1.0. General.

By definition, emergency destruction is "the act of destroying the offensive/defensive characteristics inherent in certain types of explosives and munitions. The term comprehends the mutilation, scrapping, burning, or alteration of its design so as to prevent the further use of the explosives or munitions for its original intended military lethal purpose."

In order to comply with NATO standards, the US military forces changed over to the metric system of sizing its military weapons. This change not only allowed interchangeability of munitions between the US units and its allies, but also made all of the explosives and munitions in the military stockpile interchangeable with the former Soviet Bloc countries and all the countries they supplied military hardware to. Because of this interchangeability, it is now more important than ever that individual soldiers understand the principles of emergency destruction and senior NCOs must be able to plan for it. Munitions can fall into the hands of the enemy due to fast moving operations not allowing sufficient time for all munitions to be moved; lack of transportation assets can also mandate the abandonment of munitions. When munitions must be left behind, we must be able to leave it in such a manner or condition that will prevent its use by the enemy.

As NCOs in tactical situations, you may need to destroy all the munitions and explosives stored in your Ammunition Storage Area (ASA), Corps Storage Area (CSA), or Theater Storage Area (TSA), because it is in imminent danger of being captured by the enemy. To prepare you for this possibility, this lesson will show you how to prepare an emergency destruction plan to destroy your ammunition facility to prevent it from falling into enemy hands. The lesson will discuss:

- The required safety precautions observed during an emergency destruction operation.
- The forms, records, and publications that identify the munitions/explosives stored to be destroyed or used in the destruction of other munitions.
- The priorities of emergency destruction.
- The methods, explosives, and disposal types used to destroy munitions/explosives.
- The firing systems used for emergency destruction procedures.
- The requirements necessary to write an emergency destruction SOP.
- The team composition, tools, and equipment used for emergency destruction procedures.

1.1. Authorization for Emergency Destruction.

The authority to emergency destroy a munitions storage facility is a command decision. Divisional or higher commanders can delegate this authority. Orders for destruction of the facility are based on the following:

- Command policy.
- Tactical situation.
- Location of material.
- Quantity in each location.
- Material/personnel available to conduct the operation.
- Time available to conduct the operation.

1.2. Safety in Emergency Destruction Planning.

Observance of safety precautions is mandatory, regardless of the urgency of the situation. Safety is always the first consideration when undertaking the planning or conduct of any destruction operation. The following safety factors must be considered in emergency destruction planning:

- Ensuring that published procedures are followed.
- Using only trained/experiences personnel for emergency destruction.
- Using only correct demolition procedures.
- Planning for the number of personnel to be utilized by keeping the number to a minimum but no fewer than two.
- Determining the danger radius based on munitions/explosives to be destroyed—no less than 1,000 meter radius with personnel undercover and warned.
- Plan for notifying adjacent units.
- Plan for correct destruction procedures. For example:
    - When destroying pyrotechnics, face the opposite direction.
    - When destroying riot control agents, carry the protective mask.
    - Use extreme caution when handling gasoline and highly volatile solvents.
    - Always stand by for a high order detonation when burning munitions explosives.

2.0. Degrees of Destruction.

During the establishment of a munitions storage facility such as a Depot, CSA, or ASA, etc., an Emergency Destruction Plan must be formulated. The Emergency Destruction Plan will provide guidance for the destruction of all assets stored in the facility if and when destruction is warranted.

Emergency Destruction (ED) of munitions/explosives is the process of destroying it or rendering it inoperative to the maximum degree possible, when it is in imminent danger of capture by the enemy. Munitions should be rendered useless to the enemy by:

- Completely destroying explosive and non-explosive demolition materials in a combat zone.

- Damage essential components of sets and kits to prevent complete assembly by cannibalizing from undamaged components. For example:

    - Damaged so it cannot function normally.
    - Damaged so it cannot be used for its intended purposes.
    - Modified so it cannot be restored to its original condition.

In a combat emergency situation, munitions are usually destroyed in place. However, if time permits, consideration should be given to:

- Direction of prevailing winds.
- Use and availability of barricades.
- Possibility of obstructing enemy movement.
- Reducing stock on some storage sites.
- Force issue.

3.0. Identify the Types and Quantities of Munitions/Explosives for Destruction.

A primary consideration in planning emergency destruction operations is to determine the type and quantities of munitions that may have to be destroyed. There are several tools available to assist in making those determinations. By reviewing the following records, you will know the quantities and types of munitions that you may be required to destroy:

- Review Stock Accounting Records, DA Form 5203 and DA Form 5204, to determine the types and quantities of munitions/explosives and components on hand.

- Review DA Form 3260, Planograph(s), to determine the exact location of the items.

- Consult with the surveillance section to review their records, DA Form 3022-R and DD Form 1650, to determine what munitions they have and their location.

- Review supply catalogs, Section IV, and the Army Master Data File (AMDF) to determine the type and quantity of net explosive weight (NEW) per item.

After completing your records review, you can then plan on the type of disposal method to use and the quantity of explosives that will be required for the destruction operation.

4.0. Destruction Priorities.

The next step in the planning process is to determine destruction priorities. Munitions/explosives are divided into four priorities for destruction.

- **Priority 1.** Classified munitions and associated documents. Office files and publications (classified or unclassified) are not included in this category. They are the responsibility of the personnel who maintain/work with them.

- **Priority 2.** Munitions/explosives that could be used in retaliation and munitions for which the enemy has weapons capability. These include:

    - Rockets and guided missiles.
    - Grenades, land mines, and bulk chemicals.
    - 81mm mortars and some specific small arms munitions.
    - Demolition charges/material and accessories (Field Storage Category E). Shaped charges, demolition blocks, and detonating cord are included in this category.

- **Priority 3.** Casualty-producing munitions not included in Priorities 1 and 2. These include:

    - High explosive items.
    - Antipersonnel type, etc.

- **Priority 4.** Non-casualty and pyrotechnic munitions. These include:

    - Riot control agents.
    - Flares.
    - Illuminating projectiles, etc.

Bulk fuel should not be destroyed until the last minute because you may need it.

5.0. Methods of Destruction.

Burning and detonating, in that order, are considered the most satisfactory methods for destroying munitions to prevent enemy use. Destruction can be accomplished using either method or a combination of both. This section will focus primarily on burning or detonation, but will offer several other expedient methods that could be employed during an emergency situation. It will include information on the actual destruction to better assist you in your planning process.

5.1. Burning.

Destroy packed and unpacked high-explosive items by burning. These explosives included linear demolition charges, shaped demolition charges, block demolition charges, stick dynamite, detonating cord, firing devices, timed blasting fuse, and similar methods. Do not attempt to destroy blasting caps by burning them since they will detonate from extreme heat. Separate them from other explosives and destroy them by detonation. Personnel should not attempt to extinguish burning explosives without expert advice and assistance. Use the following procedure for burning explosives:

- Place blasting caps in piles separate from explosives and destroy by detonation. Ensure blasting caps are stored far enough away from the other explosives being burned to prevent the burning explosives from detonating the blasting caps or vice versa.

- Stack explosives in a pile over a layer of combustible material. Piles should not exceed 2,000 pounds or be more than 3 inches thick.

- Ignite the pile with a combustible train (excelsior or slow-burning propellant) of suitable length, and take cover immediately. See Table 1 for calculating the safe distance from the pile. This distance is never less than 300 meters.

You should consider the following when planning for emergency destruction by burning.

