabilizes the submunition instead of the drogue parachute.

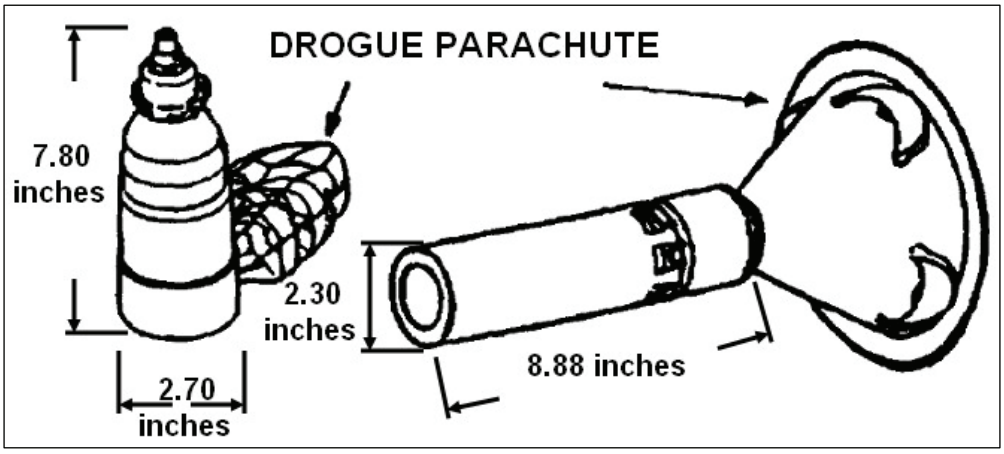

Figure 2-17. AMAT/AT parachute-stabilized submunitions

WARNING

DO NOT TOUCH OR DISTURB STABILIZATION PARACHUTE OR RIBBON THIS MAY ARM OR DETONATE SUBMUNITION.

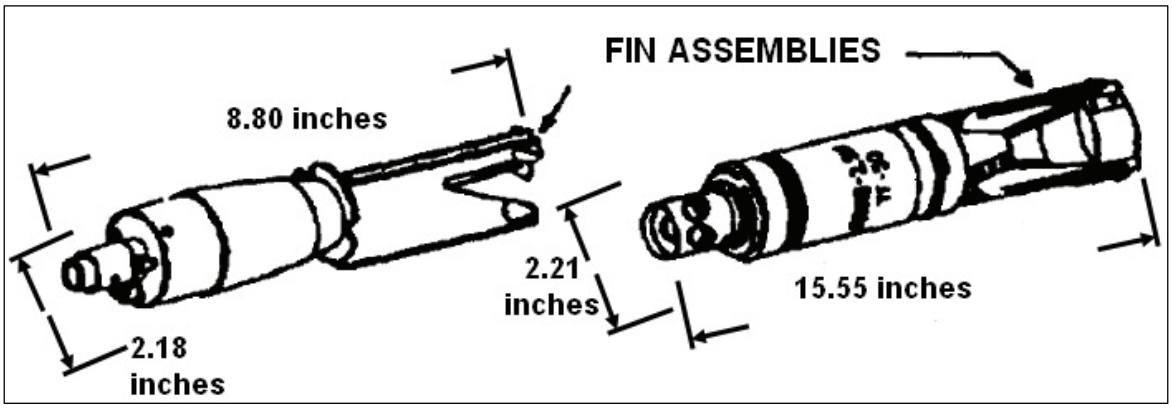

Figure 2-18. AMAT/AT fin-stabilized submunitions

2-23. AT area-denial submunitions (Figure 2-19) can be delivered by aircraft, artillery, and even some engineer vehicles. These FASCAMs may have magnetic fuzing. They will function when they receive a signal from metallic objects. These submunitions, similar to the AP area-denial submunitions that are shown in Figure 2-15, also have antidisturbance and self-destruct fuzing. AT and AP area-denial mines are usually found deployed together.

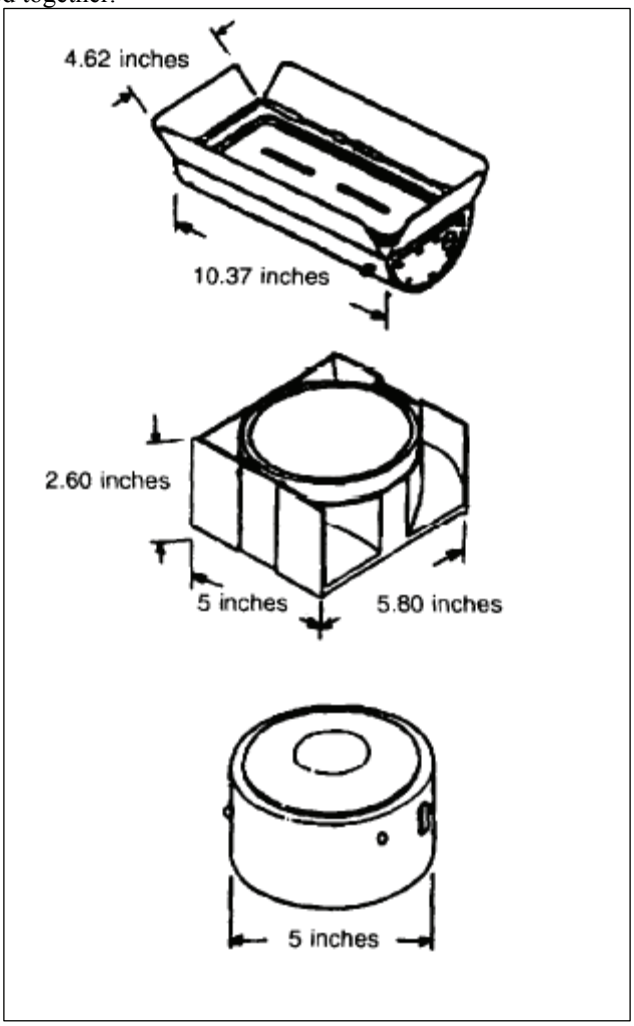

Figure 2-19. AT area-denial submunitions (FASCAM)

PROJECTED ORDNANCE

2-24. All projected ordnance is fired from some type of launcher or gun tube. Photographs of projected ordnance and their NEW are in Appendix C. Projected ordnance falls into the following five subgroups:

- Projectiles.
- Mortars.
- Rockets.
- Guided missiles.
- Rifle grenades.

PROJECTILES

2-25. Projectiles range from 20 millimeters to 16 inches in diameter and from 2 inches to 4 feet in length. They can have a variety of fillers including explosives, chemicals (to include riot-control agents such as combat support [CS]), white phosphorus (WP), illumination flares, or submunitions. Projectile bodies can be one piece of metal or multiple sections fastened together.

2-26. Projectiles, like bombs, can have impact or proximity fuzing. They can also be fuzed with time-delay fuzing that functions at a preset time after firing. For safety reasons, all projectiles should be considered as having proximity fuzing. Getting too close to proximity fuzing will cause the fuze to function, and the projectile will detonate. Depending on the type of filler and the design of the projectile, the fuze can be in the nose, as shown in Figure 2-20 or in the base, as shown in Figure 2-21.

2-27. There are two ways projectiles are stabilized, by spin or fin. Spin-stabilized projectiles use rotating bands near the rear section to stabilize the projectile. See Figure 2-22. Riding along the internal lands and grooves of the gun tube, these bands create a stabilizing spin as the projectile is fired. Fin-stabilized projectiles may have either fixed fins or folding fins. See Figure 2-23. Folding fins unfold after the projectile leaves the gun tube to stabilize the projectile.

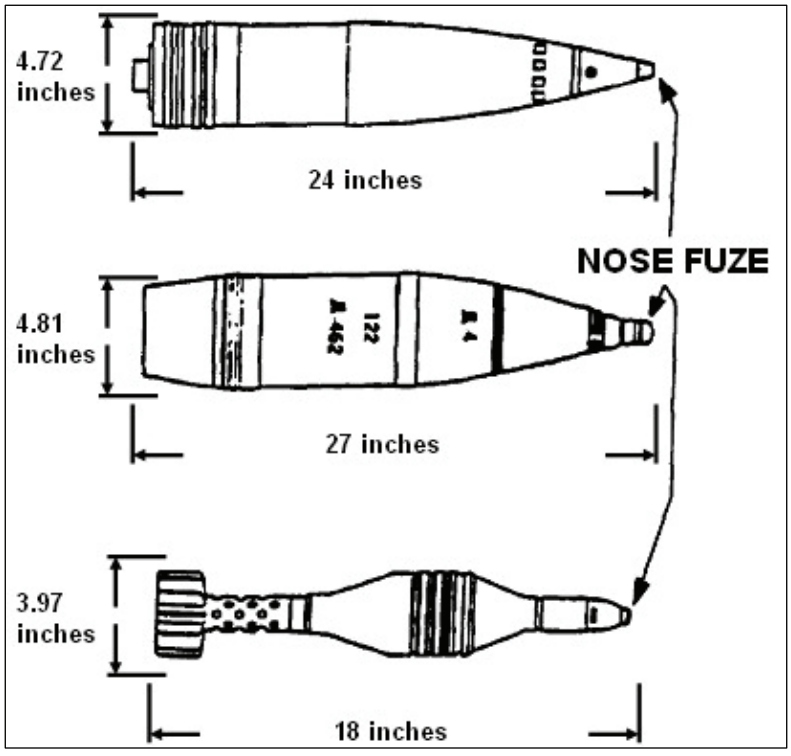

Figure 2-20. Nose-fuzed projectiles

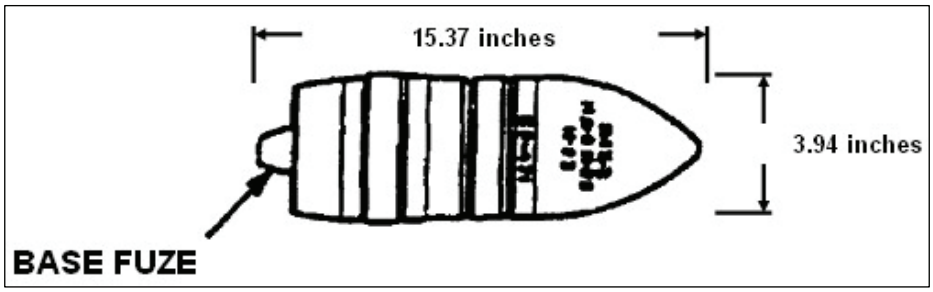

Figure 2-21. Base-fuzed projectile

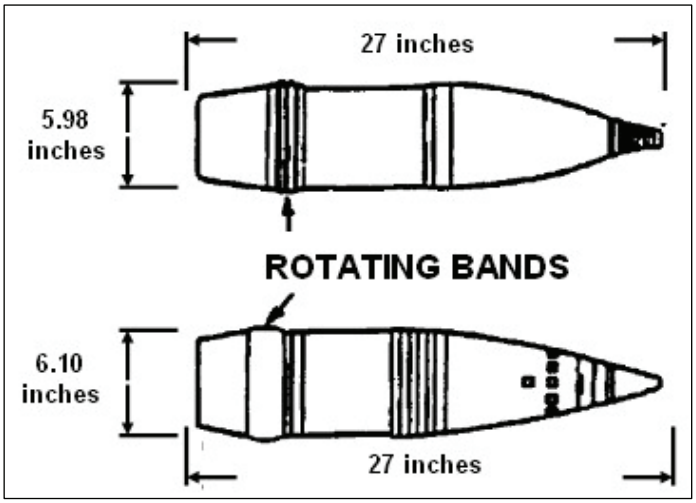

Figure 2-22. Spin-stabilized projectiles

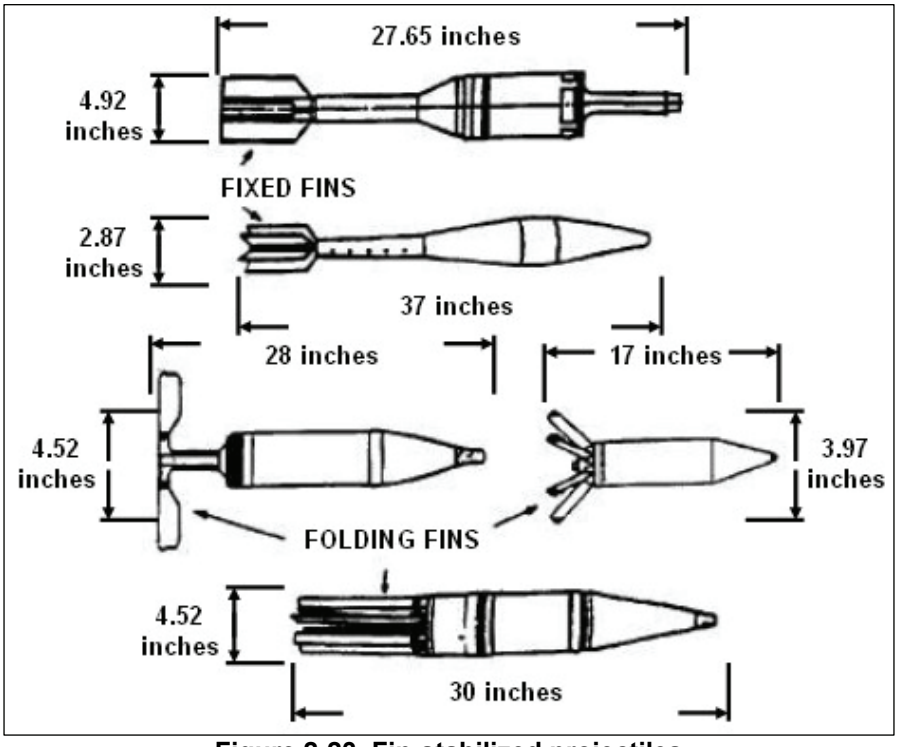

Figure 2-23. Fin-stabilized projectiles

DEPLETED URANIUM (DU)

2-28. DU ammunition is known to be currently in service with the armed forces of Israel, Russia, UK, and USA. DU ammunition is commonly restricted to armor piercing fin stabilized discarding sabot (APFSDS) tank and Armored Fighting Vehicle (AFV) ammunition in calibers ranging from 20 mm to 125mm. Cannon rounds range from 20 to 30mm for ground attack rotary and fixed wing aircraft.

IDENTIFICATION OF DU UXO

2-29. DU UXOs have the following physical characteristics:

- They are non-magnetic.
- DU UXO are extremely heavy. In relation to size DU is 60 percent more dense than lead.
- They are jet-black in color, possibly with a greenish tinge. After three to four weeks they will turn green.
- The fragment will have a honeycombed texture.
- DU UXOs will retain heat to the point where they will cause serious burns for three to four hours after firing. A red hot core may be coated with black dust and therefore appear cool.

DANGER

Do not let DU residue or fragments come into contact with exposed unprotected skin. DU fragments are not to be picked up by hand; a scoop or other such tool is to be used.

2-30. If you feel you have come in contact with DU you should wash any exposed skin, do not eat or drink until you have contacted your unit chemical/radiation protection officer.

2-31. You should be aware that it will not be possible, without special instruments, to detect whether a damaged target has been struck by DU. The following precautions should be taken

- Do not enter or climb onto a damaged hard target, or loiter within 50 meters, unless you are working in co-operation with an EOD team.
- If your work requires you to work within 50 meters, wear a facemask and gloves, and roll your sleeves down. Cover any cuts and abrasions with waterproof dressings. Spend as little time as practicable on the task.
- Do not eat, drink or smoke near the damaged target. After completing your task, wash and shower as soon as practicable. Remove your outer clothing and, if feasible, replace it. Otherwise, have it laundered. Do not eat, drink or smoke until you have done so.
- If you suspect you have been exposed to DU, inform your medical support team.

