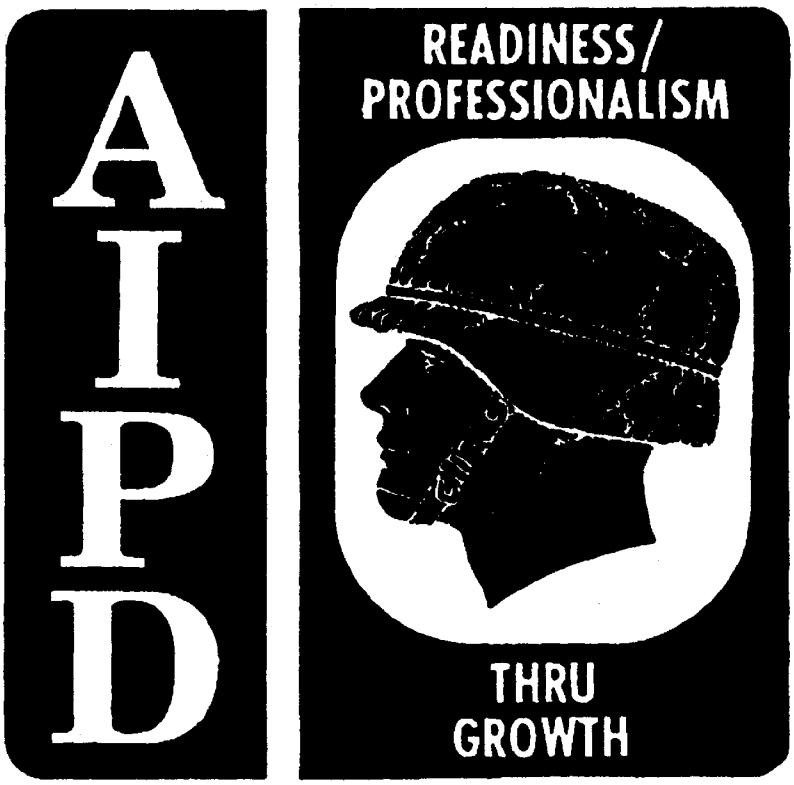
SUBCOURSE
MM0165

EDITION
A

EMERGENCY DESTRUCTION OF CONVENTIONAL AMMUNITION



US ARMY ORDNANCE
MISSILE AND MUNITIONS CENTER AND SCHOOL

THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT

ARMY CORRESPONDENCE COURSE PROGRAM

EMERGENCY DESTRUCTION OF CONVENTIONAL AMMUNITION

Subcourse Number MM0165
EDITION A

Missile and Munitions
United States Army Combined Arms Support Command
Fort Lee, Virginia 23801-1809

8 Credit Hours

Edition Date: September 1992

SUBCOURSE OVERVIEW

This subcourse is designed to provide you with the information required to conduct the emergency destruction (ED) of conventional ammunition at a storage facility and to develop a standing operating procedure (SOP) to support this mission.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine that was current at the time this subcourse was prepared. In you own work situation, always refer to the latest official publications.

Unless otherwise stated, the masculine gender of singular pronouns is used to refer to both men and women.

Terminal Learning Objective

Action: You will learn to develop procedures for the ED of conventional ammunition stocks in your ammunition supply point (ASP), corps storage area (CSA), or theater storage area (TSA). You will also learn how to develop an ED SOP for your storage facility.

Condition: In this booklet, you will find all of the information required to complete this subcourse.

Standard: To demonstrate competency of this task, you must achieve a minimum of 70 percent on the subcourse examination.

TABLE OF CONTENTS

LESSON

PLANNING FOR THE EMERGENCY DESTRUCTION OF CONVENTIONAL AMMUNITION

STP 9-91DII-MQS: 03-4010-01-0006

OVERVIEW

Lesson Description

In this lesson, you will learn how to plan ED operations at an ammunition storage facility.

Terminal Learning Objective

Action: Describe the procedures necessary to perform ED operations at an ammunition storage facility. To do this, you must be able to:

- Define ED.
- Cite the authority authorized to order ED.
- Establish ED priorities for stocks.
- Describe the method of ED most effective for different types of ammunition.
- Identify the types of demolition materials authorized for use in ED operations.
- Describe the different demolition firing systems.
- Develop an ED area layout of an ASP.
- Develop an ED SOP.