- Burning is less time-consuming than detonation.

- There is a possibility of kick-outs (scattering of unburned munitions).

- Burning will not totally destroy all munitions.

- It can be used on stacked/boxed munitions.

- ICM/Flechette rounds should have HE/Fuel placed around them.

- Surround each stack with flammable material such as, scrap wood, empty boxes, brush, propelling charges (out of containers).

- Pour fuel over each pile, ignite with 8 meter ignition train.
- Point rockets toward enemy.

Table 1. Safe Distances for Personnel (near bare charges)

Explosive Weight (Pounds)	Safe Distance Feet	Safe Distance Meters	Explosive Weight (Pounds)	Safe Distance Feet	Safe Distance Meters
27 or less	985	300	175	1,838	560
30	1,021	311	200	1,920	585
35	1,073	327	225	1,999	609
40	1,123	342	250	2,067	630
45	1,168	356	275	2,136	651
50	1,211	369	300	2,199	670
60	1,287	392	325	2,258	688
70	1,355	413	350	2,313	705
80	1,415	431	375	2,369	722
90	1,474	449	400	2,418	737
100	1,526	465	425	2,461	750
125	1,641	500	500	2,625	800
150	1,752	534			

The following types of items should be destroyed by burning:

- Small arms munitions (best method).
- Rocket motors (with warhead facing toward enemy).
- Propelling charges.
- Pyrotechnics.
- Black powder.

5.2. Detonation.

The tactical situation, the commander's intent, the lack of time, the type of explosive, or the safety considerations may require an explosive to be detonated instead of burned. Use the following procedures for detonating explosives.

- Establish a safety zone for missile and blast effect by computing the safe distance required for the amount of explosives to be detonated. Use Table 1 for determining safe distances.
- Do not exceed the limitations of the disposal site. Instead of detonating one large pile of explosives, it may be necessary to make several smaller piles of explosives and stagger their detonating times.
- Use a minimum of two initiation systems to detonate a pile of explosives.

- Prime explosives every 4 to 5 feet when placing explosives in long rows or lines.

- Ensure positive contact between primed charges and other explosives in the pile or row.

The following factors should also be considered when planning for emergency destruction by detonation:

- Detonation is more time consuming than burning.
- It does not scatter munitions if the charge is properly placed.
- It can be used on stacked/boxed munitions.
- It is especially effective for ICM/Flechette rounds.

The following items should be destroyed by detonation:

- Bombs.
- Projectiles (ICMs).
- Rockets.
- Grenades.
- Land mines.
- Guided missiles.

Some items may be destroyed using either method. They include:

- Dynamite.
- Black powder.
- Fuzes.
- Boosters.
- Detonators.

5.3. Gunfire.

Gunfire can be used to render munitions inoperative or destroyed by firing artillery, tank guns, or rockets into it. Personnel cover must be maintained.

5.4. Firing.

Firing munitions into enemy territory is the easiest way to prevent it from falling into their hands.

5.5. Concealment/Scattering.

Concealment/scattering is especially suited for smaller items, e.g., fuzes, firing devices, detonators, etc. Throw small items into tall grass, streams, lakes, etc. If time permits, puncture/tear sealed containers first.

The effectiveness of the destruction depends on the following factors:

- Prior planning/preparation.
- Training/rehearsals.
- Demolition materials available.
- Approved SOP.

6.0. Materials Used by Destroying Detonation.

To effectively plan emergency destruction by detonation you must know what standard and substitute demolition material can be used. Demolition blocks of TNT, tetrytol, or Composition C-2, C-3, or C-4 are set off by a time blasting fuse (safety fuse) and a nonelectric blasting cap or by a blasting machine firing wire, and an electric blasting cap. In no case will an improvised firing device be used for this purpose. Refer to Table 2 for standard US demolition charges.

Table 2. Standard US Demolition Charges

Explosive	Unit (Pounds)	Detonation Velocity		RE Factor	Weight (Metric) (kilograms)
		M/Sec	Ft/Sec		
TNT	0.25	6,900	22600	1.00	0.113
TNT	0.50	6,900	22600	1.00	0.227
TNT	1.00	6,900	22600	1.00	0.454
M2 Tetrytol	2.50	7,000	22900	1.20	1.134
M3 Comp C2 or C3	2.25	7,625	25000	1.34	1.021
M5A1 Comp C4	2.50	8,040	26400	1.34	1.134
M112 Block (C4)	1.25	8,040	26400	1.34	0.567
M118 Block (PETN)	2.00	7,040	23600	1.14	0.907
M118 Sheet (PETN)	0.25	7,040	23600	1.14	0.113
M186 Roll (PETN)	25.00	7,040	23600	1.14	11.34
Ammonium Nitrate	43.00	3,400	11000	0.42	18.14
MI Dynamite	0.50	6,100	20000	0.92	0.227
M2A4 Shaped Charge	15.00	NA	NA	NA	6.80
M3A1 Shaped Charge	40.00	NA	NA	NA	18.14
M183 Assembly	NA	NA	NA	1.34	9.07

6.1. Substitute Demolition Material.

Substitute demolition material can be used when supplies of standard demolition materials are not available or when they are running low. When using land mines, aerial bombs, shells, or foreign explosives as demolition charges, take the appropriate precautions. The use of such explosives is usually uneconomical but may occasionally become necessary or desirable. Obtain such materials from captured or friendly supply stocks or, in the case of land mines, those recovered from enemy or friendly minefields. Never use unexploded duds (shells or bombs) for demolition purposes. When necessary, use Allied nation or captured explosives to supplement or replace standard explosive charges. Refer to Supplemental Reading (Extract from FM 5-250) for complete details.

7.0. Firing Systems.

In planning emergency destruction, you must also fully understand what firing systems are used in the process. This section will focus on the two major types of firing systems used in emergency destruction of munitions: single and dual. This section will provide a brief overview of each system.

7.1. Single.

Figure 1 shows a single-firing system. Each charge is singly primed with a branch line. The branch line is tied to the line main or ring main. (Tying to the ring main is preferred, but construction of a ring main may not be possible because of the amount of detonating cord. The ring main decreases the chances of a misfire should a break or cut occur anywhere within the ring main.) The electric, nonelectric, or combination initiation systems are then taped onto the firing system. When using a combination initiation system, the electric initiation system is always the primary means of initiation. When using dual, nonelectric initiation systems, the shorter time fuse is the primary initiation system (See Figure 2).