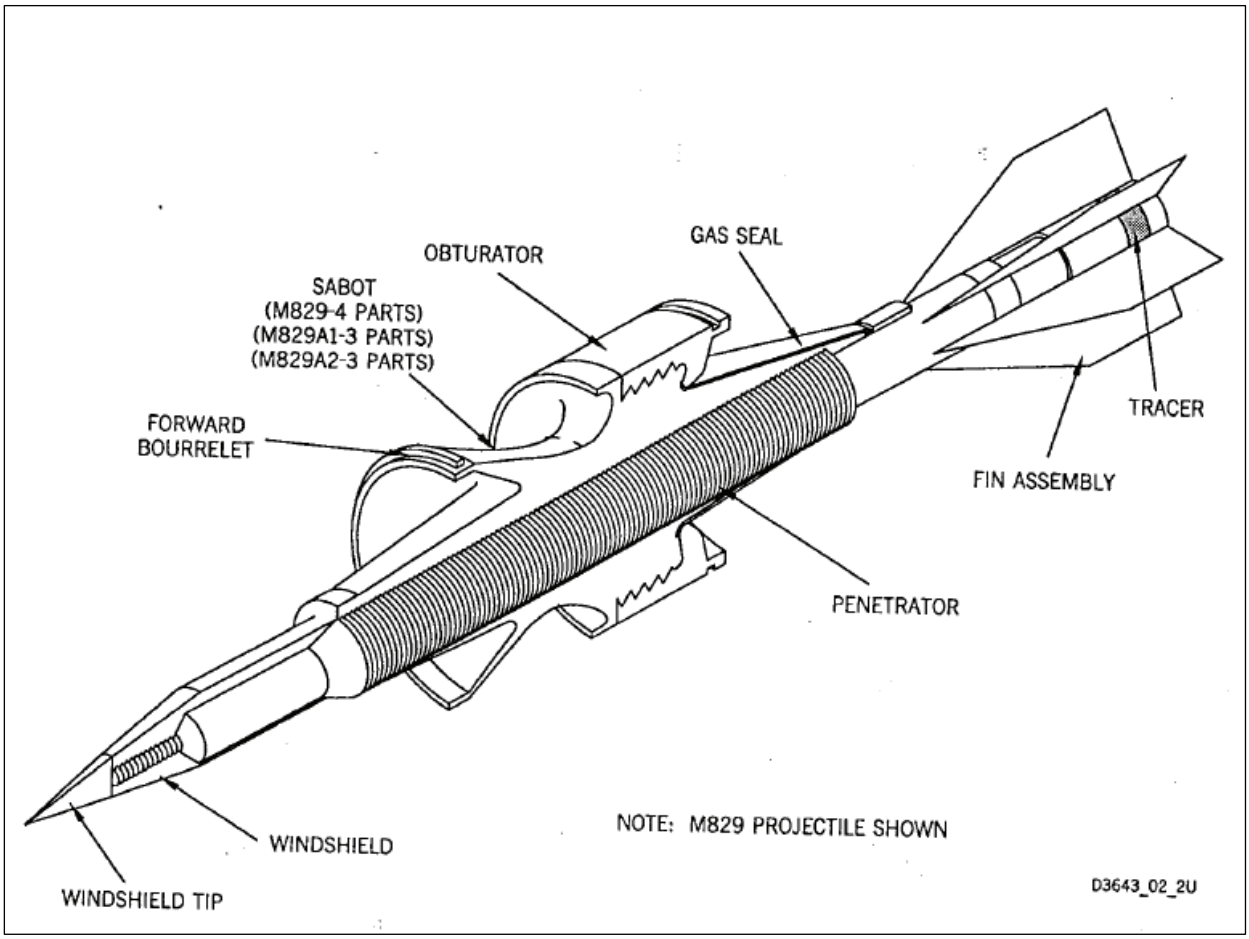

Figure 2-24. Line Drawing of a DU Projectile

Figure 2-25. DU UXO

MORTARS

2-32. Mortars range from 45 millimeters to 280 millimeters in diameter. Like projectiles, mortar shells can be filled with a variety of fillers including explosives, toxic chemicals, WP, or illumination flares. Mortars generally have thinner metal bodies than projectiles but use the same kind of fuzing. Like projectiles, mortars are stabilized in flight by fin or spin. Most mortars are fin stabilized, like the ones shown in Figure 2-26. Other mortars are spin stabilized as shown in Figure 2-27.

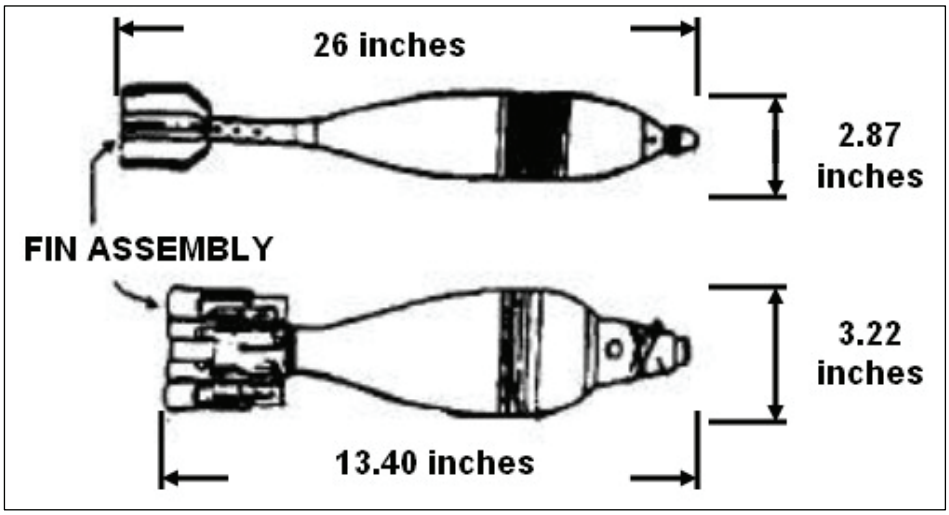

Figure 2-26. Fin-stabilized mortars

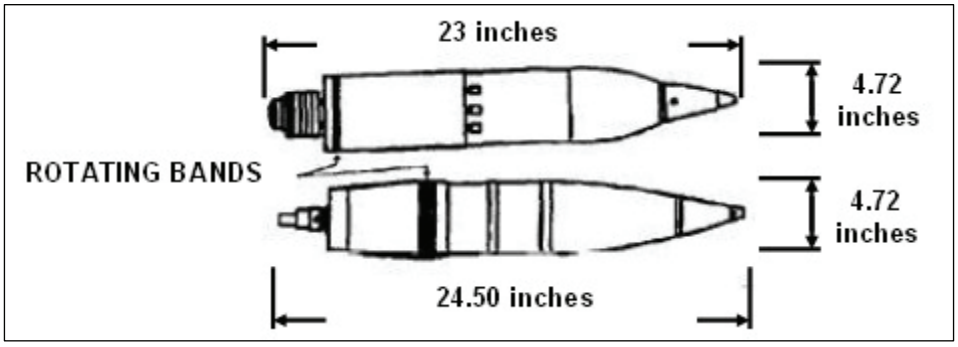

Figure 2-27. Spin-stabilized mortars

ROCKETS

2-33. A rocket may be defined as a self-propelled projectile. Unlike guided missiles, rockets cannot be controlled in flight. Rockets range in diameter from 37 millimeters to over 380 millimeters. There is no standard shape or size to rockets, as you can see in Figure 2-28. All rockets consist of a warhead section, a motor section, and a fuze. See Figure 2-29. They are stabilized in flight by fins, or canted nozzles, that are attached to the motor.

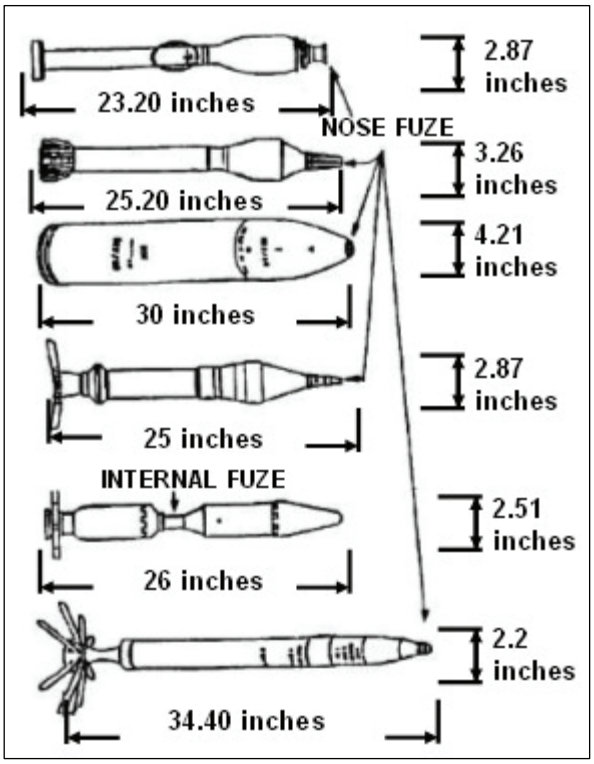

Figure 2-28. Rockets

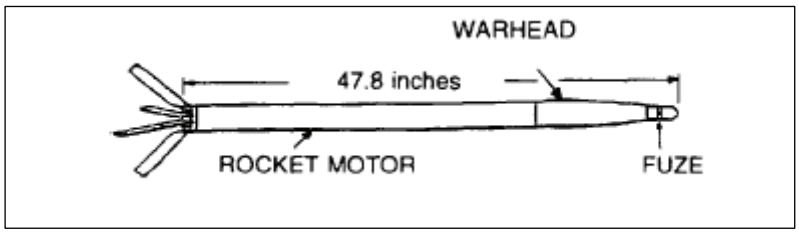

Figure 2-29. Parts of a rocket

2-34. The warhead is the portion of the rocket that produces the desired effect. It can be filled with a variety of fillers such as explosives, toxic chemicals, WP, submunitions, CS, or illumination flares. The rocket motor propels the rocket to the target. The fuze is the component that initiates the desired effect at the desired time. Rockets use the same type of fuzing as projectiles and mortars. The fuze may be located in the nose or internally between the warhead and the motor.

2-35. Rockets can be launched or fired from individual weapons (such as the light antitank weapon system), aircraft, mobile-launch vehicles, or stationary launch pads.

2-36. Some rockets are spin stabilized. Unlike projectiles and mortars, these rockets do not have rotating bands. Instead, as shown in Figure 2-30, their motor nozzles are slanted to produce the spin. The presence of motor nozzles, or venturis, in the rear of the rocket motor can be used for positive identification purposes for this type of ordnance.

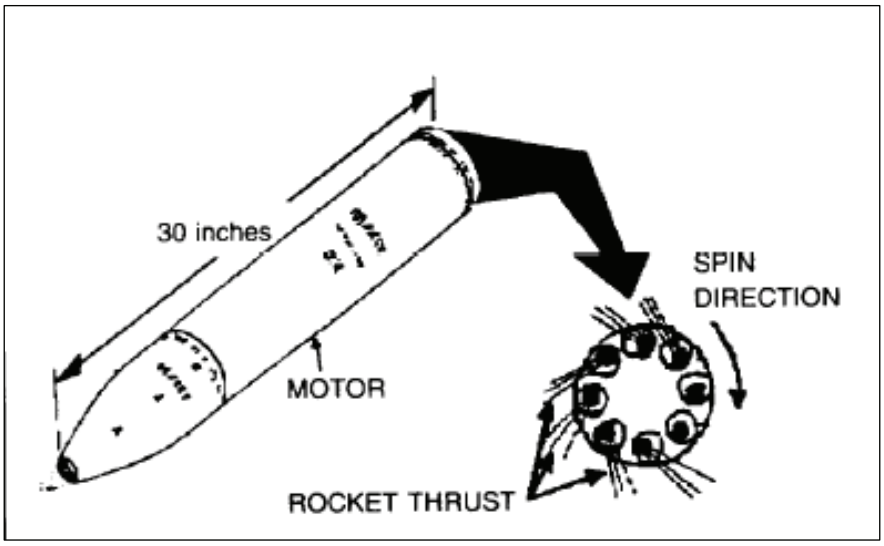

Figure 2-30. Spin-stabilized rocket

GUIDED MISSILES

2-37. The difference between a missile and a rocket is that the missile is guided to the target by various guidance systems. Some of the smaller missiles, such as the tube-launched, optically tracked, wire-guided (TOW) and Dragon missiles are wire-guided by the gunner to their targets. See Figure 2-31. Larger missiles, such as the phased-array tracking radar intercept on target (PATRIOT) and the Sparrow are guided by radar to their target. See Figure 2-32. The radar may be internal to the missile, like the PATRIOT, or external, like the Sparrow, which uses the airplane's radar system. Guided missiles are usually stabilized in flight by fins that are controlled by internal electronics. Most guided missiles use internal, proximity fuzing. Therefore, do not approach any guided missile you find lying on the battlefield.

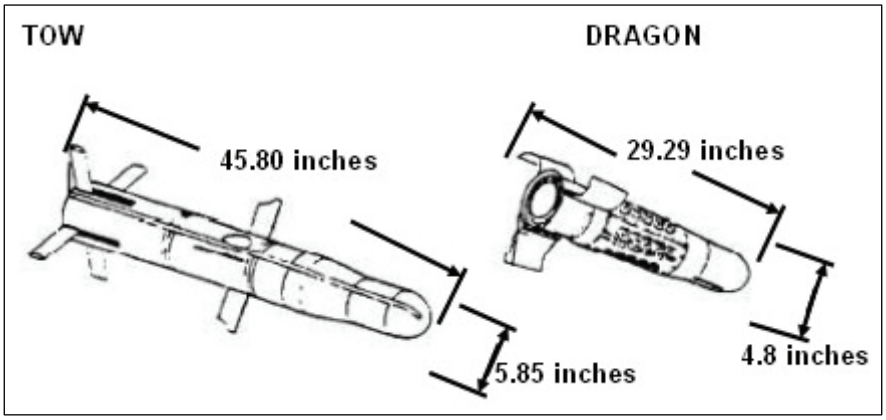

Figure 2-31. AT guided missiles

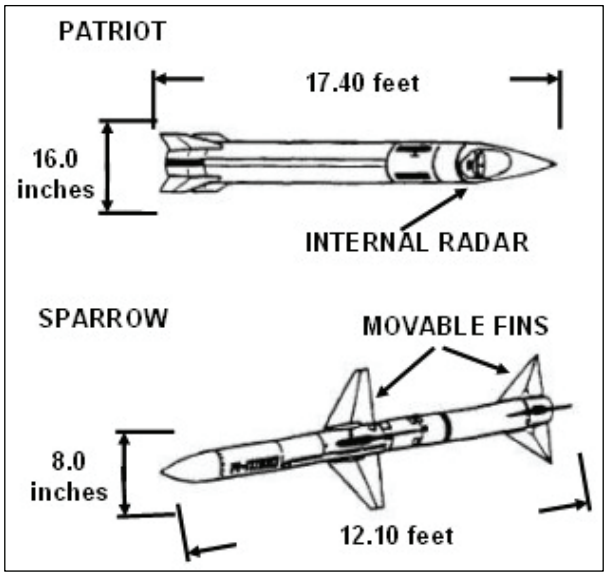

Figure 2-32. PATRIOT and Sparrow guided missiles

RIFLE GRENADES

2-38. Rifle grenades look like mortars and are fired from a rifle that is equipped with a grenade launcher or an adapter. Many countries use rifle grenades as an infantry direct-fire weapon. Some rifle grenades are propelled by specially designed blank cartridges, while others are propelled by standard ball cartridges. Rifle grenades may be filled with high explosives (HEs), WP, CS, illumination flares, or colored screening smoke. They range in size from the small AP rifle grenade to the larger AT rifle grenade. AP rifle grenades use impact fuzing. See Figure 2-33. Some rifle grenades, such as the AT, have internal fuzing behind the warhead (Figure 2-34). This type of fuzing still functions on impact with the target.

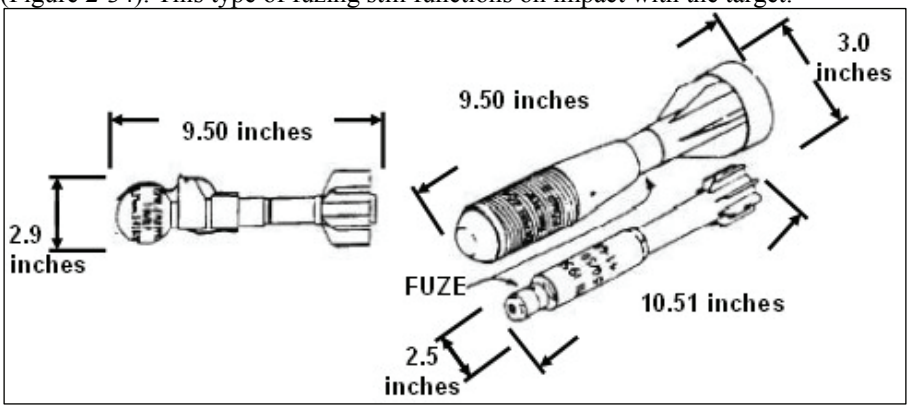

Figure 2-33. AP rifle grenades

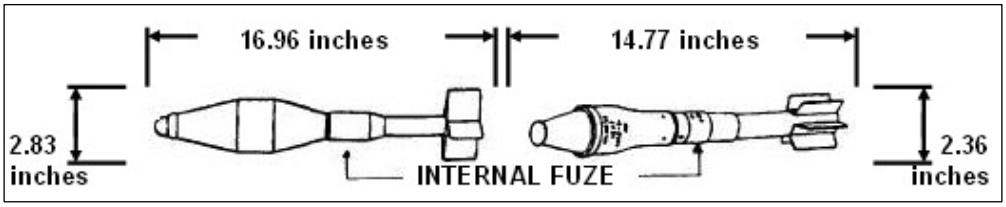

Figure 2-34. AT rifle grenades

THROWN ORDNANCE

DANGER

Never approach a grenade that was thrown and did not detonate, even if you threw it. Do not move, jar, or disturb - the fuse may function at any time.

Never pick up, move, or disturb a found grenade, even if spoon or safety pin are attached. The grenade may be booby-trapped and explode when disturbed.

2-39. Thrown ordnance, commonly known as hand grenades, can be classified by use as follows:

- Fragmentation (also called defensive).
- Offensive.
- Antitank.
- Smoke.
- Illumination.

Photographs of thrown ordnance and their NEW are in Appendix D.

2-40. Hand grenades are small items that may be held in one hand and thrown. All grenades have three main parts: a body, a fuze with a pull ring and safety clip assembly, and a filler. See Figure 2-35. Never pick up a grenade you find on the battlefield, even if the spoon and safety pin are still attached. All grenades found lying on a battlefield should be considered booby-trapped.