Condition: You will have this subcourse booklet and will work without supervision. There are no supplementary requirements for this lesson.

Standard: Description of procedures will be in accordance with this lesson.

References: The material in this lesson was derived from TM 9-1300-206, TM 9-1300-277, TM 9-1375-213-12, FM 5-25, and FM 9-13.

INTRODUCTION

As an ammunition officer in a tactical situation, you will be required to plan for and possibly conduct the ED of all ammunition and explosive stocks in your storage facility. The size of your facility may vary from a small ASP to a large CSA or TSA. Regardless of the size of the facility, ED procedures will remain the same and each unit must be prepared to perform this type of operation. In this lesson, the procedures involved in the ED of ammunition will be covered.

As you can probably tell, the ED of all stocks in a storage facility is not something that can be done on the spur of the moment without prior planning. Planning for ED operations begins when a storage facility is established, as part of the unit's SOP. The ED part of the unit SOP should provide guidance for destroying all assets in the storage area. It should address the when, where, and how of ED. The ED SOP should also include the name and position of the individual who is authorized to execute the ED action.

EMERGENCY DESTRUCTION

ED is the act of destroying the offensive and/or defensive characteristics of ammunition materiel and facilities in order to prevent their capture and use by the enemy. ED is a command decision based on the following:

- Command policy.
- Tactical situation.
- Types, quantities, and location of items to be destroyed.
- Demolition materials available.
- Personnel available.
- Time available.

Prior to issuing an ED order, commanders should consider relocating or diverting ammunition stocks to a more secure storage area or force issuing stocks to using units, if possible. If ED is directed, consideration should be given to selecting a site that will disrupt the enemy's movement but will prevent hazards to friendly troops.

Authority

The authority to conduct ED operations at an ammunition storage facility is a command decision made by the division commander or a higher-echelon commander. If the situation requires, this authority may be delegated to subordinate commanders. Once an ED order is given, only the commander who gave the order, or a higher authority, may revoke the order.

Degrees of Destruction

By degrees of destruction, we mean that stocks may be completely destroyed, damaged beyond repair, or modified and/or demilitarized. Demilitarization in ED means the disposal or deactivation of ammunition. It includes several methods that may be used to modify or damage stocks to the extent that they cannot be used or repaired. These methods include:

- Disassembly and removal of explosives.
- Alteration.
- Mutilation.
- Cutting.
- Crushing.
- Scrapping.
- Melting.
- Dumping at sea (when authorized).

Munitions to be Destroyed

Since time may be a major factor in ED, priorities for ED should be assigned to allow for the most complete job possible. Before you can assign ED priorities, you first must identify the types, quantities, and locations of items to be destroyed. This may be accomplished by reviewing the stock accounting records to determine those items and components on hand. These accounting records include DA Forms 5203 (*DODIC Master/Lot Locator Record*) and DA Forms 5204 (*Serial Number Record*). Request that the storage and surveillance sections assist you in identifying quantities and locating all stocks. Review the facility's planograph, DA Form 3260 (*Igloo Planograph [Ammunition]*), to locate stocks.

Priorities for Destruction

After you have identified and located all stocks, you can establish a priority list for destruction. Priorities for ED should be assigned to allow for the most complete job possible. Established priorities are as follows:

- Priority 1 includes all classified ammunition and components, to include related publications.
- Priority 2 includes ammunition or explosives that could be used by the enemy. These items include rockets, guided missiles, grenades, small arms, chemical agents, and demolition materials.
- Priority 3 includes all other casualty-producing ammunition not included in Priorities 1 and 2.
- Priority 4 includes noncasualty-producing ammunition and pyrotechnic items. These items include riot-control and signal munitions.

Once priorities are established, they become an integral part of the ED plan.

Methods of Destruction

Once you have identified the types, quantities, and stocks in your ASP, you should then design your methods of destruction. There are several methods that can be used to destroy assets to prevent enemy capture and use. The destruction methods that can be used individually or in combination are discussed in the following paragraphs.