Figure 1. Single-Firing System (single-initiated, singled-fired, single-primed)

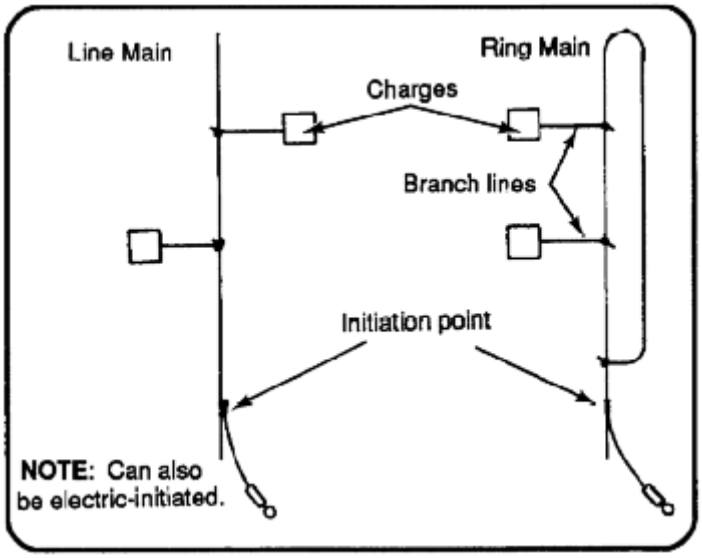
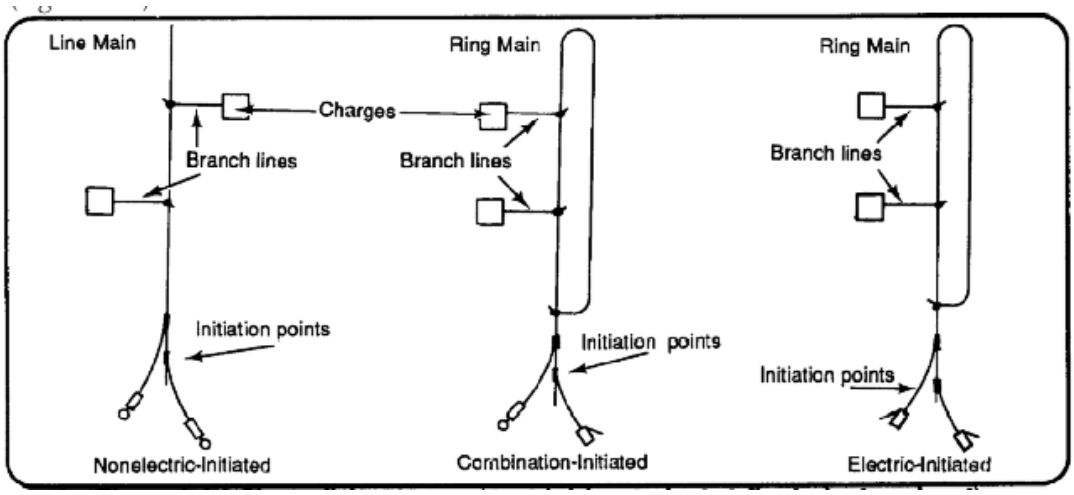


Figure 2. Single-Firing System (dual-initiated, singled-fired, single-primed)



7.2. Dual.

Figure 3 shows a dual-firing system. Each charge is dual-primed with two branch lines. One branch line is tied to one firing system and the other branch line is tied to an independent firing system, as shown in figure 4. Line mains or ring mains may be used; however, they should not be mixed. To help prevent misfires, use detonating-cord crossovers. Crossovers are used to tie both firing systems together at the ends. The initiation systems are taped in with the primary initiation system going to one firing system, and the secondary going to the other firing system.

Figure 3. Dual-Firing System (dual-installed, dual-fired, dual-primed)

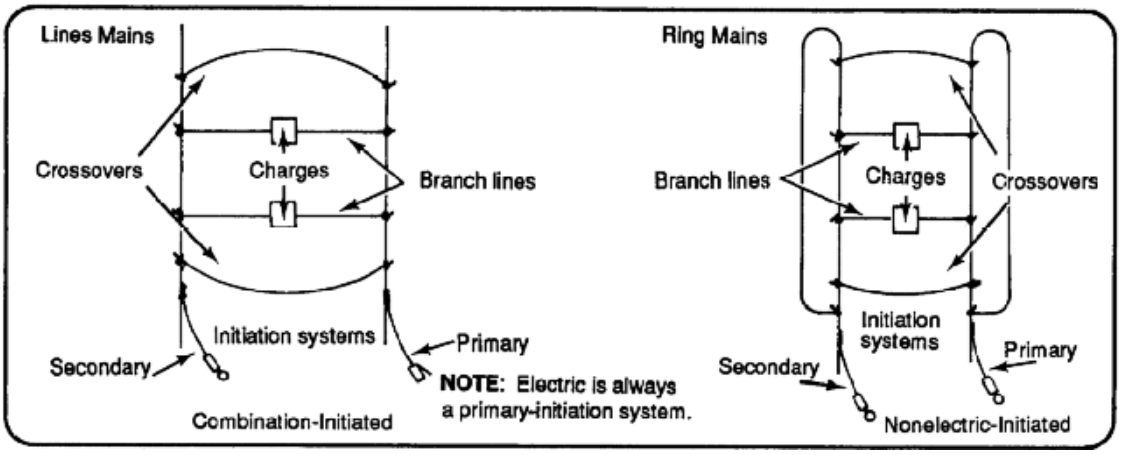
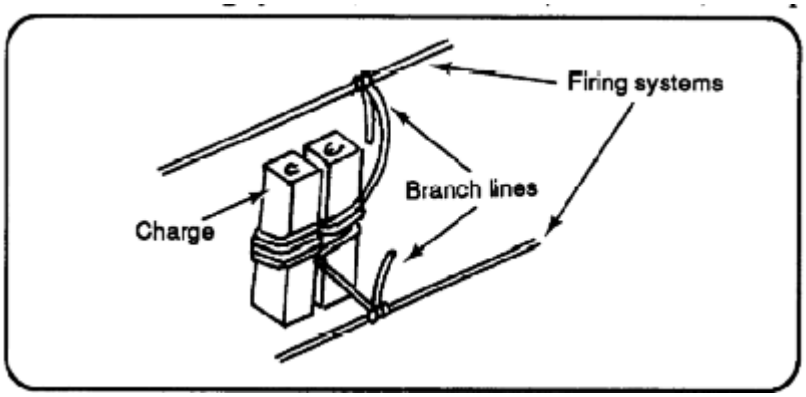


Figure 4. Dual-Primed Charge



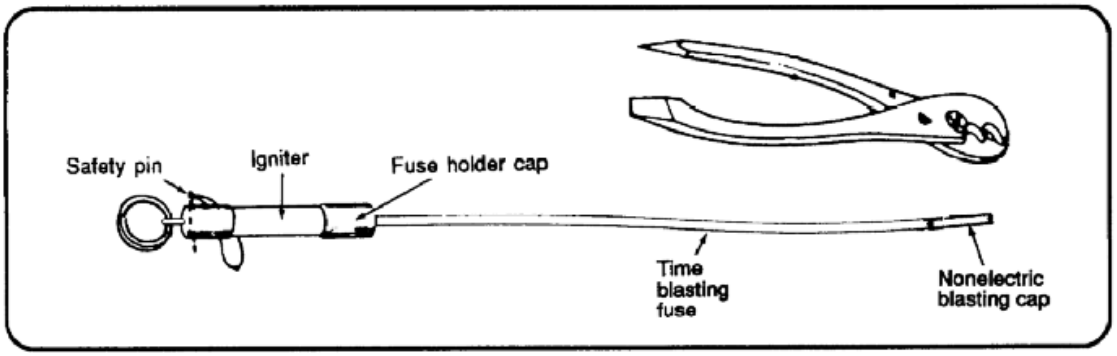
8.0. Nonelectric Initiation Sets.

A nonelectric system uses a nonelectric blasting cap as the initiator. The initiation set consists of:

- Fuse igniter, producing flame that lights the time fuse
- Time blasting fuse, transmitting the flame that fires the blasting cap
- Nonelectric blasting cap, providing shock adequate to detonate the explosive (Figure 5).