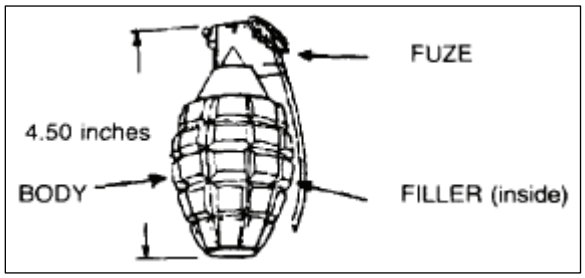

Figure 2-35. Parts of a grenade

FRAGMENTATION GRENADES

2-41. Fragmentation grenades are the most common type of grenade and may be used as offensive or defensive weapons. See Figure 2-36. They have metal or plastic bodies that hold an explosive filler. These grenades produce casualties by high-velocity projection of fragments when they detonate. The fragmentation comes from the metal body or a metal fragmentation sleeve that can be internal or attached to the outside of the grenade. These grenades may use an impact or burning delay fuze that functions 3 to 5 seconds after the safety lever is released.

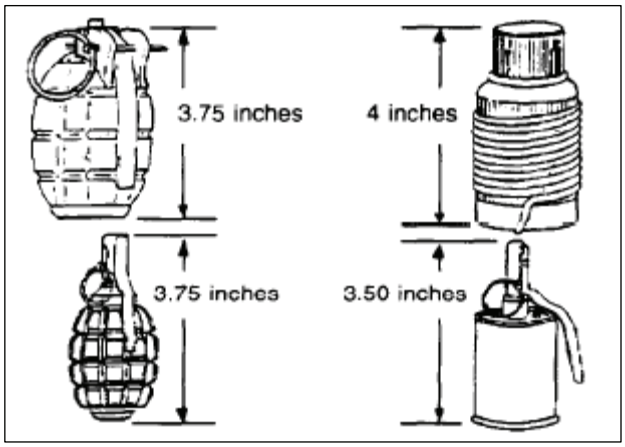

Figure 2-36. Fragmentation grenades

OFFENSIVE GRENADES

2-42. Offensive grenades have a plastic or a cardboard body. See Figure 2-37. They are not designed to have a lot of fragmentation. Their damage is caused from the over pressure of the explosive blast. These grenades may use an impact or burning-delay fuze that functions 3 to 5 seconds after the safety lever is released.

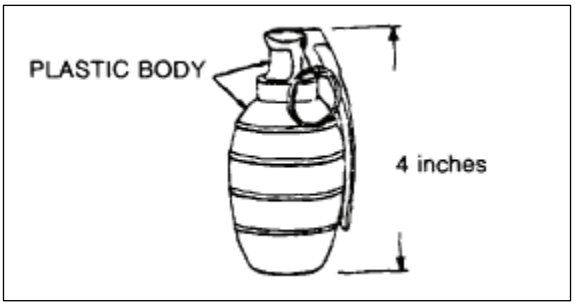

Figure 2-37. Offensive grenade

ANTITANK GRENADES

2-43. AT grenades are designed to be thrown at tanks and other armored vehicles. They have a shaped-charge explosive warhead and are stabilized in flight by a spring-deployed parachute or a cloth streamer. See Figure 2-38. These grenades use impact fuzing.

SMOKE GRENADES

2-44. There are two types of smoke grenades: bursting and burning. See Figure 2-39. They may be made of rubber, metal, or plastic. Bursting-type smoke grenades are filled with WP and detonate when the fuze functions. These grenades use a burning delay fuze that functions 3 to 5 seconds after the safety lever is released. Burning-type smoke grenades produce colored smoke. This type of grenade uses an instant-action fuze. There is no delay once the spoon is released. This is the same type of grenade that is used to dispense riot-control agents (such as CS).

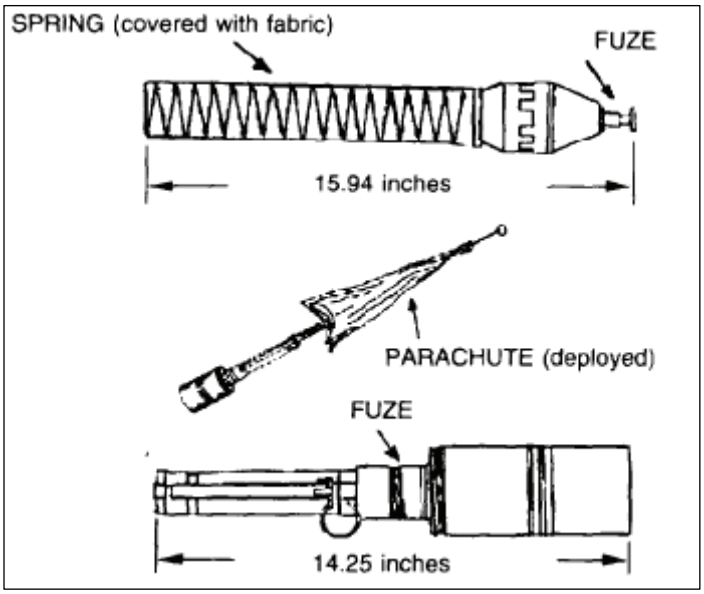

Figure 2-38. AT grenades

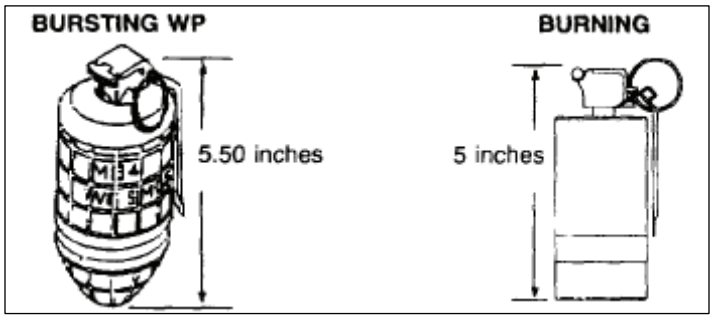

Figure 2-39. Smoke grenades

ILLUMINATION GRENADES

2-45. Illumination grenades are used for illuminating, signaling, and as an incendiary agent. See Figure 2-40. The metal body breaks apart after the fuze functions and dispenses an illumination flare. This type of grenade uses a burning-delay fuze that functions 3 to 5 seconds after the safety lever is released.

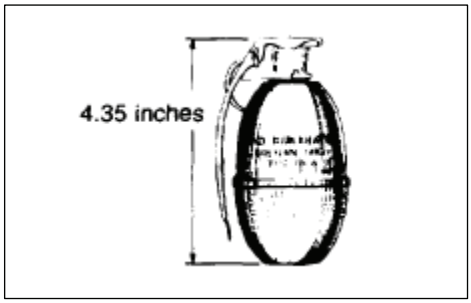

Figure 2-40. US illumination grenade

PLACED ORDNANCE

DANGER

Consider all mines to be booby-trapped or to have antidisturbance fuzing. Never attempt to uncover or remove placed ordnance.

2-46. Placed ordnance is commonly referred to as land mines. Land mines may be hidden or buried under the ground and may be classified as AP or AT. Visual detection of land mines may be difficult at best. If you come to a suspected minefield, report it through your chain of command. For further information and procedures for reporting land mines, refer to FM 3-34.210. Photographs of placed ordnance and their NEW are in Appendix E.

ANTIPERSONNEL MINES

2-47. AP mines are generally small and come in different shapes and sizes. See Figure 2-41. AP mines may be constructed from a variety of materials including plastic and wood. Some AP mines are designed to function when stepped on, such as those shown in Figure 2-41. Other AP mines are designed for use as booby traps. See Figure 2-42. These mines are set up to function by using a trip wire laid out across a path or road. When the trip wire is pulled or cut, the fuze functions. Some AP mines, such as the US claymore mine, may be set up to function by command detonation.

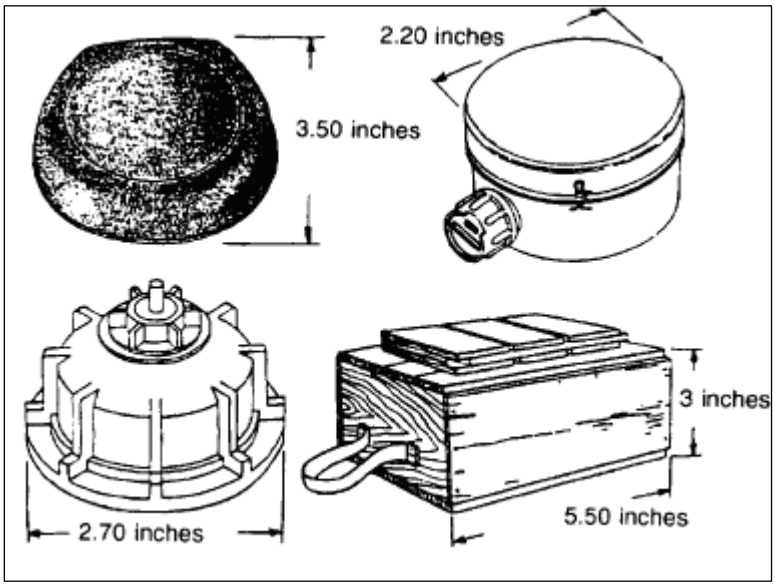

Figure 2-41. AP pressure-fuzed mines

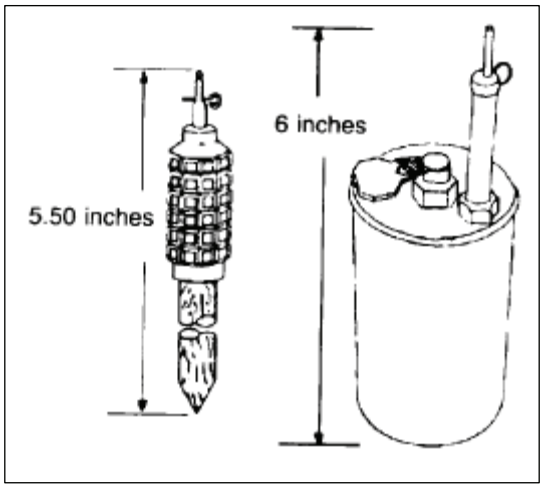

Figure 2-42. AP trip wire-fuzed mines

ANTITANK MINES

2-48. AT mines are much larger than AP mines and may use a variety of fusing including pressure, magnetic or tilt-rod fuzing. Some of the more modern AT mines have plastic bodies, which make them hard to detect with a metallic mine detector. The variety of AT mines shown in Figure 2-43 all function by direct pressure from a tank or vehicle. The mines shown in Figure 2-44, use a tilt-rod fuze that sticks out of the ground. When the rod is moved or pushed over, the mine detonates.

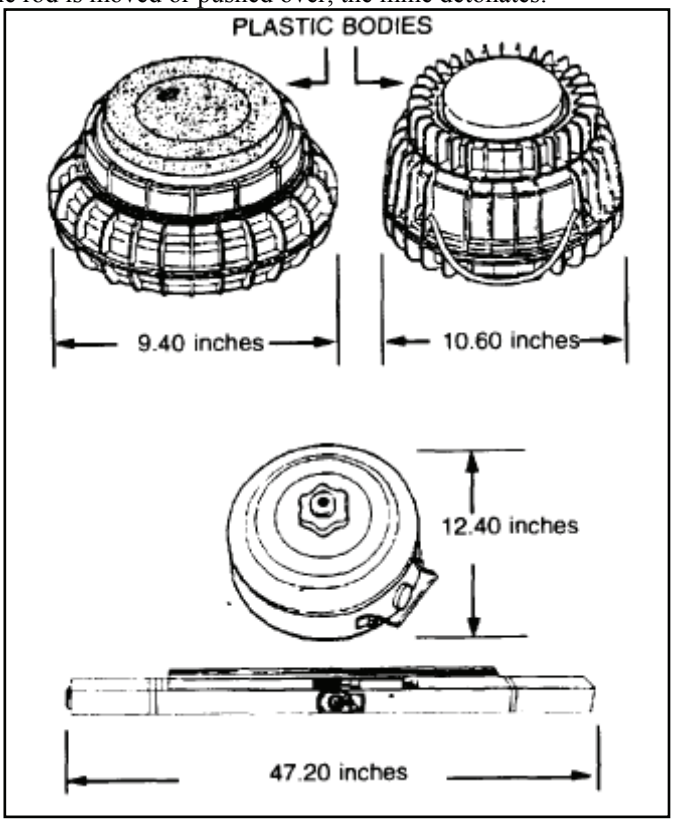

Figure 2-43. AT pressure-fuzed mines

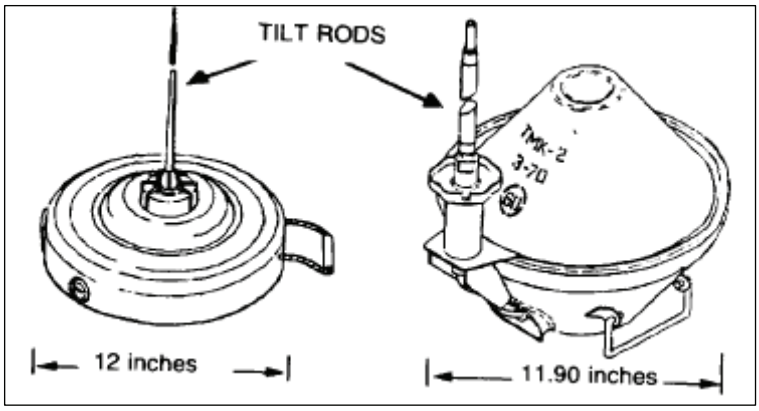

Figure 2-44. AT tilt-rod fuzed mines

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Chapter 3

Take Immediate Action

All UXOs found on the battlefield affect maneuver and mission capabilities. When you find a UXO, you must make some immediate decisions. These decisions will depend on your current mission, the size and location of the UXO, and your unit's capabilities. Figure 3-1 shows a decision chart to help you decide. This information is also in GTA 9-12-1, which is available at your local TASC.

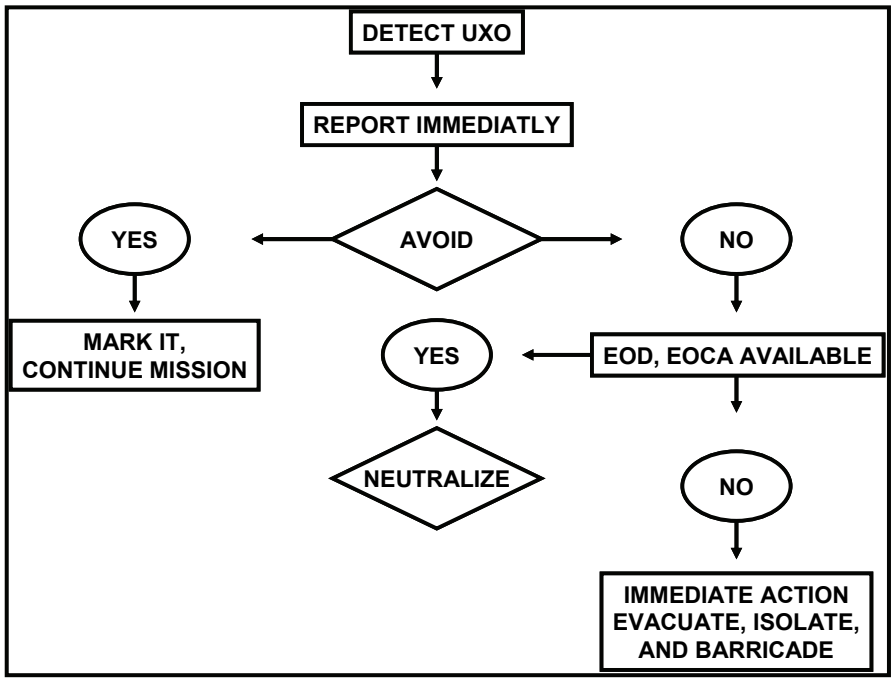

Figure 3-1. Decision chart

If at all possible, avoiding/bypassing the UXO hazard is the safest option to take for personnel and equipment. if the UXO hazard is left from a recent enemy attack, you must consider protecting your personnel and equipment by extracting them from the area before another attack is targeted on you. See Chapter 5 for extraction procedures.

If the mission cannot be accomplished due to the presence of the UXO and the hazard cannot be avoided/bypassed, protective measures must be taken to reduce the hazard to personnel and equipment. Regardless of the option you choose, the location of the UXO must be clearly marked with UXO markers and the hazard reported to your next higher headquarters. See Chapter 4 for procedures on reporting a UXO hazard.

PROTECTIVE MEASURES

3-1. There are three methods you can use to protect personnel and equipment. You can evacuate, isolate, or barricade them.

EVACUATE

3-2. Evacuation of all nonessential personnel and equipment is the best protective measure. The evacuation distances given in Figure 3-2 provide a reasonable degree of safety for unprotected personnel and equipment. These distances are based on your estimate of the amount of explosive filler in the UXO. If protective barricades are used around the UXO, these distances can be reduced.

3-3. The general rule for estimating the amount of explosive in an ordnance item is as follows: Assume that 50 percent of the total ordnance weight equals the NEW. For example, a 500-pound bomb would be calculated to have 250 pounds of explosive. According to Figure 3-2, the safe distance for unprotected personnel is 625 meters. Refer to Appendixes B through E for the NEW of general ordnance items.

3-4. After all personnel and equipment are evacuated, movement within the area should be kept to essential operations only. If equipment cannot be evacuated, only mission-essential personnel should be allowed in the area. The equipment should be protected by barricades and personnel should wear all protective equipment.

Explosive Weight (pounds)	Evacuation Distance (meters)
27 and less	300
30	310
35	330
40	350
45	360
50	375
100	475
150	550
200	600
250	625
300	675
400	725
500	800

Figure 3-2. Evacuation distances

ISOLATE

3-5. Sometimes, for mission-related, operational, or other reasons, you cannot evacuate personnel and/or equipment or you cannot leave a particular area. When this happens, you must isolate either your assets (personnel, equipment, and operations) from the UXO or isolate the UXO from your assets. See Figure 3-6, 3-7, and 3-8.