Detonation. Depending upon the ammunition being destroyed, this method is the most effective under most circumstances. It ensures complete destruction and does not scatter ammunition when properly employed.

Burning. Given sufficient fuel and time, burning is just as effective as detonation, especially for those items that are sensitive to flame or heat.

Friendly Gunfire and Air Strikes. The use of gunfire from artillery, tanks, rockets, or missiles can be used to destroy ammunition after everyone has left the storage facility. This option should be used when other destruction methods cannot be used (for example, facility is being overrun by the enemy, et cetera).

Concealment and Scattering. This is the least effective method of destruction. It should be used only when detonation or burning cannot be used. It may be used to destroy smaller items such as fuzes, firing devices, detonators, et cetera. This method effectively makes artillery rounds useless, at least in the short term.

In general, detonation and burning, or a combination of these, are the most effective means of destruction.

Safety

Safety is the first major consideration anytime ammunition or explosives are used or handled. During ED operations, safety precautions will be observed always regardless of the urgency of the situation. Anyone observing a safety violation will halt operations until a correction is made. Safety factors to consider are as follows:

- Follow only published ED procedures.
- Use only trained personnel for ED operations.
- Use the correct demolition procedures.
- Keep the number of personnel involved in handling explosives to a minimum (but no fewer than two).
- Establish a danger zone radius based on the type and weight of the ammunition or explosives to be destroyed. This radius may not be less than 1,000 meters for personnel under cover.
- Notify adjacent units of pending ED.
- Always consider prevailing wind direction when destroying explosives or chemicals. Their destruction may produce toxic smoke and residue.
- Use extreme caution when using gasoline and other highly volatile petroleum, oil, and lubricants (POL).
- Always stand by for a high-order detonation when burning ammunition and explosives.

Destruction Procedures for Types of Ammunition

Under normal circumstances, ammunition containing high explosives will be destroyed by detonation while most other items will be burned. Items to be destroyed by detonation include the following:

- Bombs to include general purpose (GP), low drag (LD), demolition, incendiary, smoke, and clustered bomb units (CBUs). Use of chemical bombs will require special NBC precautions.
- High-explosive (HE), high-explosive antitank (HEAT), high-explosive plastic (HEP), and improved conventional munition (ICM) projectiles (artillery and mortar).
- All rockets.
- Grenades.
- Guided missiles.
- Bulk HEs.

The burning method of ED is effective for destroying the following items:

- Small-arms ammunition.
- Rocket motors. When burning rocket motors, always point them toward the enemy. They may ignite and be propelled into the air.
- Propelling charges.
- Pyrotechnics.
- Black powder.
- Open containers or loose materials.

- Illuminating and WP projectiles. These may also be used to start fires.

Both methods, detonation and burning, may be used for ED of the following items:

- Dynamite and black powder.
- Loose explosives.
- Fuzes, boosters, and detonators.

DESTRUCTION BY BURNING

To perform ED by burning, you will need combustible material to keep the fire hot and to act as a means of ignition. The important thing to remember is that the fire must be intense enough to ensure complete burning.

Placement of Combustible Material

Combustible material may be scrap wood, empty boxes, brush, fiber containers, propelling charges, et cetera - almost anything that will burn. To burn unpalletized ammunition, prepare a bed of combustible material and pile the boxes of ammunition onto the combustible material. See Figure 1. To burn palletized ammunition, surround the base of each pallet with a bed of combustible material. If propelling charges are used as a combustible material, slit the propelling charge and scatter the propellant to increase the burn area. See Figure 2, Page 6.