When combined with detonating cord, a single initiation set can fire multiple charges. Dual priming should be used, which is two blasting caps in the same charge. In addition, dual firing systems should be used, which is two independent firing systems.

Figure 5. Nonelectric Initiation Set



9.0. Combination Dual Firing Systems.

This system consists of one electric and one nonelectric system that will fire the same charge. They are independent of each other. Function the nonelectric system first.

10.0. Detonation Cord Systems.

Detonation cord can be used with electric and nonelectric firing systems. It is the relay element between the initiator and the main explosive charge and used to destroy multiple shots simultaneously.

Regardless of the detonation system used, the procedures and techniques employed in a combat situation can also be utilized for permanent sites. However, it will take more time since you will have to open igloo doors and work with increased tonnages.

11.0. Destruction Plan SOP Requirements.

One of the most important steps in planning emergency destruction of munitions is to develop a viable SOP. It is generally prepared by the ammunition officer, ammunition warrant officer, and/or by the ammunition NCO. Format is determined by the local command. At a minimum each of the following areas must be included in the SOP:

- Safety Requirements.
- Priority of Material Destroyed.
- Equipment/Material/Explosives.
- Methods/Procedures Used.
- Transportation Requirements.
- Communications.
- Protective Clothing/Equipment Requirements.
- Decontamination Requirements.
- Evacuation Routes.
- Assembly Points. (Within sight of the destruction officer)
  - Teams complete missions.
  - Head count.
- Training Requirements.
  - EOD units.
  - Demolition teams.
- Assign Missions.
  - In writing.
  - By name.
- Recall procedures.
- Authorization.
  - Division Commander (or higher).
  - Delegation of authority.
- Approval. SOPs should be approved by:
  - Battalion Commander.
  - Company Commander.
  - EOD (if available).
  - The SOP should be developed immediately after establishing the facility.

- Team members should be afforded the opportunity to study the SOP and make suggestions to improve it.

As a senior NCO, you will want to ensure the SOP contains all required details to successfully carry out any emergency destruction operations.

12.0. Personnel and Equipment Requirements.

Another major planning process is determining personnel requirements. An emergency destruction team is divided into 5 smaller teams. Each team is then assigned specific duties. Team members should be selected based on experience. The following section reflects the team structure and responsibilities.

- **Ring Main Team(s).** Ring Main Team(s) place the detonating cord (main line/ring main). They should use dual systems if time and materials permit.

  Equipment Requirements:

  - Detonating Cord w/M1 Clips.
  - Electrician's Tape.
  - M2 Crimpers.
  - Radio.
  - Flashlight.
  - Vehicle.

- **Branch Line Team(s).** Branch Line Teams place branch lines and fasten them into the main line.

  Equipment Requirements:

  - Detonating Cord w/M1 Clips.
  - Electrician's Tape.
  - M2 Crimpers.
  - Radio.
  - Flashlight.
  - Vehicle.

- **Charge Team(s).** Charge Teams place and prime the explosive charge. (This function is primarily the most time-consuming).

  Equipment Requirements:

  - Demolition/fuel charges.
  - Detonating Cord w/M1 Clips.

- Electrician's Tape.
- M2 Crimpers.
- Radio.
- Flashlight.
- Vehicle.

- **Firing Team(s).** Firing Teams perform final checks of the firing system, check firing wire/blasting caps for continuity, test burn any time fuse, and perform the final hookup. The team chief/destruction officer is responsible to ensure the area is clear prior to initiating the destruction action.

  Equipment Requirements:

  - Blasting Machine (controlled by the team leader).
  - Firing Wire w/Reel.
  - Electric/Nonelectric Blasting Caps.
  - Galvanometer or M51 Test Set.
  - Fuse Igniters (controlled by the team leader).
  - Electrician's Tape.
  - Lineman's Pliers w/Cutters.
  - M2 Crimpers.
  - Radio.
  - Flashlight.
  - Vehicle.

- **Road Guard(s).** The road guards are responsible for checking the detonating cord for sharp bends or kinks and breaks in the firing wire. They are also responsible for keeping unauthorized personnel out of destruction area.

  Equipment Requirements:

  - Radio.
  - Flashlight.
  - Vehicle.

13.0. Summary.

This lesson has focused on the requirements for planning and conducting emergency destruction of munitions. It has included discussions on destruction priorities, safety, authority, methods of destruction, destruction procedures, firing systems, and explosives used for destruction. It also discussed SOP, personnel, and equipment requirements.

Student Check

This exercise will enforce the information covered in this lesson. Answer the following questions. Cite the appropriate paragraph in the lesson that supports your answer.

1. What type of decision is the authority to conduct emergency destruction of an ammunition storage facility?

ANSWER:_____

_____

_____

REFERENCE:_____

2. What is always the first consideration for emergency destruction planning?

ANSWER:_____

_____

_____

REFERENCE:_____

3. What are the two primary means of rendering munitions useless to the enemy?

ANSWER:_____

_____

_____

REFERENCE:_____

4. What record is reviewed to determine the exact location of the items to be destroyed?

ANSWER:_____

_____

_____

REFERENCE:_____

5. What is the correct priority for destruction of classified munitions?

ANSWER:_____

_____

_____

REFERENCE:_____

6. What are the two most satisfactory methods for emergency destruction of munitions?

ANSWER:_____

_____

_____

REFERENCE:_____

7. What weight should a pile of munitions designated for destruction not exceed?

ANSWER:_____

_____

_____

REFERENCE:_____

8. What additional factors should be considered when planning for emergency destruction by detonation?

ANSWER:_____

_____

_____

REFERENCE:_____

9. When should substitute demolition material be used for emergency destruction?

ANSWER:_____

_____

_____

REFERENCE:_____

10. When using a combination dual firing system, which system is functioned first?

ANSWER:_____

_____

_____

REFERENCE:_____

11. Who is included in the approval process for an emergency destruction SOP?

ANSWER:_____

_____

_____

REFERENCE:_____

12. What are the primary duties of the charge team?

ANSWER:_____

_____

_____

REFERENCE:_____

Student Check
Solution

1. Answer: A command decision.
   Reference: Paragraph 1.1.

2. Answer: Safety.
   Reference: Paragraph 1.2.

3. Answer: By completely destroying explosive and non-explosive demolition materials in a combat zone and by damaging essential components of sets and kits to prevent complete assembly by cannibalizing from undamaged components.
   Reference: Paragraph 2.0.

4. Answer: DA Form 3260, Planograph.
   Reference: Paragraph 3.0.

5. Answer: Priority 1.
   Reference: Paragraph 4.0.

6. Answer: Burning and detonation.
   Reference: Paragraph 5.0.

7. Answer: 2,000 pounds.
   Reference: Paragraph 5.1.

8. Answer: You should consider:

   - Detonation is more time-consuming than burning.
   - It does not scatter munitions if the charge is properly placed.
   - It can be used on stacked/boxed munitions.
   - It is especially effective for ICM/Flechette rounds.

   Reference: Paragraph 5.2.

9. Answer: When supplies of standard demolition materials are not available or when they are running low.
   Reference: Paragraph 6.1.

10. Answer: The nonelectric system.
    Reference: Paragraph 9.0.

11. Answer: SOPs should be approved by:

- Battalion Commander
- Company Commander
- EOD (if available)
- Team members should also review and make recommendations for improvement.

Reference: Paragraph 11.0.