BARRICADE

3-6. If your unit is stationary, evacuate all nonessential personnel and equipment out of the hazard area. Equipment that cannot be moved must be protected with barricades. Personnel who cannot be evacuated from the area must also be protected from the hazard. You can do this by reinforcing the fighting positions on the side facing the hazard and by adding overhead cover.

3-7. A barricade is an artificial barrier that provides limited protection by channeling the blast and fragmentation from the threatened area. Barricades may also be used to lessen the effect of the blast

and to reduce the size of the evacuation area. When determining if barricades are needed, you must estimate the probable damage that would result if the UXO were to explode. Building artificial barricades is very time consuming and requires a large number of sandbags. Depending on the size of the UXO, barricades can be built around the UXO to protect the entire area, or they can be built next to the equipment or areas that cannot be evacuated.

3-8. Use the following general guidelines when building barricades:

- Calculate the total destructive power of the UXO hazard. Multiply the number of items by their NEW.
- Determine which assets cannot be moved or evacuated from the area safely.
- For those assets that cannot be moved or evacuated, decide on the type of barricade(s) you will need to protect your assets. Sandbags, or other dirt or water filled barriers can be used. Concrete barriers are not preferred near the ordnance item as they tend to produce more fragments.
- Determine how many personnel are available to help build barricades. Use the absolute fewest personnel. Determine what equipment you can use. If earth-moving equipment is available, you can build earth barriers in place of sandbag barricades.
- Calculate the number of sandbags you will need or that are already available to build barricades. Personnel evacuated from the UXO area can fill sandbags and transport them to the barricade site.
- Make sure that all personnel actually building barricades are wearing all available safety equipment. This safety equipment includes a kevlar helmet, a flak vest, and hearing protection.

PLACEMENT AND SIZE OF BARRICADES

3-9. The barricade should be built no closer to the UXO than the height for the barricade plus 3 feet. Further guidance on the height for barricades is provided later in this section. For example, the barricade shown in Figure 3-3 is 5 feet tall. By adding an additional 3 feet, the barricade is built no closer than 8 feet to the UXO. Build the barricade between the building and/or the equipment to be protected and the UXO. By positioning the barricade in this location, personnel who are in or around the building or who are using the equipment will be afforded the greatest protection from the blast and flying fragments. See Figure 3-4. Refer to para 3-11 thru 3-13 for the appropriate height of a barricade.

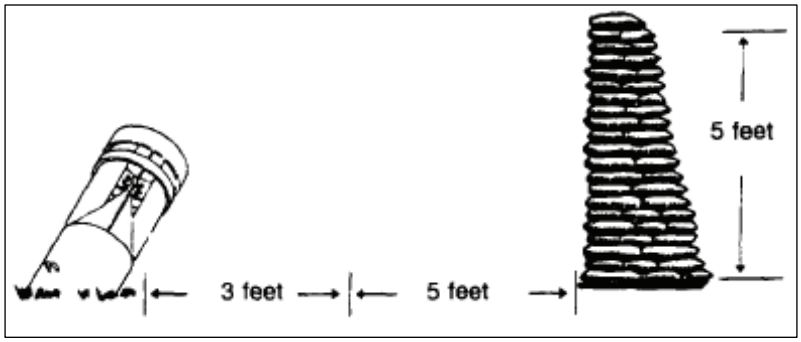

Figure 3-3. Placement distance for barricade

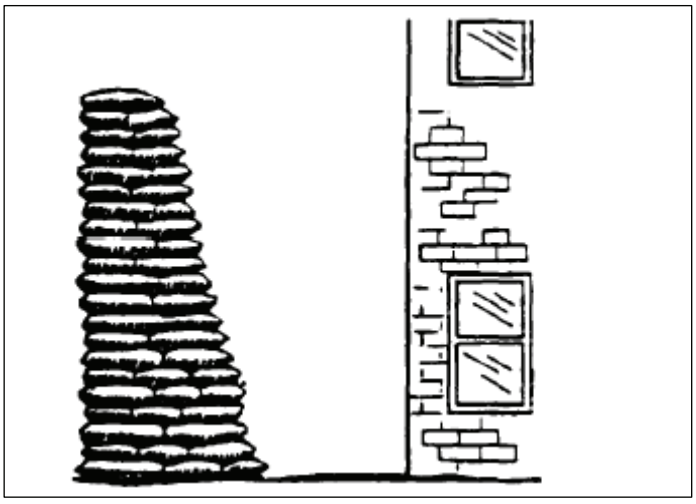

Figure 3-4. Placement of wall barricade

3-10. When building a barricade, the sandbags must be interlocked for stability. See Figure 3-5. Sandbags that are not interlocked will reduce protection and make the barricade unstable.

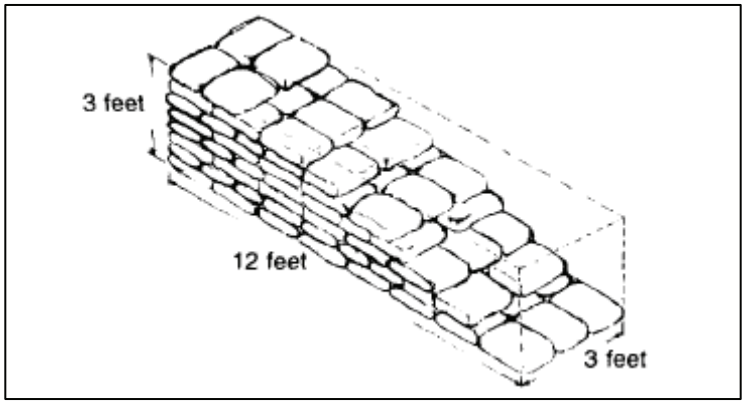

Figure 3-5. Interlocking sandbags

3-11. **Small UXO.** For small UXOs such as missiles and rockets less than 70 millimeters in diameter, for projectiles less than 75 millimeters in diameter, and for submunitions and grenades, a double wall thickness of sandbags should surround the area of the UXO. The sandbags must be stacked to a height of at least 3 feet and should be thick enough to protect personnel and equipment from the blast and fragmentation. This type of barricade may be semicircular or circular. Types of barricades are discussed later in this section.

3-12. **Medium UXO.** For medium-sized UXOs such as missiles, rockets, and projectiles up to 200 millimeters in diameter, and for large sized placed munitions on the surface, a four- or five-wall thickness of sandbags should surround the area. The sandbags must be stacked to a height of at least 5 feet in order to protect assets. This type of barricade is usually semicircular.

3-13. **Large UXO.** Large UXOs such as projectiles, missiles, and general-purpose bombs are too large for effective barricades to be built around the ordnance item. In these cases, equipment and personnel activity areas would need to be barricaded. A wall barricade between the affected area and the UXO hazard provides the best and easiest protection. Jersey or Texas concrete barriers can be used to protect assets in this situation since the barrier is further away from the ordnance site.

BARRICADE TYPES

3-14. The three types of barricades are circular, semicircular, and wall. The type barricade that you use will depend on the UXO hazard and the area that requires protection.

- **Circular.** A circular barricade is the best choice for small UXO hazards, because it provides complete protection for personnel and equipment. A circular barricade that is 8 feet in diameter, 3 feet tall, and 3 sandbags thick would require approximately 400 sandbags. The barricade shown in Figure 3-6 will force the blast upwards and contain the majority of the fragments.

Figure 3-6. Complete circular placement of barricade

- **Semicircular.** A semicircular barricade is used for small- and medium-sized UXO hazards. It will channel the blast and fragmentation through the open side and away from the protected area. See Figure 3-7.
- **Wall.** The wall barricade protects specific equipment or personnel areas. It is used when the UXO hazard is too large to contain by using a circular or semicircular barricade. The number of wall barricades you need will depend on how much equipment or how many personnel you must protect. A wall barricade that is 12 feet long, 6 feet high, and 3 sandbags thick would require 700 sandbags. As shown in Figure 3-8, the barricade should extend beyond and be at least as tall as the equipment or personnel areas to be protected. Equipment that is barricaded must still be usable. For example, the radar shown in Figure 3-8 must be left exposed in order to function.

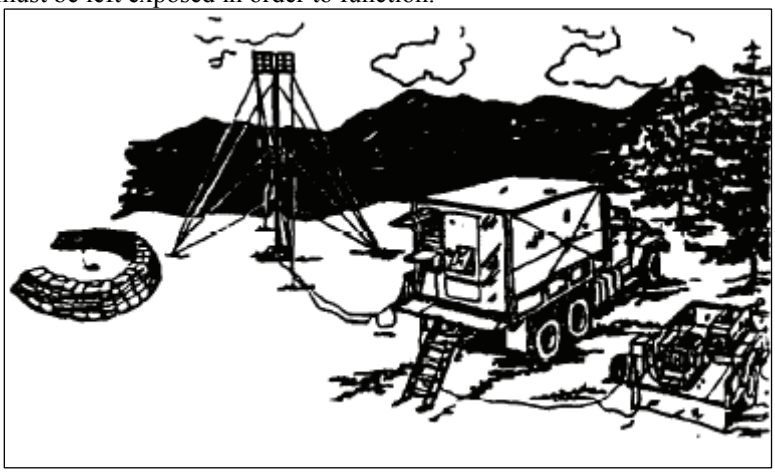

Figure 3-7. Semicircular placement of barricade

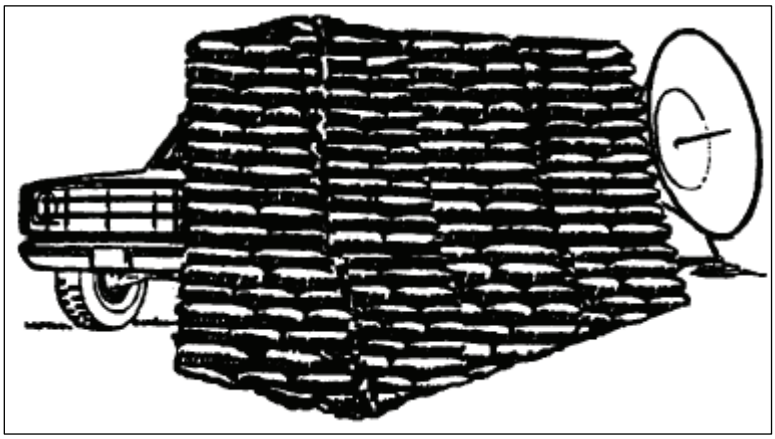

Figure 3-8. Wall barricade placement

This item implements STANAG 2002, Edition 7.

MARK UXO

3-15. Marking a UXO hazard is just as important as marking other hazard areas such as CBRNE areas, minefield, and booby-trapped areas. All of these hazards are marked by using triangular signs, if readily available, that by their background color indicate the danger involved. The standard UXO marker is shown in Figure 3-9. The background is red with a white bomb inset. It has the same dimensions as the other markers.

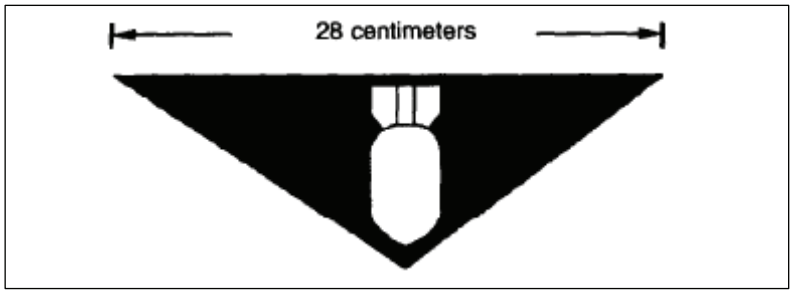

Figure 3-9. Standard UXO marker

3-16. The UXO marker is placed above ground at waist level (about 3 feet) with the bomb pointing down as shown in Figure 3-10. The marker should be placed no closer to the hazard than the point where you first recognized the UXO hazard. The marker should be attached to a stake (Figure 3-10), a tree, or other suitable holder. Just be sure that the marker is clearly visible.

3-17. You should also mark all logical approach routes to the area. If the hazard is near a road, as a minimum, put a marker on each side of the road approaching the UXO. If there is a large concentration of UXO hazards such as submunitions, mark the area as you would a scatterable minefield, with markers placed about every 15 meters around the area. Refer to FM 3-34.210 for additional information on marking minefields.

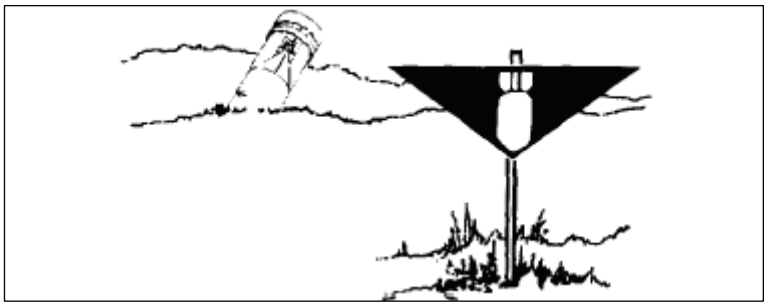

Figure 3-10. Marking a UXO with standard marker

3-18. As a general rule, the UXO hazard itself must be easily seen from any of the markers. This helps to keep others away from the hazard. It also helps the EOD team to find the hazard.

3-19. If standard UXO markers are not available, you may use other suitable materials (such as engineer tape or colored ribbons). Try using the same color ribbon to avoid confusion. When using other materials, the same principles used for the standard markers apply for placement of the makeshift markers. That is, they should be placed about 3 feet off the ground and easily seen from all approach routes. See Figure 3-11.

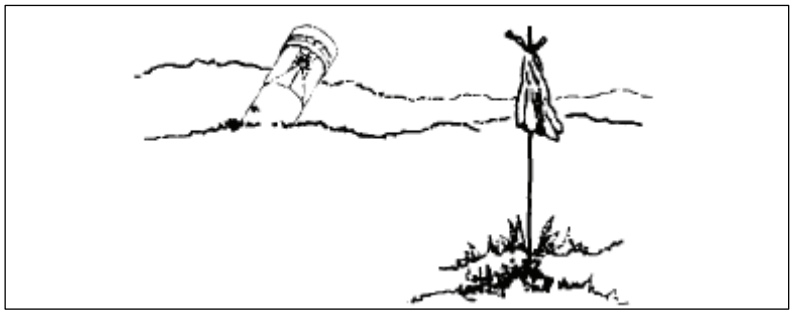

Figure 3-11. Marking UXO with alternate type of material

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Chapter 4

Report the UXO Hazard

As discussed in Chapter 1, UXO hazards on the battlefield have an enormous effect on command and control decisions for battle planning. The location of these hazards is vital to the command and control elements when projecting movement and support of combat units. UXO hazards also have a direct impact on the combat capabilities of any element that encounters them. To assist commanders, an effective UXO reporting system must be in place and maintained to allow commanders to concentrate EOD assets according to priorities and battle plans.

EXPLOSIVE HAZARDS SPOT REPORT

4-1. The EH spot report (formally known as the UXO spot report) is a detailed, swift, reporting system that makes clear where the UXO hazard areas are, what their priorities are, and which units are affected by them. The report is used to request help in handling a UXO hazard that is beyond a unit's ability to handle and that affects the unit's mission. This report helps the commander set priorities based on the battlefield situation. If tactically feasible add a digital photo to the Spot Report. Digital photos can greatly assist EOD personnel in identifying UXO and therefore providing any subsequent recommendations to the reporting unit.

4-2. The EH spot report is the first-echelon report that is sent when a UXO is encountered. Information about this report is also found in GTA 9-12-1 and in the supplemental information section of the signal operating instructions (SOI), where it is just behind the request for medical evacuation (MEDEVAC).

4-3. The EH spot report lets personnel on the battlefield report found UXOs, improvised explosive devices (IEDs), and captured enemy ammunition (CEA) through the appropriate channels. It provides a brief description, location, and recommended priority to assist in determining response categories. The report consists of nine lines, and is sent by the reporting unit using the fastest means available.

- **Line 1. Date-Time Group.** The DTG that the item was discovered.
- **Line 2. Reporting Unit and Location.** The unit identification code (UIC) of the reporting activity unit and the location of the explosive hazard in an 8-digit grid coordinate.
- **Line 3. Contact Method.** Provide the radio frequency, the call sign, the point of contact, and the telephone number.
- **Line 4. Type of Munition.** Note the size, quantity, type of ordnance (dropped, projected, placed, or thrown), and subgroup, if available. Note if antihandling devices were used. Indicate the emplacement method and type of initiation device.
- **Line 5. CBRN Contamination.** - If present, be as specific as possible. (Chemical agent monitor (CAM) detected G Agent at 3 bars; Soldiers are experiencing symptoms of Nerve agent etc….)
- **Line 6. Resources Threatened.** Report any equipment, facilities, or other assets that are threatened.
- **Line 7. Impact on Mission.** Provide a short description of your current tactical situation and how the presence of the explosive hazard affects your status (for example, delayed, diverted, cancelled).
- **Line 8. Protective Measures Taken.** - Describe measures taken to protect personnel and equipment. (Personnel evacuated to 300M, marked, Sandbag barrier constructed etc…)
- **Line 9. Recommended Priority (Immediate, Direct, Minor, No Threat).** Recommend a priority for response by EOD. Ensure that the priority requested corresponds with the tactical situation you described on line 7 of the report (Impact on Mission). These priorities refer only to

the explosive hazard's impact on your current mission. A priority of MINOR or NO THREAT does not mean that the explosive hazard is not dangerous. (See PRIORITIES below)

Line 1.	DTG	131200ZAUG04
Line 2.	Reporting activity	2/505 PIR, BS13221433.
Line 3.	Contact method	F400, Shockwave3 SGT Turner
Line 4.	Type of ordnance	82MM Mortar 1 EA
Line 5.	CBRN contamination	Yes, the Soldiers have blisters. M8 paper confirms the presence of a chemical agent.
Line 6.	Resources threatened	Personnel, Mortar Emplacement
Line 7.	Impact on mission	Counter fire operations stopped.
Line 8.	Protective measures	Personnel evacuated to 300M, Sandbag barrier constructed
Line 9.	Recommended priority	Immediate

Figure 4-1. Explosive Hazard Spot Report

PRIORITY BASIS

4-4. Priorities are defined by the commanders' guidance. The EOD commander coordinates EOD incident categories and priorities with the commanders staff based on the supported commanders priorities. The four priorities established for EOD support are—

- Immediate. This priority stops the unit's maneuver and mission capability, or threatens critical assets vital to the mission.
- Direct. This priority restricts the unit's maneuver and mission capability, or threatens critical assets important to the mission.
- Minor. This priority reduces the unit's maneuver and mission capability, or threatens non-critical assets of value.
- No threat. This priority has little or no effect on unit capabilities or assets.