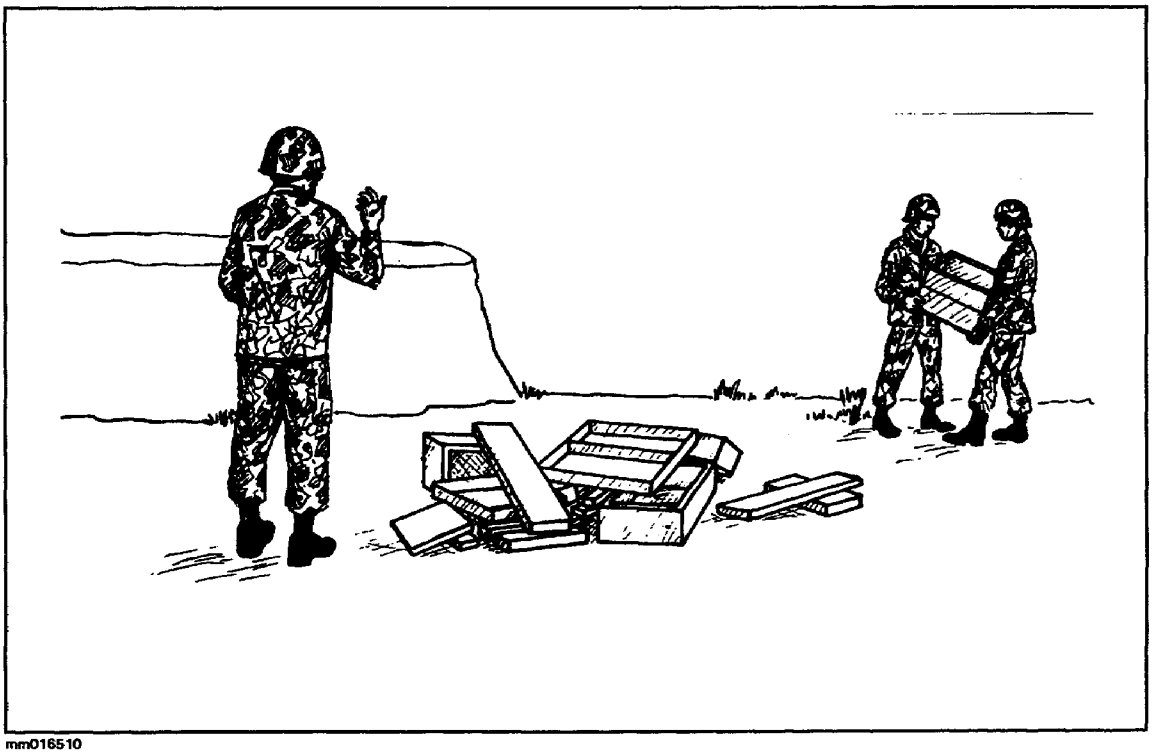


Figure 1. Preparing a bed of combustible material.