12. Answer: Charge teams place and prime the explosive charge.
Reference: Paragraph 12.0.

SUPPLEMENTAL READING 55B40A07

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Appendix C
Use of Demolition Charges

C-1. Sources.

a. *Primary Charges*. When using land mines, aerial bombs, shells, and foreign explosives as demolition charges, take the appropriate precautions outlined in the paragraphs below. The use of such explosives is usually uneconomical but may occasionally become necessary or desirable. Obtain such materials from captured or friendly supply stocks or, in the case of land mines, those recovered from enemy or friendly minefield. Never use unexploded duds (shells or bombs) for demolition purposes.

b. *Supplementary Charges*. When necessary, use allied-nation or captured explosives to supplement or replace standard explosive charges.

C-2. Land Mines.

a. *Safety Precautions*. Use only defused mines as demolition charges. Recovered mines may be sensitive because of near misses and may detonate during normal handling. The theater commander prescribes the policy for use of salvaged or captured threat mines.

b. *Charges*. When calculating charges using mines, consider only the explosive weight. Use normal explosive quantities for cratering or pressure charges. However, the mine case does not allow proper contact of the explosives against irregularly shaped objects. You may find it necessary to increase the size of cutting charges considerably when using mines for this purpose. Test shots are the best way to determine the proper charge under given conditions. Table C-1 (page C-2) lists the explosives content of various antitank mines by country of origin. The US mines are current; foreign mines may be current or obsolete.

c. *Priming*. Detonate a land mine by placing a l-pound charge on the pressure plate. If firing large quantities of mines simultaneously, prime several mines to ensure complete detonation. Detonating a single mine normally detonates any other mine in direct contact with the primed mine.

C-3. Aerial Bombs.

a. *Safety Precautions*. General-purpose, aerial bombs make satisfactory demolition charges but are more effective as cratering charges. Their shape makes them inefficient for demolitions requiring close contact between the explosive and the target. Take precautions against fragmentation, as the steel fragments from bomb cases may fly great distances. Before using any bomb, positively identify it as a general-purpose bomb.

Table C-1. Antitank (AT) mine explosives content (by nation)

Country	Mine Type	Weight/Explosive
United States	M15 AT (Metallic)	22 lb/TNT
	M19 AT (Nonmetallic)	21 lb/TNT
	M21 AT (Metallic)	10.5 lb/Comp H6
Belgium	PRB-4 AT	20 lb/Hexogen
Communist China	Dual-Purpose No. 4 (Metallic)	4.5 lb/TNT
Czechoslovakia	PT-Mi-K AT (Metallic)	11 lb/TNT
	PT-Mi-Ba AT (Plastic)	12 lb/TNT
	Na-Mi-Ba AT (Plastic)	5.3 lb/Tritol
	TQ-Mi AT (Cardboard)	11.5 lb/TNT
Finland	M36 AT (Metallic)	8 lb/TNT
	M39 AT (Metallic)	8.8 lb/TNT
France	M1948 AT (Metallic)	11.5 lb/TNT or Military Dynamite
	M1948 Plate Charge AT (Metallic)	15.2 lb/TNT or Picric Acid
	M1951 Shaped Charge AT (Metallic)	4 to 5 lb/Kexolite
	M1951 AT (Caseless)	14.3 lb/TNT (Cast)
	M1951 AT (Plastic "grille")	11 to 16 lb/PETN
Japan	Model 63 Heavy AT	24.2 lb/Comp B
Netherlands	Type II AT (Metallic)	9 lb
South Korea	Heavy AT (Metallic)	22 lb/TNT
	Type I Dual Purpose (Metallic)	5.7 lb/TNT
	Type II Dual Purpose (Metallic)	4.5 lb/TNT
Former Soviet Union	TMD-B AT (Wooden)	11 to 15 lb/Amatol, DTNT, or Picric Acid*
	TMN-46 AT (Metallic)	12.6 lb/TNT
	YaM-5 AT	8 to 11 lb/TNT or Amatol
United Kingdom	Mark 4 GS AT (Metallic)	8.25 lb/TNT
	Mark 5 GS AT (Metallic)	4.5 lb/TNT
	Mark 5 HC AT (Metallic)	8.3 lb/TNT
	Mark 7 AT (Metallic)	19.6 lb/TNT

*Picric acid corrodes metals, forming extremely sensitive compounds that are easily detonated. Do *not* handle mines loaded with this explosive except to move them to a safe disposal area for destruction.

b. *Charges*. The explosive content of an aerial bomb is approximately half its total weight. Table C-2 lists the explosives content for various general-purpose bombs. Approximately 20 percent of the explosive potential of an aerial bomb is expended in shattering the casing.

c. *Priming*. Detonate bombs under 500 pounds by placing a 5-pound explosive charge on the middle of the casing; bombs exceeding 500 pounds require a 10-pound charge. Do not place fuses on the nose or tail of the bomb. To ensure detonation, prime large bombs separately.

Table C-2. General-purpose, aerial bombs (explosive contents)

Bomb	Explosive Weight	Total Weight
Old Series		
AN-30A1, 100-pound GP	57	120
AN-M57A1, 250-pound GP	125	261
AN-M64A1, 500-pound GP	266	549
AN-M65A1, 1,000-pound GP	555	1,064
AN-M66A2, 2,000-pound GP	1,098	2,113
New Series		
M117, 750-pound GP	386	823
M118, 3,000-pound GP	1,975	3,049
Low-Drag		
MK81, Mod 1, 250-pound GP	100	260
MK82, Mod 1, 500-pound GP	192	531
MK83, Mod 3, 1,000-pound GP	445	985
MK84, Mod 1, 2,000-pound GP	945	1,970
Low-Drag, Snakeye I		
MK81, Mod 1, 250-pound GP	100	300
MK82, Mod 2, 500-pound GP	192	560

C-4. Artillery Shells (Non-nuclear).

a. *Safety Precautions*. Use artillery shells for demolition when only fragmentation is desired. Because of their low explosive content, artillery shells are generally not adequate for other demolition purposes.

b. *Charges*. Any artillery shell fits this category; however, avoid shells smaller than 100 millimeters. The 105-millimeter howitzer, high-explosive shell, which weighs 33 pounds, contains only 5 pounds of explosive. The 155-millimeter howitzer shell contains only 15 pounds of explosive.

c. *Priming*. Detonate shells up to 240 millimeters by placing 2-pound charges on the case, just forward of the rotating band. To ensure complete detonation of multiple shells simultaneously, place a charge on each shell. Use the M10 universal destructor to detonate shells that have threaded fuse wells of 1.7- or 2-inch diameters. Fill the booster cavities of bombs and large projectiles fully by adding booster cups to the M10 destructor, as required.

C-5. Foreign Explosives.

a. *Safety Precautions*. Use foreign explosives to supplement standard US charges or, in certain cases, instead of US charges. However, only experienced demolition personnel should work with such explosives and then only according to instructions and directives issued by the theater commander. TM 9-1300-214 lists the most common foreign explosives.

b. *Priming*. Most foreign explosive blocks have cap wells large enough to receive US military blasting caps. However, test fire these charges with US military blasting caps to ensure positive detonation. In certain instances,

you may find it necessary to initiate the explosives by using a standard US demolition block primed with a blasting cap.

Appendix D
Expedient Demolitions

D-1. Expedient Techniques. These techniques are intended for use only by personnel experienced in demolitions and demolitions safety. Do not use expedient techniques to replace standard demolition methods. Availability of trained soldiers, time, and material are the factors to consider when evaluating the use of expedient techniques.