PRIORITIZING THE SPOT REPORT

4-5. The UXO spot report is forwarded through your chain of command. Each commander in the chain who receives/reviews the report may change the priority to reflect the current tactical situation or projected battle plans. It is the responsibility of each commander in the chain to ensure that UXO spot reports are forwarded through command channels and that the proper priority is set for each report.

4-6. If a higher-level commander in the chain changes a priority, all subordinate commanders, especially the commander of the reporting unit, must be told. Commanders must keep the following in mind: even though they may lower a priority, the reporting unit must be able to continue its mission until help comes. In addition to the priority status, all commanders need to be kept informed of the status of each UXO hazard in their area.

4-7. The final priority is determined by the reporting unit's higher headquarters that is supported by EOD. Based on mission, enemy, terrain and weather, troops and support available-time available (METT-T), EOD are dispatched to respond to the hazard.

Chapter 5

Self-Extraction from UXO Hazards

The use of submunitions and scatterable mines on the modern battlefield will have a direct impact on mobility, survivability, and logistical support requirements. All units must be able to maintain their mobility despite these hazards. Our forces must be able to self-extract from submunition and scatterable mine threats in order to survive.

EOD units are responsible for the elimination of these threats from the battlefield, while engineer elements provide breaching and mine-clearing support for these threats. These elements may not be readily available to all units that receive submunition or scatterable mine attacks from the enemy. Any unit that cannot self-extract will risk being destroyed in place by follow-on attacks.

DETECTION

5-1. Detection is the first step in extraction. Submunitions and scatterable mines are very small in size and are difficult to detect in optimum circumstances. In some terrain, such as dense foliage, tall grass, or uneven ground, many of them will go undetected. During periods of limited visibility or at night, detection is almost impossible. Combat vehicle personnel traveling cross-country in a buttoned-up vehicle will be at a great disadvantage, because they will not be able to see them or to avoid them.

5-2. The unit detecting a submunitions area or scatterable minefield is required to report it, mark it, and, if so directed, breach through it. All areas will remain marked until they are cleared.

IMMEDIATE ACTIONS

5-3. When an operating area becomes contaminated with submunitions or scatterable mines, a certain amount of confusion is understandable. Therefore, a recognized and rehearsed system of alerting personnel to the danger and orders on how to evacuate the area are essential. Alerting systems may include loudspeakers, radios, or runners. A combination of these systems may be the most effective.

5-4. The unit field SOP should include procedures for evacuating personnel from an area and reestablishing operations at another location. An established and trained evacuation plan will reduce personnel and vehicle losses. The plan must be flexible so it can be adapted to fit the different scenarios and environments that might be encountered.

5-5. When setting up operational bases or work sites, the UXO threat must be considered. Roads are critical for evacuation. Hard surfaced roads are the best evacuation routes and are also the easiest to clear. The evacuation plan should include procedures for unit elements to reconnoiter and mark clear paths or to link paths from other unit positions to their position and to the nearest hard surfaced road.

5-6. A unit that has been directly fired on must presume that more fires are coming. The unit must be able to self-extract from the area in order to resume operations or be able to protect assets in order to continue the assigned mission. The extraction procedure resembles an in-stride breach as outlined in FM 3-34.210 and FM 90-13-1, or in MCWP 3-17.3 for the Marine Corps. Units that are conducting movement operations can use route clearance procedures to force a cleared lane through the area only as a last resort. Most units are not equipped to deal with this situation and the results could be as devastating as the attack itself.

5-7. Combat units that have the assets to conduct an in-stride breach can do so and reduce the hazard for follow-on forces and continue in the original direction of the march. CS and combat service support (CSS) units must rely on their OPORD to designate alternate support areas. These units must employ their organic assets to reconnoiter and create cleared lanes in the direction of the alternate support location. Not all equipment may be retrievable. The emphasis should be placed on relocating personnel and operational equipment as quickly as possible.

SITUATIONAL ASSESSMENT

5-8. After taking immediate actions to alert personnel, locate the submunitions or scatterable mines, and provide protection for personnel and equipment, the following operational situation and tactical factors should be assessed:

- Effect of the delay on the mission.
- Threat from direct and indirect fire. The risk of casualties from direct or indirect fire may be greater than that from the submunitions or scatterable mines.
- Type of terrain. The terrain determines the effectiveness of submunitions or scatterable mines, their visibility, and, consequently, their ability to be detected, avoided, or neutralized.
- Alternate routes or positions available.
- Degree of protection available.
- Availability of specialized support, such as EOD or engineer teams and equipment.

5-9. After assessing the situation, three main options are available, as follows:

- Accept the risk of casualties and continue with the assigned mission.
- Employ tactical breaching procedures and extract to alternate routes or positions.
- Employ preplanned alternate tactical plans according to the current OPORD.

BREACHING TECHNIQUES

5-10. Hazardous areas must be bypassed if at all possible. When bypassing is not feasible, you must try to neutralize the submunitions and scatterable mines that prevent movement. There is no single device or technique that will neutralize every submunition or scatterable mine in every situation. The differences in fuzing, self-neutralization, terrain, and unit mission mean that multiple techniques must be considered.

5-11. When employing breaching techniques, take all protective measures possible to protect personnel and equipment. Personnel who are not directly involved should be under cover, away from the area. Personnel who are directly involved must make use of all available cover. These approved extraction techniques are listed from least to most hazardous and should be considered for execution in this order:

- Perform area reconnaissance, and mark a cleared route.
- Use engineer equipment to remove or destroy items.
- Destroy items using explosive charges.
- Contain the item by building protective works.
- Destroy items using direct-fire weapons.

DANGER

Employing breaching techniques on ordnance other than submunitions or scatterable mines is not recommended. The amount of explosives involved would create more of a hazard to your operations than the UXO itself.

WARNING

Prior to employing breaching techniques, make sure that none of the items are filled with chemical, radiological, or biological agents.

UXO CONSIDERATION FOR SELF EVACUATION

5-12. After indirect fire attack immediate action drills for self extraction must include a plan to mitigate the hazards of UXO.

5-13. If you enter a minefield or UXO saturated area, evacuate by the same route you entered, marking the route if situation permits.

ENGINEER EQUIPMENT (HEAVY-FORCE BREACHING)

5-14. Using engineer equipment is the preferred method of breaching small submunitions and scatterable mines. This procedure allows for the quickest clearance of an evacuation route. Suitable equipment includes a bulldozer (with mine clearance armor protection if possible), deployable universal combat earthmover (DEUCE), combat vehicle mounted with a mine clearing blade or roller, or an armored combat earthmover (ACE). If an unarmored vehicle is used (such as a bulldozer or a grader), the operator's cab must be protected by sandbags.

5-15. Four major disadvantages to heavy-force breaching are as follows:

- Operators may be killed or injured.
- Equipment may be damaged. If either happens, extraction through the area will be hampered.
- Equipment may only partially clear the area, requiring further clearance procedures.
- Equipment may bury some submunitions or scatterable mines, which would keep them from being detected while using the evacuation route.

EXPLOSIVE CHARGES

MINE-CLEARING LINE CHARGE

5-16. The mine-clearing line charger (MICLIC) is a rocket-propelled explosive line charge used to reduce minefield containing single impulse, pressure-activated AT mines and mechanically activated AP mines. It has limited effectiveness against magnetically activated mines, including scatterable mines and those containing multiple-impulse or delay-time fuzes.

5-17. The MICLIC will explosively clear a path through an area. Several MICLICS may be required in the same area to ensure that a wide enough path is cleared.

5-18. Three major disadvantages to using MICLICs are as follows:

- The explosive charges may not be close enough to the submunition or scatterable mine to cause destruction. This can result in "kick outs" where submunitions or scatterable mines can be thrown away from the detonation, possibly towards your position.
- Further reconnaissance of the area is required prior to using the route for evacuation in order to detect those submunitions or scatterable mines that are still in place after using MICLIC.
- MICLIC cannot be used if high order detonation or explosives in the area is not acceptable.

PLACED EXPLOSIVE CHARGE

5-19. This is the most effective way to clear an evacuation route. If at all possible, the explosive charges should be remotely placed to the side of the UXO as close as possible without touching it. If it can not be done remotely hand emplacement of the charge is the most hazardous and time consuming procedure. The explosive charge should be large enough to consume the item and placed to the side of the UXO that is closest to the unit's position. This will direct most of the fragmentation away from the unit. Enough time delay should be used to allow personnel to return to a safe area prior to the detonation.

5-20. Four major disadvantages to using placed charges are as follows:

- They are very labor intensive to use and expose personnel to a greater risk, especially if the submunitions use magnetic, delay, or trip-wire fuzing.
- Their use is very slow and time consuming, because all items must be detected, marked, and destroyed individually.
- They cannot be used if detonation of the submunitions or scatterable mines will cause unacceptable damage to the operational area and/or equipment.
- They should not be used in heavy concentrations of submunitions or scatterable mines. The detonations will cause "kick outs."

CONTAINMENT

5-21. For containment see Chapter 3.

- There is one major disadvantage to containment. Building barricades is time consuming and thereby exposes a large number of personnel to the UXO.

UXO DIRECT-FIRE WEAPONS

5-22. This is the least preferred method of clearance. Submunitions and scatterable mines can be destroyed or disabled by the use of direct-fire service weapons. The goal of this procedure is to produce a disabling reaction that rapidly reduces or eliminates the designed fuze functioning of the submunition or scatterable mine. Service weapons such as the 5.56 millimeter, the 7.62 millimeter, the .50 caliber, and the 25 millimeter will most likely produce the desired effect. The person firing the service weapon should approach the UXO only close enough to be able to fire accurately. However, this person should never be closer than 300 meters to the item. When performing the direct-fire procedure, the aiming point is center mass. Single shots should be fired until the item is hit. On some larger items, multiple hits may be required to be sure that the submunition or scatterable mine has been disabled. Frontal protection is required for mounted and dismounted personnel. Figure 5-1 shows the dismounted procedure, while Figure 5-2, shows the light-vehicle mounted procedure with sandbags being used for frontal protection. If several persons are being used to clear a large area, ensure that each person is protected sufficiently from all areas. No one person should be closer than 300 meters to any item being engaged.

5-23. This technique has many variables and must only be performed by personnel with the appropriate training. Certain smaller caliber weapons will have little to no effect on some ordnance items and leave it in a more hazardous state. If personnel are trained in UXO direct-fire techniques this by no means implies that they are qualified to use direct-fire techniques for IEDs or other specific ordnance items.

5-24. Five major disadvantages to direct-fire destruction are as follows:

- It is very slow and time consuming. Each item must be individually located, and each person can only engage one target at a time.
- Some submunitions are too small to engage effectively with direct-fire weapons from a distance of 25 meters. The terrain has a major affect on this procedure. Because submunitions and scatterable mines are so small, it does not take very much vegetation or loose dirt to hide them.

- This technique is applicable only to high explosive filled munitions and can be used only when the possibility of high order detonation of the targeted UXO is tolerable. High order detonation can cause sympathetic detonation of other munitions.
- The detonation of the submunition or scatterable mine can result in "kick outs" where submunitions or scatterable mines can be thrown away from the detonation, possibly towards your position.
- If the ordnance item is damaged and not destroyed it may be more sensitive and the disrupted components may be more hazardous.

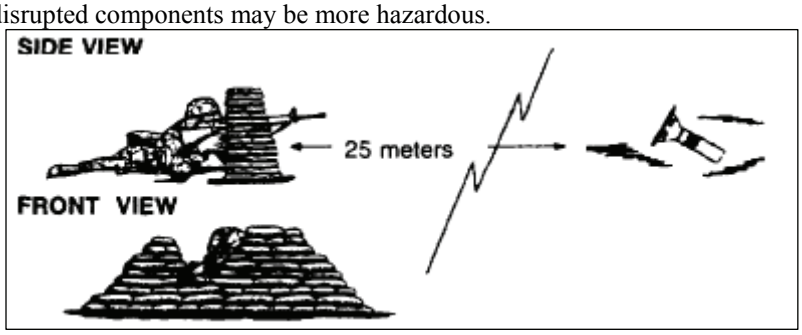

Figure 5-1. Dismounted direct-fire procedure

Figure 5-2. Light-vehicle mounted direct-fire procedure

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Chapter 6

UXO Response to the Battlefield

EOD units are responsible for identifying, rendering safe, recovering, evaluating, disposal, threat mitigation, and reporting (EOD and Intelligence) of unexploded US and foreign explosive ordnance. This includes chemical, biological, and radiological weapons which have been fired, dropped, or placed in such a manner so as to constitute a hazard to installations, personnel, materiel or operations. The mission of EOD is to eliminate or reduce hazards and to protect the commander's combat power.

CAPABILITIES

- Render Safe UXO hazards.
- Identify UXO hazards.
- Destroy UXO hazards.
- Move UXOs to Safe Holding or Disposal areas within the limitations of their organic transportation Assets.
- Perform Technical Intelligence on new or first seen ordnance items.
- Perform post-blast forensic analysis.
- Perform specialized demolition techniques and procedures.

SUPPORT REQUIREMENTS

- Security forces.
- Medical Support.
- Fire Fighting Support.
- Supported unit provides and builds protective measures.

OTHER SUPPORTING ORGANIZATIONS

- Combat Engineer Companies.
- Military Intelligence Company/Teams.
- Army Explosive Ordnance Clearance Agents (EOCA).

ARMY EXPLOSIVE ORDNANCE CLEARANCE AGENT (EOCA)

6-1. The design of the Army EOCA is to enhance the engineer's ability to assure mobility and provide maneuver units with a limited alternative capability to counter unexploded ordnance. Army EOCAs are combat engineers who have attended and graduated from the Army EOCA course. The "Army Explosive Ordnance Clearance Agent (EOCA) Identification Guide" provides more information on Army EOCA. To perform in an Army EOCA capacity, these Soldiers must pass the Army EOCA course at the Ordnance Munitions and Electronic Maintenance School (OMEMS), Redstone Arsenal, Alabama.

6-2. Army EOCA personnel are trained to perform limited battlefield disposal of UXOs as outlined in Army EOCA Identification Guide and JOA UXO supplemental list. If the UXO is out of the scope of operations for the Army EOCA, EOD Soldiers must respond. Army EOCA Soldiers can assist EOD Soldiers in disposing of other EH as requested. Properly trained and certified Army EOCA Soldiers capabilities include:

- UXO reconnaissance. Army EOCA personnel are trained to perform detailed reconnaissance of suspected UXO.

- UXO identification. Army EOCA can perform limited identification of items listed in EOCA Identification Guide and JOA UXO supplemental list. Items that the Army EOCA cannot positively identify must be reported to EOD personnel.
- UXO area marking. Army EOCA personnel mark UXO area in accordance with the standard UXO marking system.
- Protective works. Army EOCA can provide blast and fragmentation danger area of identified UXOs. Army EOCA may provide estimated blast and fragmentation danger area for items similar to but not included in Army EOCA Identification Guide and JOA UXO supplemental list. Army EOCA will advise the on scene commander on recommended personnel and equipment protection measures. When the commander determines that certain personnel or equipment can not be removed from the hazard area, protective works must be established to protect those personnel and assets from the effects of the UXO. Army EOCA will recommend and supervise the appropriate protective works to be completed.
- UXO Disposal. Army EOCA personnel are authorized to destroy by detonation individual UXOs identified in Army EOCA Identification Guide and JOA UXO supplemental list.

ARMY EOCA LIMITATIONS

- No reconnaissance or handling of IEDs or Large Vehicle Improvised Explosive Devices incidents.
- Can only perform CEA operations under the direct supervision of EOD personnel.
- Cannot move, combine, and/or destroy multiple UXOs.

6-3. Army EOCA Soldiers are not to be used for explosive hazard response calls.

6-4. The US Marine Corps does not have Explosive Ordnance Clearance Agent and relies on EOD to clear UXOs and IEDs, unless passing through an area containing UXO or IEDs is deemed a mobility requirement by the commander, in which case engineers will create a “breach” through the affected area much the same as they would breach through an explosive obstacle on the battlefield.