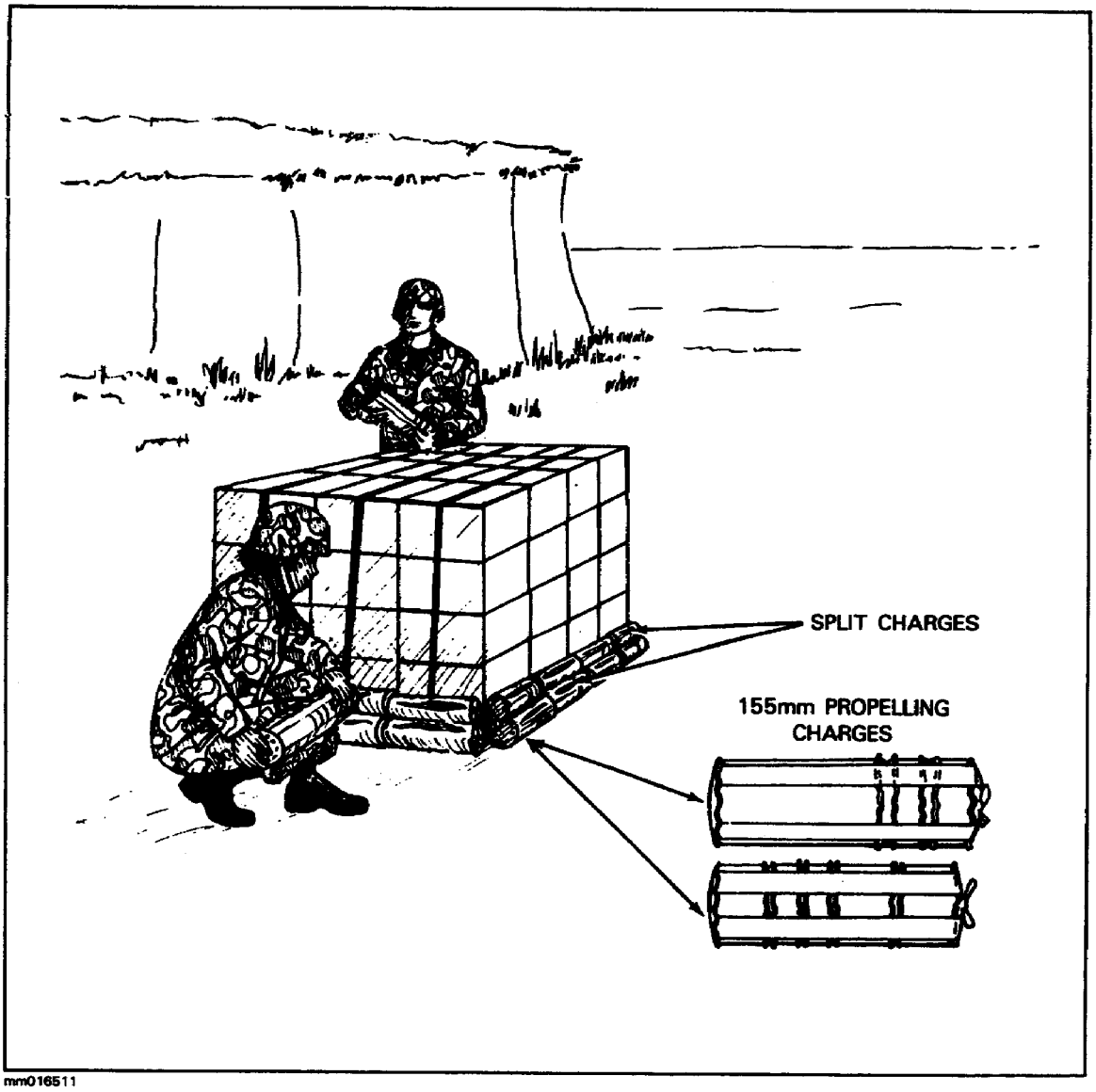


Figure 2. Placing propelling charges around a pallet of ammunition.

Pouring the Fuel

The next step is to pour diesel fuel or JP4 aircraft fuel over each pile or stack. Fuel extends the burning time of the combustible material and generates heat. See Figure 3. Never pour gasoline over the stack! If gasoline must be used, leave it in a closed container and ignite it with detonating cord or an explosive charge.

Preparing the Ignition Train

An ignition train is used in burning operations to allow personnel sufficient time to reach a safe distance before the ammunition explodes. There are three preferred methods used to ignite materials during an ED burn.

Figure 3. Pouring fuel on pallets of ammunition.

The first method utilizes fuel cans half-filled with a mixture of gasoline and diesel fuel. The fuel cans are positioned on the stack and primed with detonating cord that has been wrapped around the outside of the can. This method may be used with a ring main. See Figures 4 and 5, Page 8.

The second method utilizes a nonelectric ignition train that consists of M700 safety fuse and a plastic bag of smokeless powder or an electric ignition system that consists of an electric squib, firing wire, and a bag of smokeless powder. See Figures 6 and 7, Page 9.

The third method utilizes an excelsior (straw or paper) ignition train that is at least 8 meters (25 feet) long. Arrange the train so that it will burn against the wind. This method is used only when the first two methods are not available.