D-2. Shaped Charges.

a. *Description*. Shaped charges concentrate the energy of the explosion released on a small area, making a tubular or linear fracture in the target. The versatility and simplicity of shaped charges make them effective against many targets, especially those made of concrete or those with armor plating. You can improvise a shaped charge (Figure D-l). Because of the many variables (configuration, explosive density, liner cavity density, and so forth), consistent results are impossible to obtain. Therefore, experiment to determine the optimum standoff distances. Plastic explosive is best suited for this type of charge. However, dynamite and molten TNT can be effective expedients.

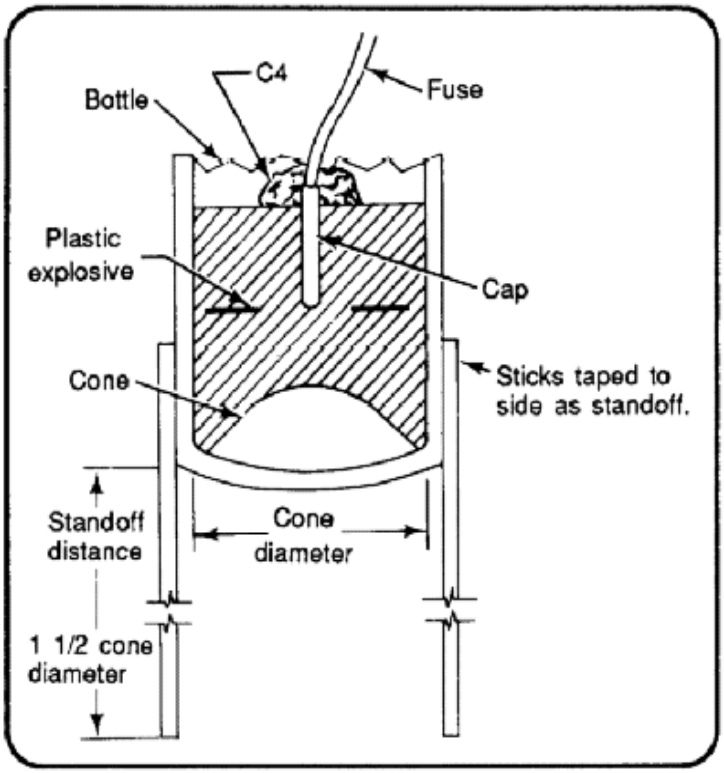

Figure D-1. Improvised shaped charge

b. *Fabrication*. Obtain a container for the shaped charge and remove both ends. Almost any kind of container will work. Cans, jars, bottles, or drinking glasses will do. Some containers come equipped with built-in cavity liners, such as champagne or cognac bottles with the stems removed. With the ends removed, the container is ready for a cavity liner and explosive. Optimum shaped-charge characteristics are:

(1) *Cavity Liner*. Make a cone-shaped cavity liner for the container from copper, tin, zinc, or glass. Funnels or bottles with a cone in the bottom (champagne or cognac bottles) are excellent. However, if material is not available for a cavity liner, a workable but less effective shaped charge can be made by cutting a coned-shaped cavity in a block of explosive.

(2) *Cavity Angle*. For most high-explosive antitank (HEAT) ammunition, the cavity angle is 42 to 45 degrees. Expedient charges will work with cavity angles between 30 and 60 degrees.

(3) Explosive Height (In Container). The explosive height is two times the cone height, measured from the base of the cone to the top of the explosive. Press the explosive into the container, being careful not to alter the cavity angle of the cone. Ensure the explosive is tightly packed and is free of any air pockets.

(4) Standoff Distance. The normal standoff distance is one and one-half cone diameters. Use standoff sticks to achieve this.

(5) Detonation Point. The exact top center of the charge is the detonation point. Cover the blasting cap with a small quantity of C4 if any part of the blasting cap is exposed or extends above the charge.

NOTE: Remove the narrow neck of a bottle or the stem of a glass by wrapping it with a piece of soft, absorbent twine or by soaking the string in gasoline and lighting it. Place two bands of adhesive tape, one on each side of the twine, to hold the twine firmly in place. To heat the glass uniformly, turn the bottle or stem continuously with the neck up. After the twine or plastic has burned, submerge the neck of the bottle in water and tap it against some object to break it off. Tape the sharp edge of the bottle to prevent cutting hands while tamping the explosive in place. A narrow band of plastic explosive placed around the neck and burned gives the same results as using string or twine.

D-3. Platter Charge. This device uses the Miznay-Shardin effect. It turns a metal plate into a powerful, blunt-nosed projectile (Figure D-2). Use a round, steel platter, if available. Square platters also will work. The platter should weigh 2 to 6 pounds.

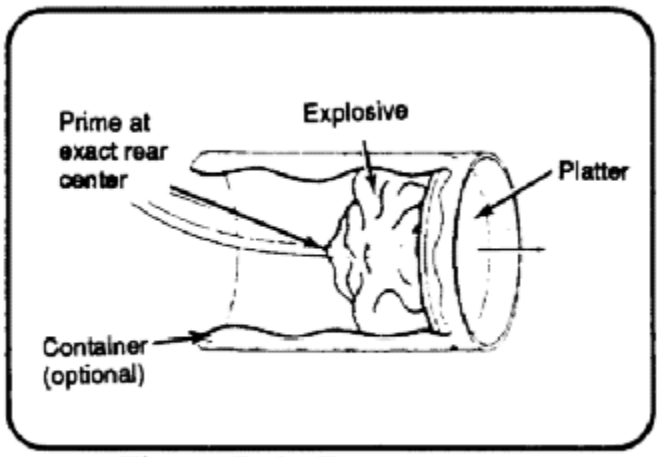

Figure D-2. Platter charge

a. *Charge Size*. Use a quantity of explosive equal to the platter weight.

b. *Fabrication*.

(1) Uniformly pack the explosive behind the platter. A container is not necessary if the explosive will remain firmly against the platter without a container. Tape is an acceptable anchoring material.

(2) Prime the charge at the exact, rear center. Cover the blasting cap with a small quantity of C4 if any part of the blasting cap is exposed.

(3) If available, use a gutted M60 fuze igniter as an expedient aiming device and aim the charge at the direct center of a target. Ensure the explosive is on the side of the platter opposite the target. With practice, you can hit a 55-gallon drum, a relatively small target, at 25 yards about 90 percent of the time with a platter charge.

D-4. Grapeshot Charge. This charge consists of a container (an ammo can or Number- 10 can), projectiles (nails, bolts, glass, small pieces of scrap metal, or rocks), buffer material (soil, leaves, felt, cloth, cardboard, or wood), a charge (plastic explosive like C4), and a blasting cap. Assemble these components as shown in Figure D-3.

a. *Charge Size*. Use a quantity of explosive equal to one quarter the projectile weight.

b. *Fabrication*.

(1) Make a hole in the center of the bottom of the container large enough to accept a blasting cap.

(2) Place the components in the container in the following sequence:

(a) Explosive. Place the plastic explosive uniformity in the bottom of the container, remove all voids or air spaces by tamping with a nonsparking instrument.

(b) Buffer. Place 2 inches of buffer material directly on top of the explosive.