Emergency destruction of CEA that is 90mm and smaller is taught to Marine Corps engineer officers and NCOs at Marine Corps Engineer School. Positive identification of all ordnance items to be destroyed is required and a necessity must exist to justify the destruction of CEA by engineers; for example, in order to prevent ordnance from falling into enemy hands. Key portions of the course taught at Marine Corps Engineer School (MCES) pertaining to destruction of CEA are identification of ordnance items, calculating the net explosive weight of the CEA plus the charge used to destroy it, calculating the minimum safe distance needed to destroy CEA, and the use of a decision process when assessing a CEA situation.

As new counter-IED technologies become available, for example, the Buffalo and MARCbot robot, MCES plans to include the TTPs required for successful employment in its programs of instruction.

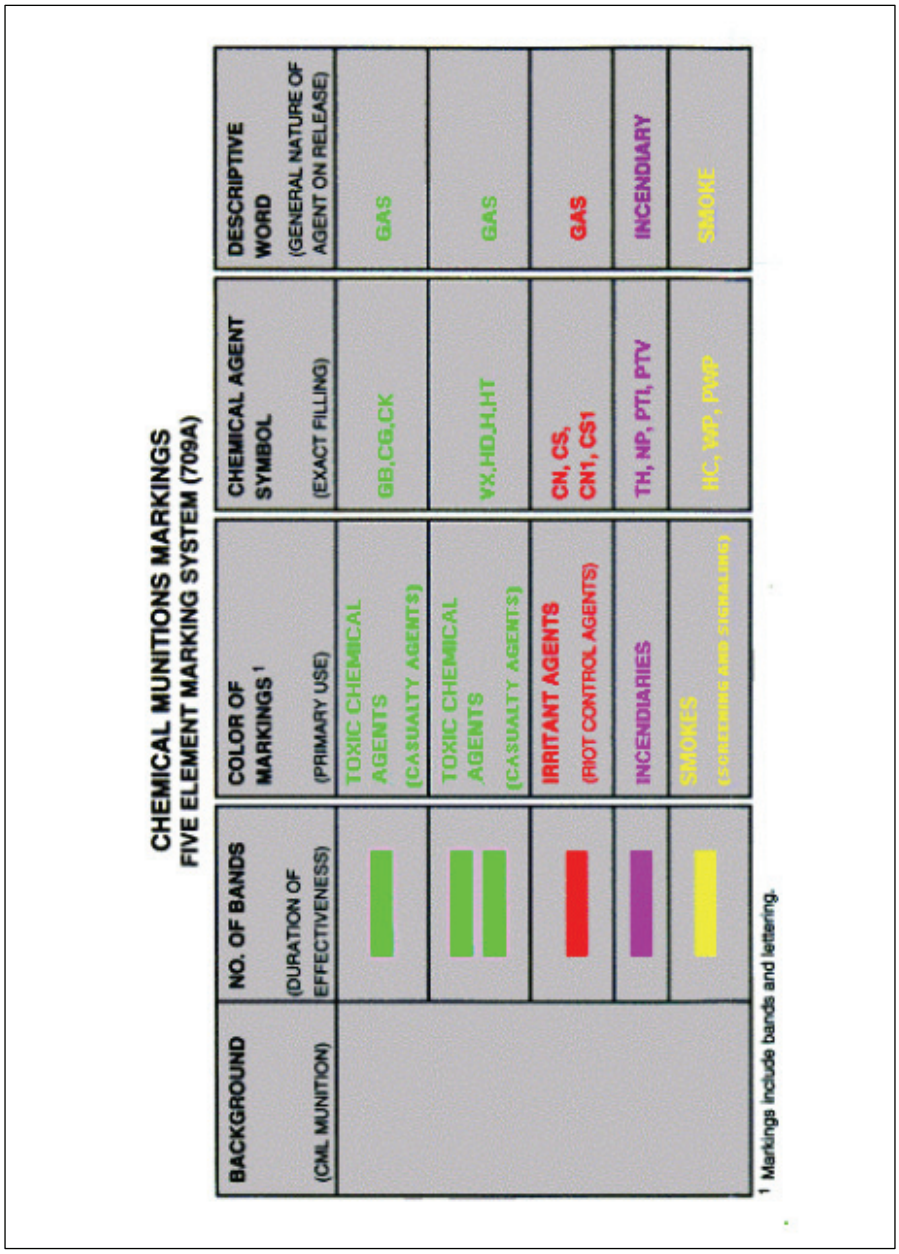
Appendix A

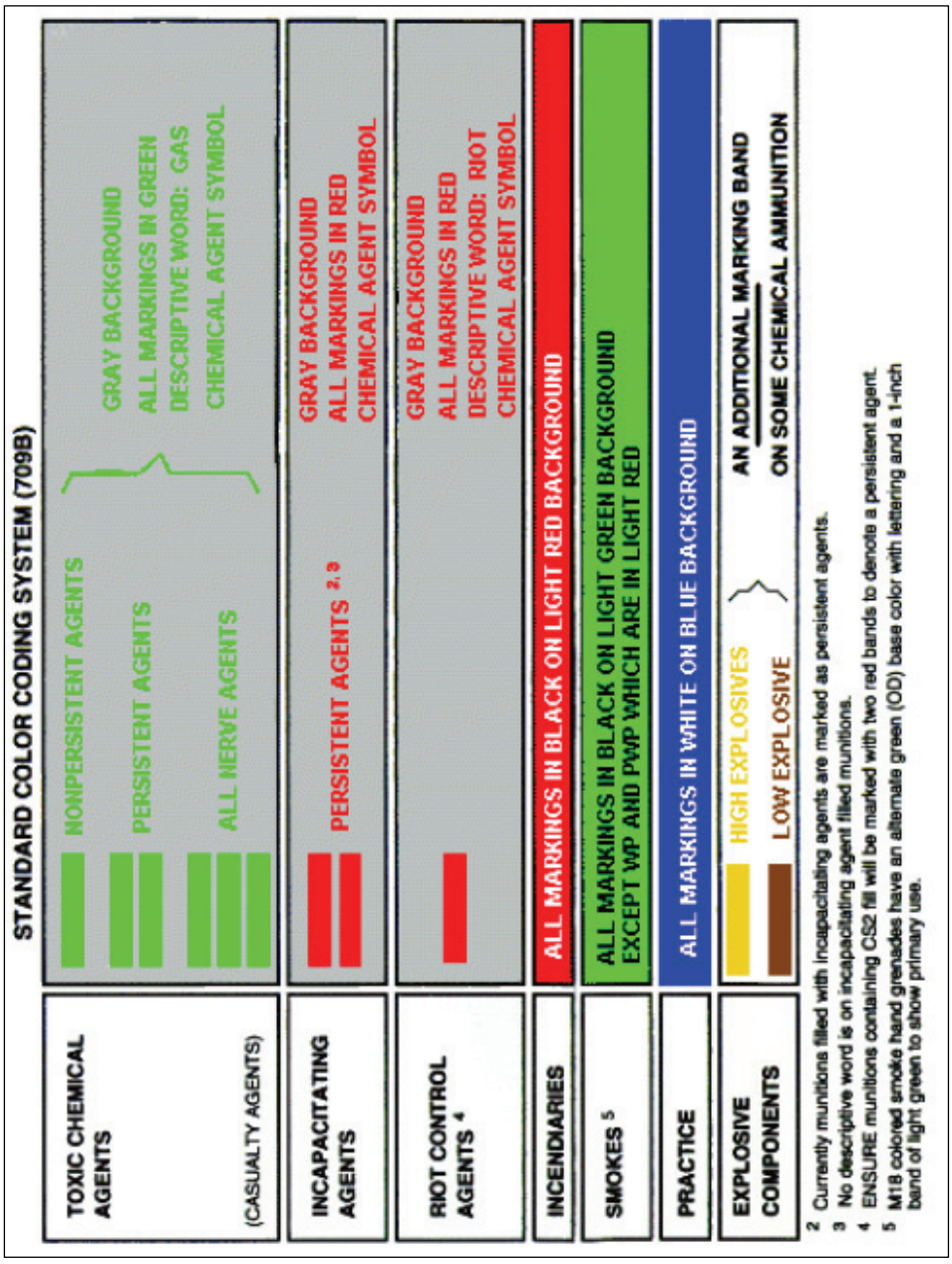
Ammunition Color Codes

The color codes and markings in this appendix are for informational purposes only. They are provided to help you identify the different types of UXO. Keep in mind that each country that manufactures munitions has devised its own color codes. Remember do not approach a UXO any closer than necessary to make an immediate identification. Remember also, that you are not responsible for determining UXO fillers.

The ammunition color codes in Tables A-1, A-2, and A-3 are used by the US and NATO. The ammunition color codes in Tables A-4 and A-5 are used by the former Soviet Union. The markings used on Soviet chemical munitions are in Table A-6.

Table A-1. US and NATO color codes




STANDARD COLOR CODING SYSTEM (709B)
TOXIC CHEMICAL AGENTS
(CASUALTY AGENTS)
NONPERSISTENT AGENTS
PERSISTENT AGENTS
ALL NERVE AGENTS
GRAY BACKGROUND
ALL MARKINGS IN GREEN
DESCRIPTIVE WORD: GAS
CHEMICAL AGENT SYMBOL
INCAPACITATING AGENTS
PERSISTENT AGENTS 2,3
GRAY BACKGROUND
ALL MARKINGS IN RED
CHEMICAL AGENT SYMBOL
RIOT CONTROL AGENTS 4
GRAY BACKGROUND
ALL MARKINGS IN RED
DESCRIPTIVE WORD: RIOT
CHEMICAL AGENT SYMBOL
INCENDIARIES
ALL MARKINGS IN BLACK ON LIGHT RED BACKGROUND
SMOKES 5
ALL MARKINGS IN BLACK ON LIGHT GREEN BACKGROUND
EXCEPT WP AND PWP WHICH ARE IN LIGHT RED
PRACTICE
ALL MARKINGS IN WHITE ON BLUE BACKGROUND
EXPLOSIVE COMPONENTS
HIGH EXPLOSIVES
LOW EXPLOSIVE
AN ADDITIONAL MARKING BAND
ON SOME CHEMICAL AMMUNITION
2 Currently munitions filled with incapacitating agents are marked as persistent agents.
3 No descriptive word is on incapacitating agent filled munitions.
4 ENSURE munitions containing CS2 fill will be marked with two red bands to denote a persistent agent.
5 M18 colored smoke hand grenades have an alternate green (OD) base color with lettering and a 1-inch band of light green to show primary use.

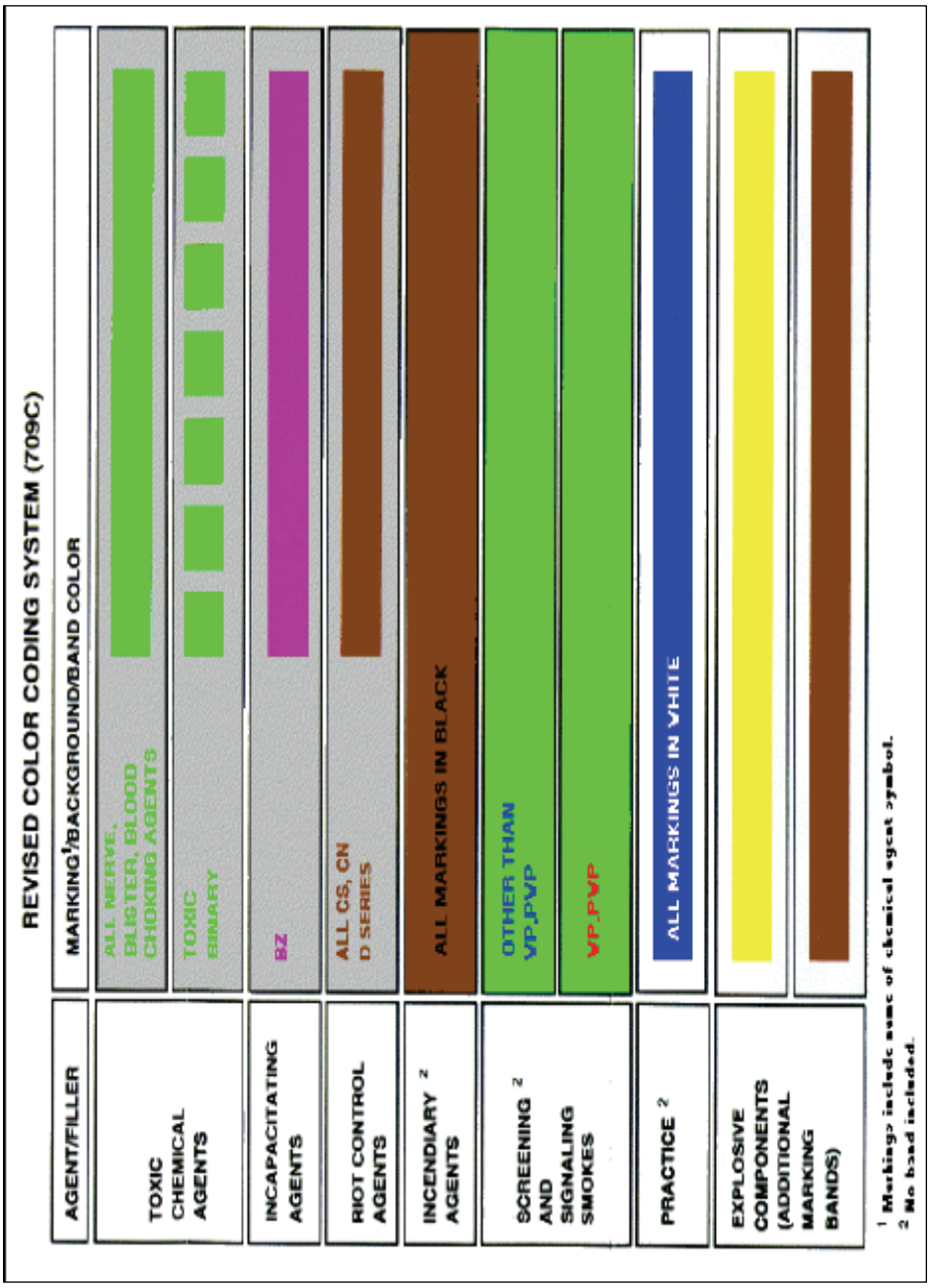

REVISED COLOR CODING SYSTEM (709C)
AGENT/FILLER
MARKING[1]/BACKGROUND/BAND COLOR
TOXIC CHEMICAL AGENTS
ALL NERVE, BLISTER, BLOOD CHOKING AGENTS
TOXIC BINARY
INCAPACITATING AGENTS
BZ
RIOT CONTROL AGENTS
ALL CS, CN D SERIES
INCENDIARY [2] AGENTS
ALL MARKINGS IN BLACK
SCREENING [2] AND SIGNALING SMOKES
OTHER THAN VP,PVP
VP,PVP
PRACTICE [2]
ALL MARKINGS IN WHITE
EXPLOSIVE COMPONENTS (ADDITIONAL MARKING BANDS)
[1] Markings include name of chemical agent symbol.
[2] No band included.

Table A-2. Former Soviet Union color codes for bombs

Nose Band	*Body Band*	*Type*
Green	Blue	Fragmentation
Green	Blue and Green	Fragmentation and Chemical
Orange		Semi-armor Piercing
Blue		Armor Piercing
Red	Blue Red	Incendiary Incendiary Dispenser
Red	Green	Persistent Chemical
Green	Green	Non-persistent Chemical
White	White	Parachute Flare
Blue	Black	Rocket Assisted
Red	White	Practice

Table A-3. Former Soviet Union color codes for projectiles

Color Codes (Bands)	*Type*
Red	Incendiary
Blue	Concrete Piercing
Black	Smoke
White	Illumination
Yellow	Ball Shrapnel
Khaki	Bar Shrapnel
One Green Band	Non-persistent Agent
Two Green Bands	Persistent Agent

Table A-4. Former Soviet Union markings for chemical munitions

Marking	*Chemical Filler*
P-4	White Phosphorus
P-5	Mustard Agent
PC	Lewisite Agent
P-10	Phosgene Agent
P-15	Adamsite (DM)
TP	Thermite

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Appendix B

Dropped Ordnance Identification and Net Explosive Weight (NEW)

BOMBS

Figure B-1. Bomb, general purpose, 2,000 pound
NEW: 1,000 pounds

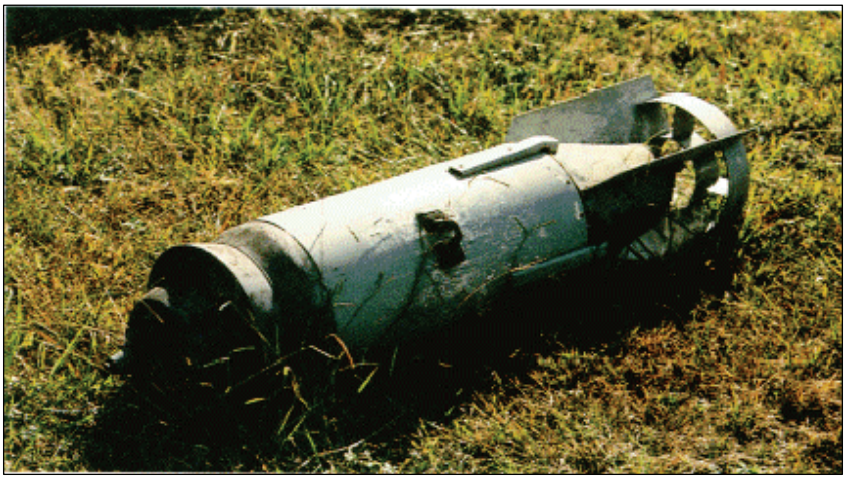
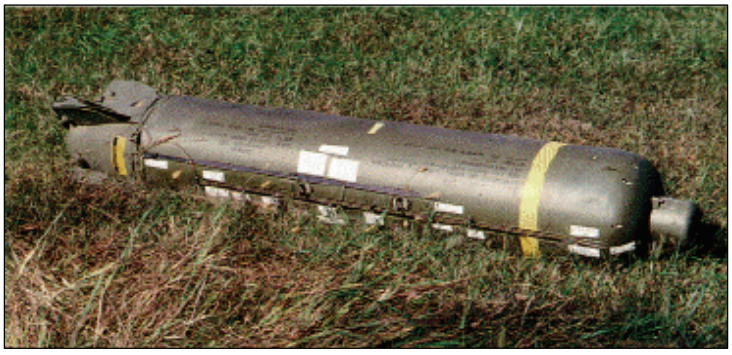


Figure B-2. Bomb, general purpose 500 kilogram
NEW: 550 pounds

Figure B-3. Bomb general purpose 250 pound
NEW: 125 pounds

Figure B-4. Bomb general purpose 100 kilogram
NEW: 110 pounds



NOTE: This dispenser is loaded with BLU-97/B submunitions. However, it can be loaded with a variety of submunitions.