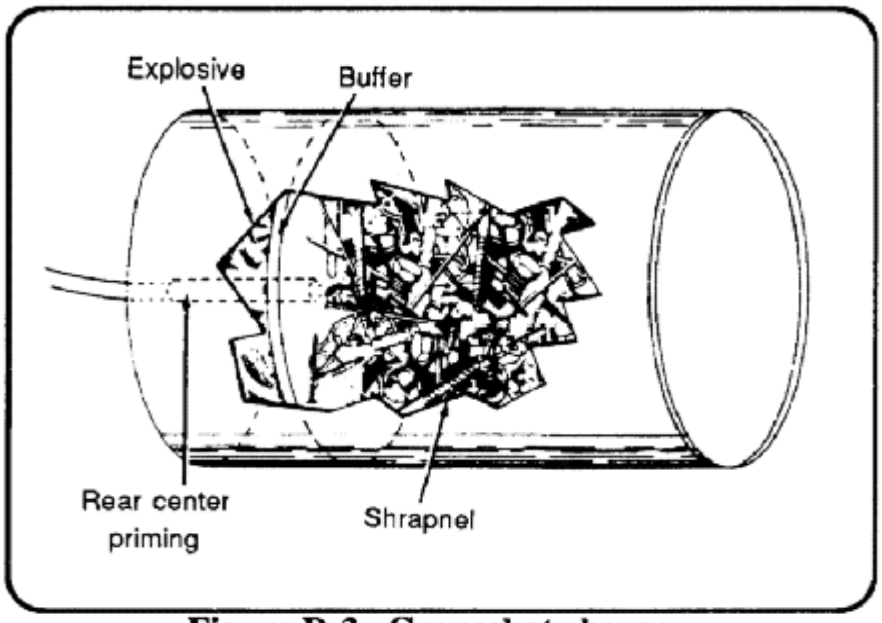

Figure D-3. Grapeshot charge

(c) Projectiles. Place the projectiles on top of the buffer material, and place a covering over the projectiles to prevent them nom spilling out when handling the charge.

(3) Make a cap well in the plastic-explosive charge through the hole in the bottom of the container and insert the blasting cap of the initiation set. Cover the blasting cap with a small quantity of C4 if any part of the blasting cap is exposed.

(4) Aim the charge at the center of the target from approximately 100 feet.

D-5. Dust Initiator. Dust-initiator charges use small quantities of explosives with larger amounts of powdered materials (dust or cover) to destroy thin-walled, wooden buildings or railroad boxcars. These charges work best in an enclosed area with few windows. At detonation, the dust or cover is distributed in the air within the target and ignited by an explosive-incendiary charge. The dust-initiator charge consists of an explosive, mixed with equal parts of incendiary mix, and a cover of finely divided organic material.

a. *Charge Computations*.

(1) Charge Size. One pound of explosive-incendiary mixture will effectively detonate up to 40 pounds of cover. To make a l-pound explosive-incendiary mixture, combine 1/2 pound of crushed TNT or C3 and 1/2 pound of incendiary mix (two parts aluminum powder or magnesium powder and three parts ferric oxide). Do not use C4 because the explosive component in C4 will not combine properly with the incendiary mixture.

(2) Cover (Dust) Size. Use 3 to 5 pounds of cover for each 1,000 cubic feet of target (3 pounds for enclosed buildings, 5 pounds for partially enclosed buildings). The cover can consist of coal dust, cocoa, powdered coffee, confectioners sugar, tapioca, wheat flour, corn starch, hard-rubber dust, aluminum powder, magnesium powder, powdered soap, or a volatile fuel such as gasoline.

b. *Fabrication*. Place the TNT or C3 explosive in a canvas bag and crush it into a powder with a wooden mallet. In the same bag that contains the crushed explosive, add an equal amount of incendiary mixture and mix thoroughly. Prime this explosive-incendiary charge with a detonating-cord knot. Place the primed charge in the

center of the target and pour or place the cover on top of it, forming a pyramid. When using gasoline as the cover, do not use more than 3 gallons, since greater quantities will not evenly disperse in the air, giving poor results.

c. *Detonation*. The charge can be detonated by attaching initiation sets to the detonating cord.

D-6. Improvised Cratering Charge. This charge consists of a mixture of ammonium nitrate fertilizer (at least 33.33 percent nitrogen) and diesel fuel, motor oil, or gasoline. The ratio of fertilizer and fuel is 25 pounds to 1 quart. The fertilizer must not be damp. You may fabricate almost any size of improvised charge from this mixture. Proceed as follows:

a. Measure the fertilizer and fuel for the size charge you require.

b. Add the fuel to the fertilizer and mix thoroughly.

c. Allow the fuel to soak into the fertilizer for an hour.

d. Place half of the ammonium nitrate charge in the borehole. Then, place two l-pound primed blocks of explosives in the borehole and add the remainder of the ammonium nitrate charge. Never leave the charge in the borehole for a long period, since the charge will accumulate moisture, reducing its effectiveness.

NOTE: Boreholes should receive 10 pounds of explosives for every foot of depth and must be dual primed.

e. Detonate the charge.

D-7. Improvised Borehole Method (Detonating-Cord Wick). This method (Figure D-4) is used to enlarge boreholes in soil. The best results are obtained in hard soil. Use the following procedure:

a. Tape together several strands of detonating cord 5 to 6 feet long. Generally, one strand enlarges the diameter of the hole by about one inch. Tape or tie the strands together into a wick for optimum results.

b. Make a hole by driving a steel rod approximately 2 inches in diameter into the ground to the depth required. According to the rule of thumb, a hole 10 inches in diameter requires 10 strands of detonating cord.

c. Place the detonating-cord wick into the hole using an inserting rod or some other field expedient. The strands must extend the full length of the hole.

d. Fire the cord either electrically or nonelectrically. An unlimited number of wicks can be fired atone time by connecting them with the detonating cord ring main or line main. If successive charges are placed in the holes, blowout excess gases and inspect the hole for excessive heat.

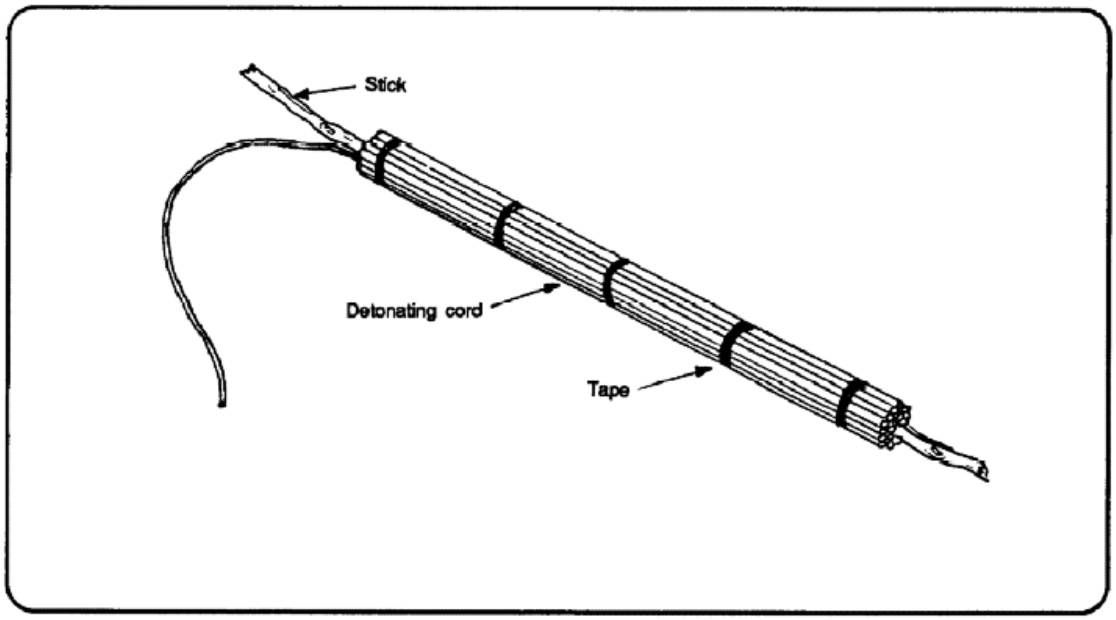

Figure D-4. Detonating-cord wick

D-8. Ammonium-Nitrate Satchel Charge. Although the satchel charge is excellent, it is mostly suitable for cratering. A more manageable charge may be used by mixing ammonium-nitrate fertilizer with melted wax instead of oil. The mixing ratio is 4 pounds of fertilizer to 1 pound of wax. Set the primer in place before the mixture hardens.