Figure B-5. Submunition dispenser CBU-87/B
NEW: Not Applicable

Figure B-6. AP/AMAT submunitions
NEW: less than 0.5 pounds per item

Figure B-7. AP/AMAT submunitions (conventional)
NEW: less than 7 pounds per item

Figure B-8. AMAT/AT submunitions (conventional)
NEW: Less than 2 pounds per item

Figure B-9. Soviet style AMAT/AT submunitions (conventional)
NEW: less than 2 pounds per item

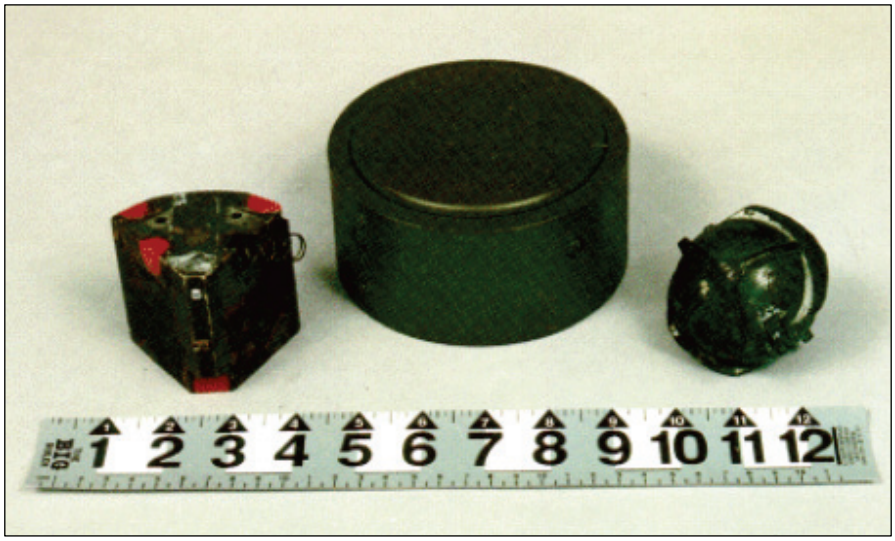


Figure B-10. Area denial submunitions: ADAM (left), RAAMS (middle) and BLU-54/B (right)
NEW: RAAMS 2 pounds, ADM and BLU-54/B less than 0.5 pounds

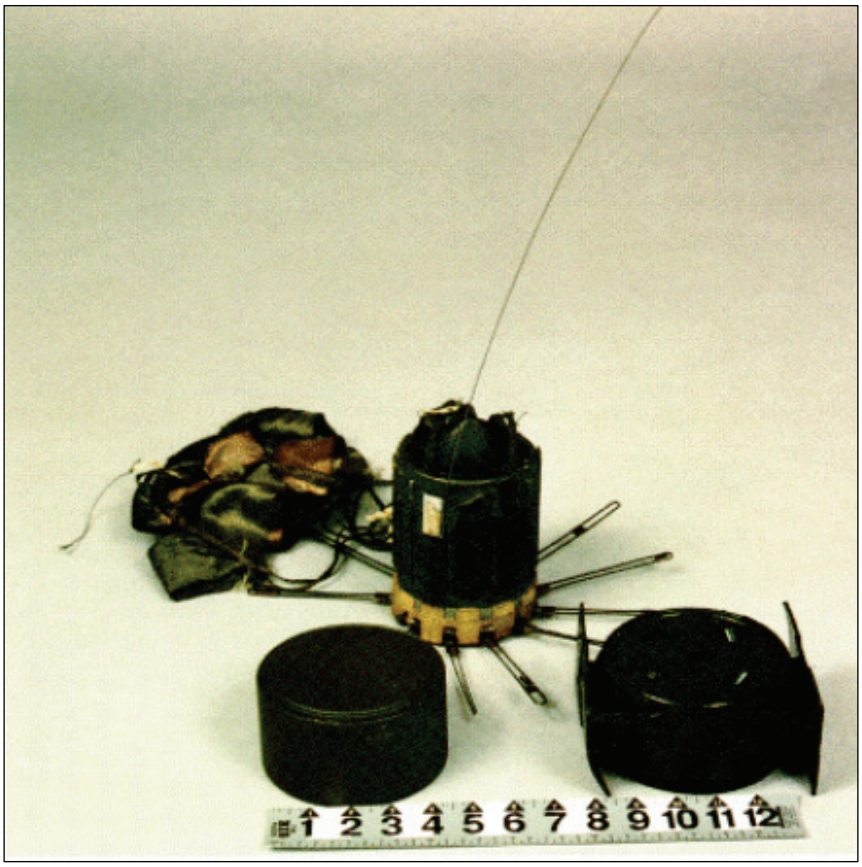


Figure B-11. Area denial submunitions: M74 (left, BLU-91/B "Gator" (right) and AT-2 (rear)
NEW: 2 pounds per item

Appendix C

Projected Ordnance Identification and Net Explosive Weight (NEW)

PROJECTILES

Figure C-1. Spin stabilized projectiles, 105 millimeter and smaller
NEW: less than 8 pounds per item

Figure C-2. Spin stabilized projectiles 130 millimeter
NEW: less than 20 pounds per item

Figure C-3. Spin stabilized projectiles 105 millimeter high explosive plastic (HEP) (top) and 100 millimeter armor piercing (AP) (bottom)
NEW: less than 15 pounds for the 105 millimeter projectile and 2 pounds for the 100 millimeter projectile

Figure C-4. Spin stabilized projectiles 180 millimeter (left) and 155 millimeter (right)
NEW: less than 20 pounds per item

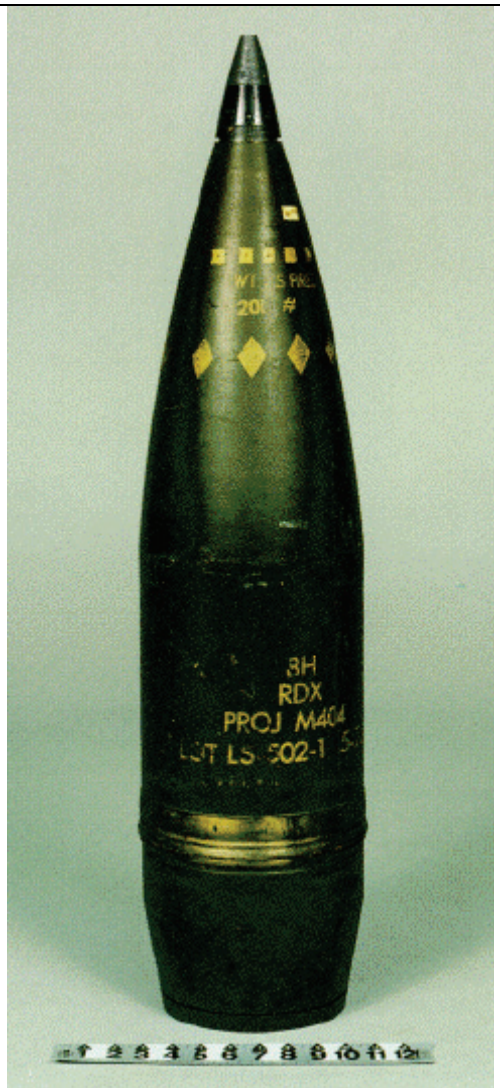


Figure C-5. Spin stabilized projectile 8 inch HE
NEW: less than 40 pounds

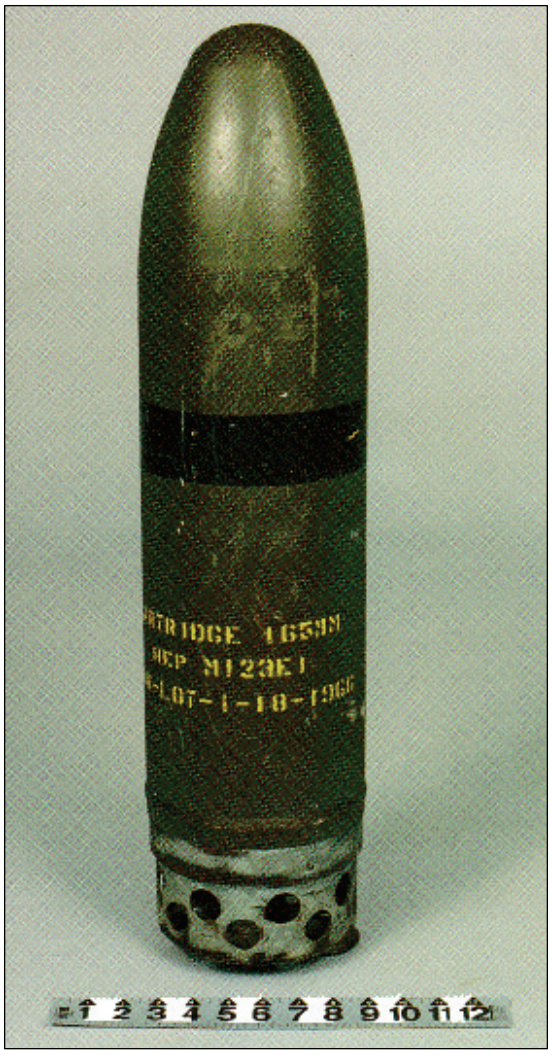


Figure C-6. Spin stabilized projectile 165 millimeter HEP
NEW: less than 35 pounds

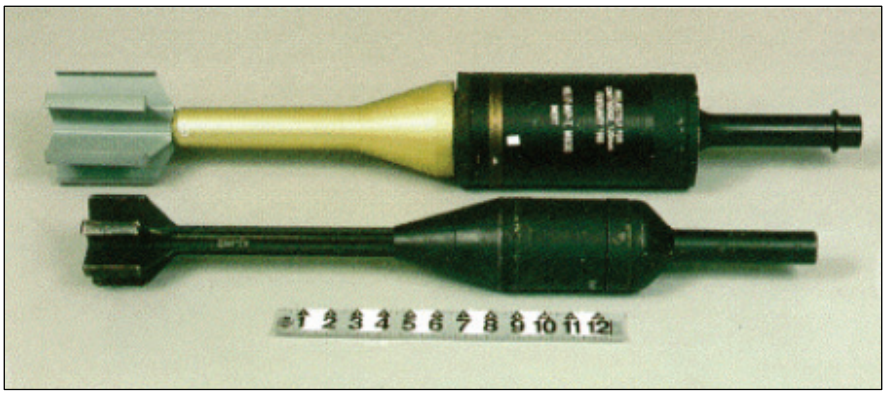


Figure C-7. Fin stabilized projectiles 90 millimeter (bottom) and 120 millimeter high explosive antitank (HEAT) (top)
NEW: less than 5 pounds per item

Figure C-8. Fin stabilized projectiles
NEW: less than 5 pounds per item

Figure C-9. Folding fin stabilized HEAT projectiles
NEW: less than 5 pounds per item

MORTARS

Figure C-10. Fin stabilized mortars 60 millimeter and below
NEW: less than 5 pounds per item

Figure C-11. Fin stabilized mortars 82 millimeter (top) and 100 millimeter recoilless rifle projectile (bottom)
NEW: less than 5 pounds per item

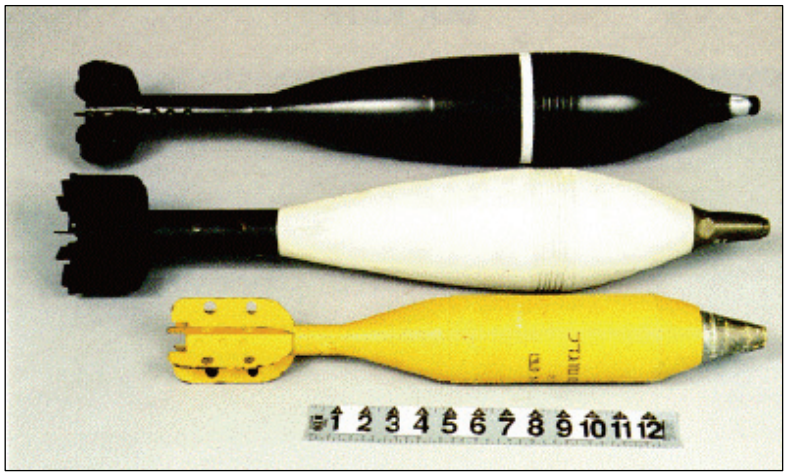


Figure C-12. Fin stabilized mortars 81 Millimeter and 120 millimeter
NEW: less than 5 pounds per item

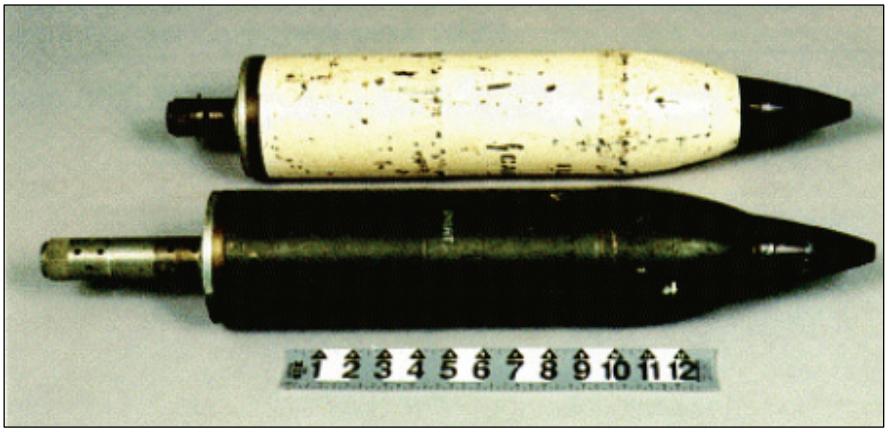


Figure C-13. Spin stabilized mortars 4.2 HE (bottom) and illumination (top)
NEW: less than 10 pounds per item

ROCKETS

Figure C-14. Spin stabilized rockets 128 millimeter (left) and 132 millimeter (right)
NEW: less than 10 pounds per item

Figure C-15. Fin stabilized HEAT rockets
NEW: less than 3 pounds per item

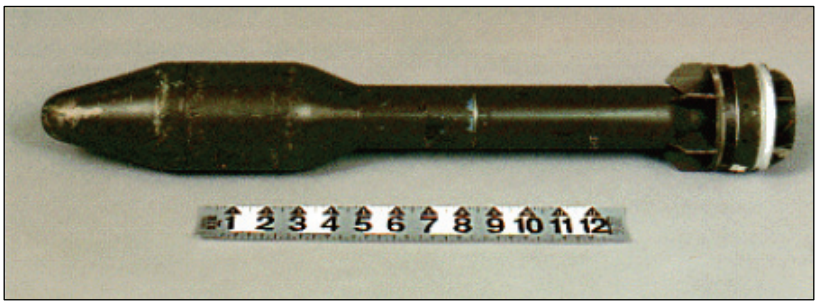


Figure C-16. Fin stabilized rocket 3.5 inch HEAT
NEW: less than 5 pounds per item

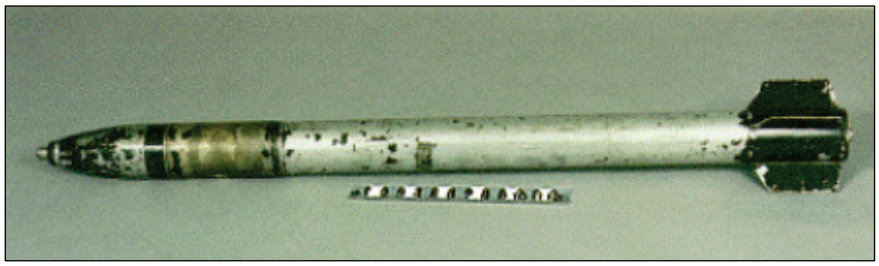


Figure C-17. Fin stabilized rocket
NEW: less than 10 pounds per item

Figure C-18. Fin stabilized rocket 2.75 inch
NEW: less than 10 pounds per item

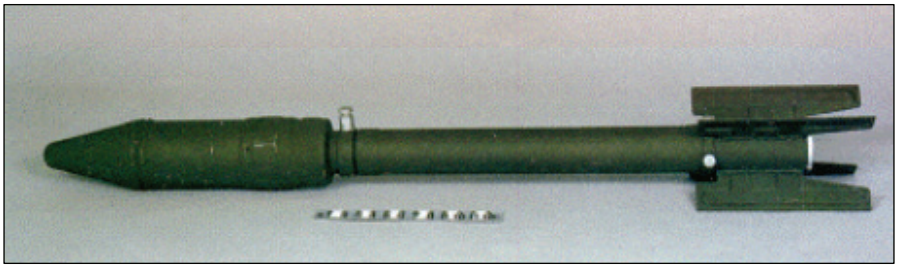


Figure C-19. Fin stabilized rocket 132 millimeter
NEW: less than 20 pounds per item

Figure C-20. Fin stabilized rocket 122 millimeter
NEW: less than 20 pounds per item

GUIDED MISSILES

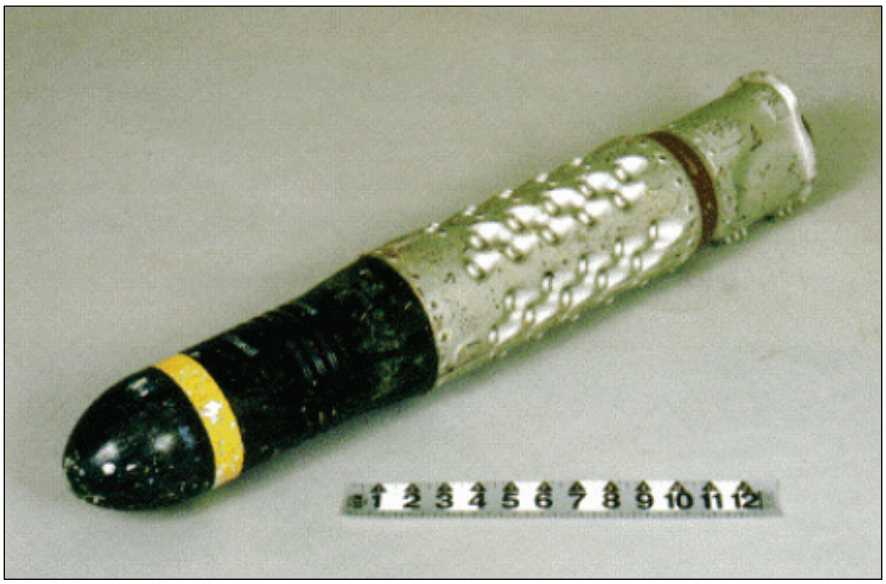


Figure C-21. Dragon guided missile
NEW: less than 10 pounds per item

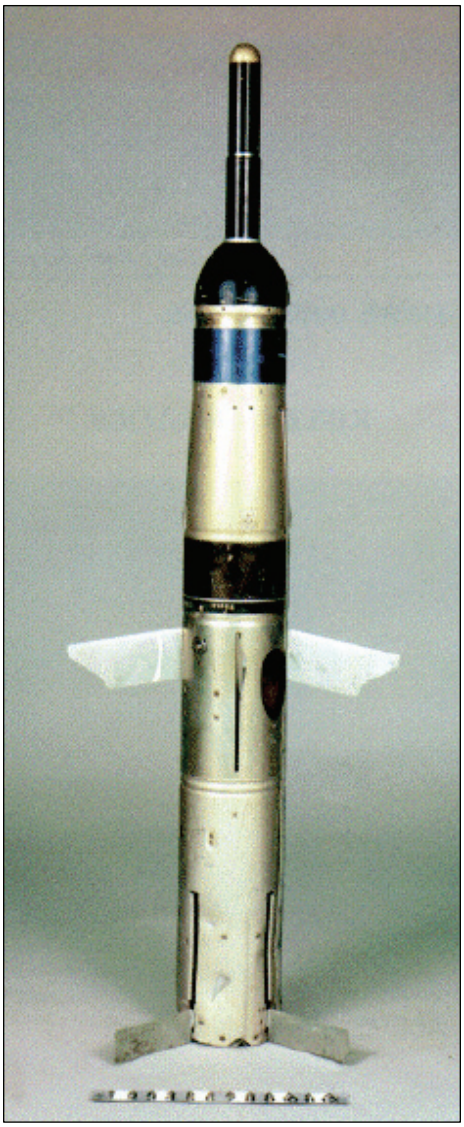


Figure C-22. TOW guided missile
NEW: less than 10 pounds per item

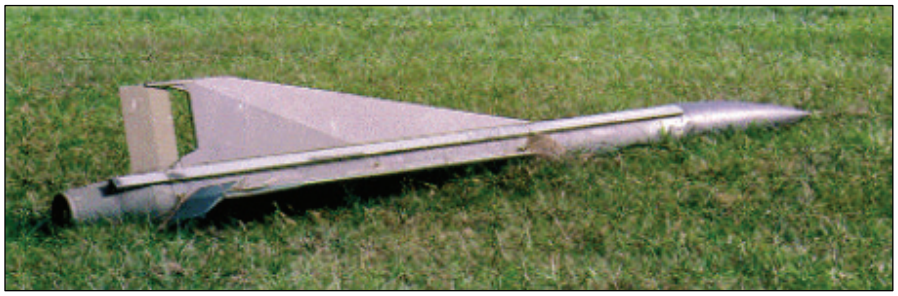


Figure C-23. HAWK guided missile
NEW: less than 40 pounds per item

RIFLE GRENADES

Figure C-24. AP rifle grenades
NEW: less than 1 pound per item

Figure C-25. HEAT rifle grenades
NEW: less than 3 pounds per item

Figure C-26. Former Soviet Union rifle grenades, RPG models HEAT
NEW: less than 5 pounds per item

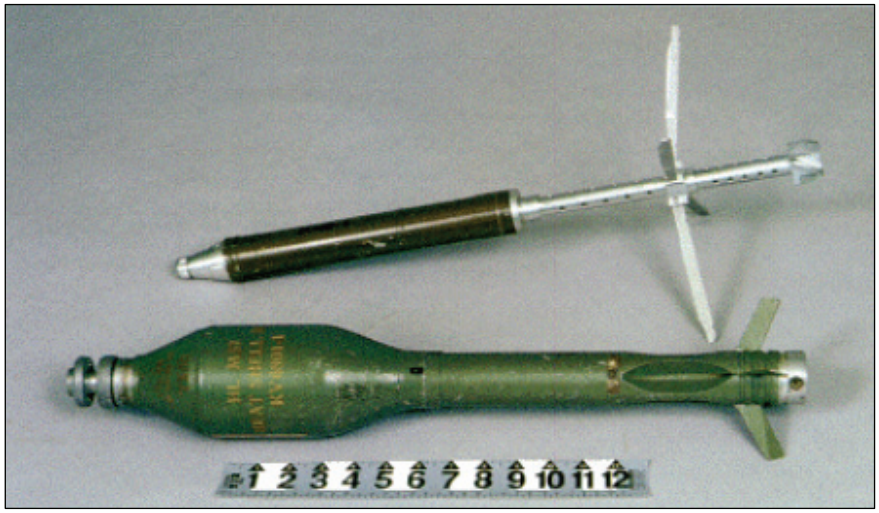


Figure C-27. Former Yugoslavia rifle grenades HEAT (bottom) and HE (top)
NEW: less than 5 pound

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Appendix D

Thrown Ordnance Identification and Net Explosive Weight (NEW)

FRAGMENTATION GRENADES

Figure D-1. Fragmentation grenades
NEW: less than 2 pounds per item

ANTITANK GRENADES

Figure D-2. HEAT grenades
NEW: less than 2 pounds per item

SMOKE GRENADES

NOTE: These grenades do not have a NEW concern, although bursting WP grenades have a 15-meter bursting radius.

Figure D-3. Smoke grenades burning type (left) and bursting type (middle and right)
NEW: Not applicable

Figure D-4. Riot control CS grenades
NEW: Not applicable

ILLUMINATION GRENADES

Figure D-5. Illumination grenade
NEW: Not applicable

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Appendix E

Placed Ordnance Identification and Net Explosive Weight (NEW)

ANTIPERSONNEL MINES

Figure E-1. AP land mines
NEW: less than 0.5 pound per item

Figure E-2. AP land mines
NEW: less than 2 pounds per item

ANTITANK MINES

Figure E-3. AT/anti-vehicular land mines
NEW: less than 15 pounds per item

Figure E-4. AT/anti-vehicular land mines
NEW: less than 20 pounds per item

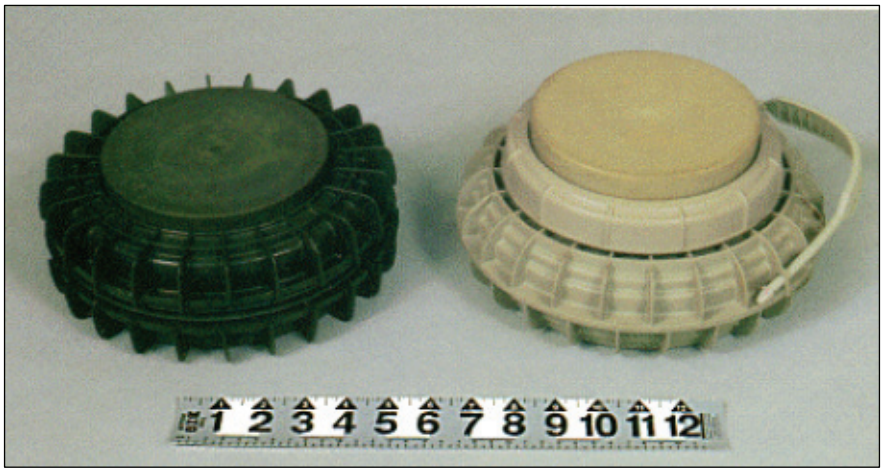

Figure E-5. AT/anti-vehicular land mines
NEW: less than 6 pounds per item

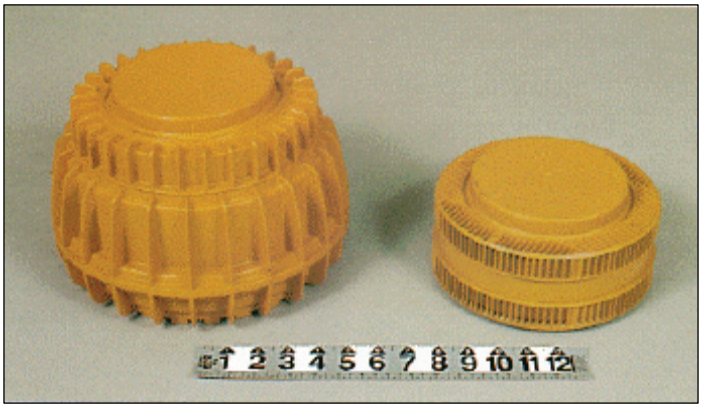

Figure E-6. AT/anti-vehicular land mines
NEW: less than 15 pounds per item

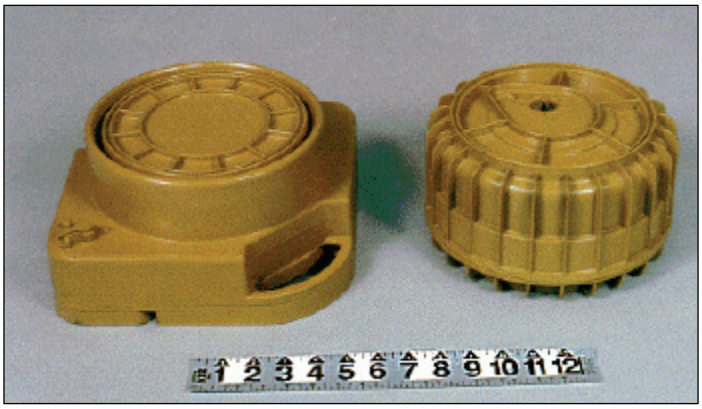

Figure E-7. AT/anti-vehicular land mines
NEW: less than 15 pounds per item

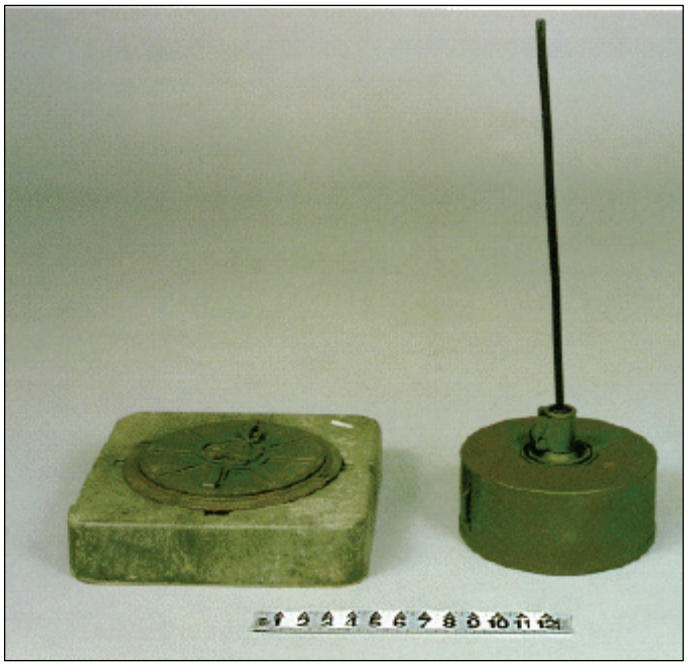

Figure E-8. AT/anti-vehicular land mines
NEW: less than 22 pounds per item

Glossary

Acronym/Term	Definition
AMAT	antimateriel
AP	armor piercing
AP	antipersonnel
APFSDS	armor-piercing fin-stabilized, discarding sabot
AT	antitank
BFA	battlefield functional area
CAM	chemical agent monitor
CBRNE	chemical, biological, radiological, nuclear, and high yield explosive
CEA	captured enemy ammunition
CS	combat support
CSS	combat service support
DOD	Department of Defense
DP	dual purpose
DU	depleted uranium
EH	explosive hazards
EMR	electromagnetic radiation
EOCA	explosive ordnance clearance agents
EOD	explosive ordnance disposal
EOR	explosive ordnance reconnaissance
FASCAM	family of scatterable mines
FM	field manual
FMFM	fleet marine force manual
GTA	graphic training aid
HE	high explosive
HEAT	high explosive antitank
HEP	high explosive plastic
HQ	headquarters
IED	improvised explosive devices
MAGTF	Marine Air ground task force
MCRP	Marine Corps
MCWP	Marine Corps warfighting publication
MEDEVAC	medical evacuation
METT-T	mission, enemy, terrain and weather, troops and support available—time available
MICLIC	mine clearing line charge
NATO	North Atlantic Treaty Organization

NEW	net explosive weight
OMEMS	Ordnance Munitions and Electronic Maintenance School
OPORD	operation order
PATRIOT	phased array tracking radar intercept on traget
RAAMS	remote antiarmor mine syatem
RPG	rocket propelled grenade
SMCT	Soldier's Manual of Common Tasks
SOI	signal operating instructions
SOP	standing operating procedures
STANAG	standardization agreement
STP	Soldier Training Publication
TASC	Training Aids Support Center
TOW	tube-launched optically-tracked wire-guided
TRADOC	Training and Doctrine Command
US	United States
UIC	unit identification code
UXO	unexploded ordnance
WP	white phosphorus

References

SOURCES USED

These are the sources quoted or paraphrased in this publication.

JOINT PUBLICATIONS

CJCSM 3500.04C, *Universal Joint Task List (UJTL)*. 1 Jul 2002

JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 Apr 2001

ARMY PUBLICATIONS

AR 75-15, *Responsibilities and Procedures for Explosive Ordnance Disposal*, 22 Feb 2005

FM 1-02, *Operational Terms and Graphics*, 21 Sep 2004

FM 3-0, *Operations*, 14 Jun 2001

FMI 3-07.22, *Counterinsurgency Operations*, Aug 2004

FM 3-34, *Engineer Operations*, 2 Jan 2004

FM 4-0, *Combat Service Support*, 29 Aug 2003

FM 5-0, *Army Planning and Orders Production*, 20 Jan 2005

FM 5-34, *Engineer Field Data*, 30 Aug 1999

FM 9-15, *Explosive Ordnance Disposal Service and Unit Operations*, 20 Mar 1989

FM 20-32, *Mine/Counter Mine Operations*, 1 April 2005

FM 34-130, *Intelligence Preparation of the Battlefield*, 8 Jul 1994

FM 90-13-1, *Combined Arms Breaching Techniques*, 28 Feb 1991

GTS 9-12-1, *Unexploded Ordnance Procedures*

Instructional Video No. 710288 "*The UXO Hazard*"

Safety Video No. 709919 "*Danger UXO*"

STP 21-1-SMCT, *Soldier's Manual of Common Tasks, Skill Level 1*, 11 Oct 2005

STP 21-I-MQS, *Military Qualification Standards I Manual of Common Tasks (Recommissioning Requirements)*, 31 May 1990.

STP 21-II-MQS, *Military Qualification Standards II Manual of Common Tasks (for Lieutenants and Captains)*, 31 January 1991.

MARINE PUBLICATIONS

FMFM 13-8, *MAGTF Explosive Ordnance Disposal*, 20 Dec 1993.

FMFRP 13-5, *Engineer Field Data*, 30 Aug 1999.

MCWP 3-17.3, *MAGTF Breaching Operations,* 13 June 1994.

DOCUMENTS NEEDED - NONE

READINGS RECOMMENDED – NONE

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Index

W

FM 4-30.51 (FM 21-16)

MCRP 3-17.2A
13 July 2006

By Order of the Secretary of the Army:

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

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
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