a. Preparation.

(1) Melt the wax in a container and stir in the ammonium-nitrate pellets, making sure that the wax is hot while mixing.

(2) Before the mixture hardens, add a 1/2-pound block of explosive primed with detonating cord. Ensure the primed charge is in the center of the mixture and that there is sufficient detonating cord available to attach initiation sets.

(3) Pour the mixture into a container. Add shrapnel material to the mixture if desired or attach the shrapnel on the outside of the container to give a shrapnel effect.

(4) Detonate the charge by attaching initiation sets to the detonating cord coming from the satchel charge.

b. *Use*. Because the wax and fertilizer may be molded into almost any size or shape, it may be applied to a great many demolition projects with satisfactory results.

D-9. Expedient Flame Fougasse. Use this device in defensive or offensive operations for its incendiary, illuminating, and signaling effects. The charge consists of a 55-gallon drum of thickened fuel, a kicker charge, a trip flare, and detonating cord (Figure D-5, page D-6). A 55-gallon drum containing a fougasse mixture is effective for a controlled-direction burst.

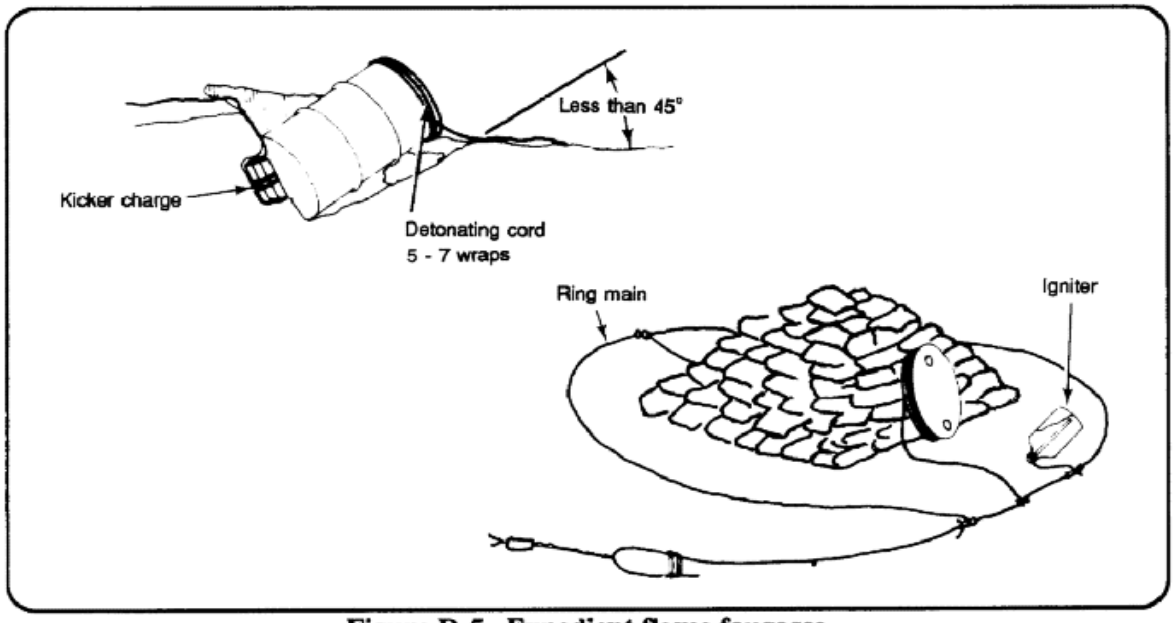

Figure D-5. Expedient flame fougasse

a. *Preparation*.

(1) Make the fougasse mixture by mixing 3 ounces of M4 thickening compound per gallon of gasoline or JP4 fuel. Depending on the temperature, the mixture may take from 15 minutes to several hours to thicken to the desired viscosity (resembling applesauce or runny gelatin). For a 55-gallon drum, vigorously mix 150 ounces of M4 thickening compound with 50 gallons of gasoline or JP4 fuel.

(2) Dig an angled trench for the 55 gallon drum that will allow the best coverage and dispersion of the flame fougasse. However, do not build the trench steeper than 45 degrees. Make a small cutout area in the back of the trench for the kicker charge (2 pounds of TNT or 2 blocks of C4).

(3) Prime the kicker charge with detonating cord, leaving 6 to 10 feet of detonating cord free to tie into a ring main (6 to 10 feet).

(4) Wrap the top end of the 55 gallon drum with 5 to 7 wraps of detonating cord, leaving 6 to 10 feet of the detonating cord free to tie into a ring main.

(5) Lay the drum in the trench and place the kicker charge in the small cutout. Push the drum against the back of the trench so the kicker charge seats firmly against the bottom of the drum. It may be necessary to tamp soil around the charge to properly center the kicker charge against the bottom of the drum. The running ends of detonating cord for the kicker charge and drum top should extend from the trench. Avoid kinks or sharp bends in the detonating cord.

(6) Lay out a ring main of detonating cord around the 55-gallon drum and tie the detonating cord from the kicker charge and wraps to the ring main.

(7) Cover the entire 55-gallon drum with a minimum of 1 foot of tamped soil, leaving the front of the drum exposed or uncovered.

(8) Using a length of detonating cord, tape one end under the spoon handle of an igniter trip flare (M49). Tape the spoon handle down securely, attach the trip flare to a stake, and position the stake 3 to 4 feet in front of the drum. Attach the free end of the detonating cord secured to the trip flare to the ring main. During combat, a WP grenade (M34) will work in place of the trip flare. If trip flares are not available, do the following:

- Take a 2-liter plastic bottle and fill it half full with raw gasoline or JP4 (unthickened).
- Punch a hole in the cap of the bottle and thread one end of a detonating cord through the hole.
- Tie a single overhand knot in the detonating cord to prevent it from being pulled back out of the cap.
- Place the detonating cord with the single overhand knot inside the bottle and secure the cap onto the bottle.
- Take the opposite end of the detonating cord and attach it to the ring main.

(9) Attach initiation sets to the ring main.

b. *Function*. When initiated, the ring main initiates the detonating cord to the trip flare, the drum top, and the kicker charge. The wraps cut the top of the drum off, the kicker charge propels the thickened fuel outward, and the trip flare ignites the thickened fuel as it travels downrange. The result is a flash of flame that spreads downrange for approximately 100 meters.