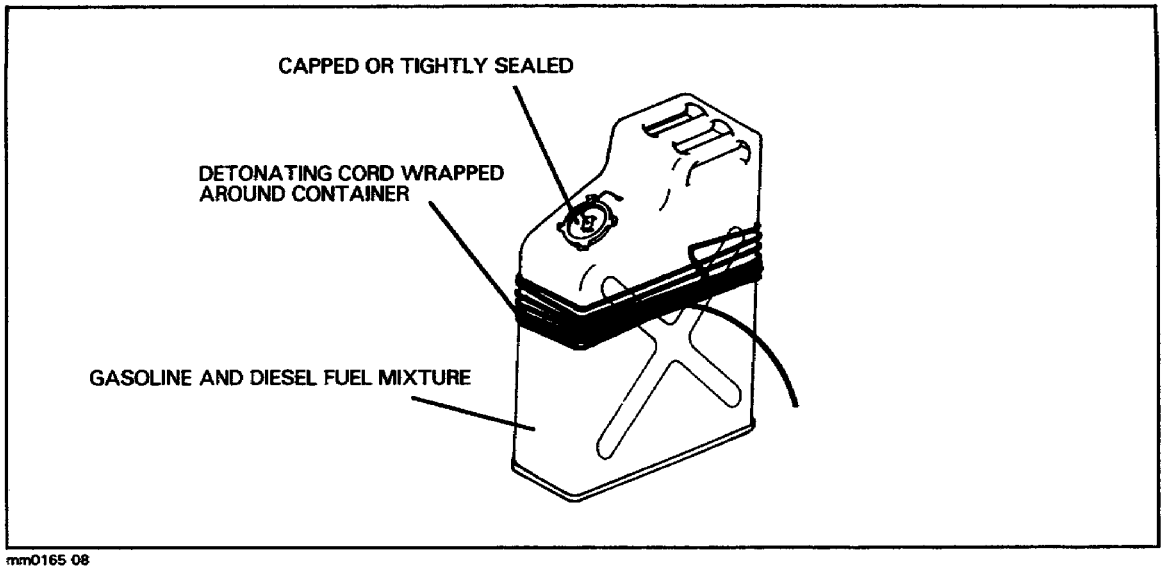


Figure 4. Gasoline and diesel fuel mixed and primed with detonating cord.

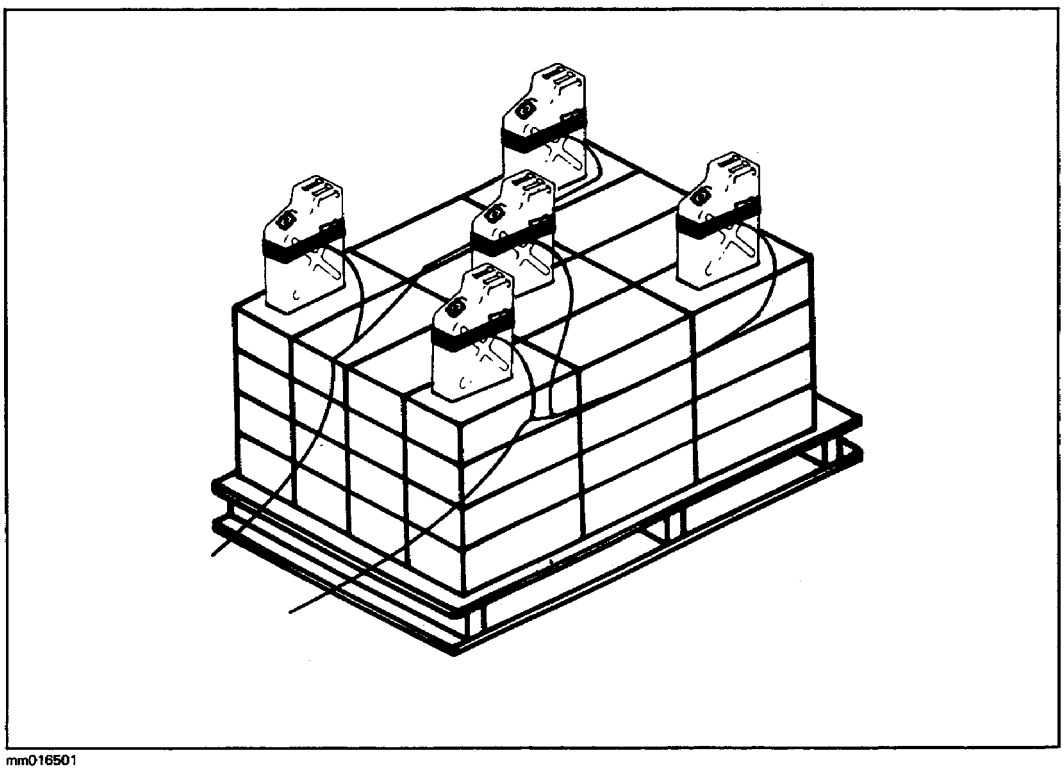


Figure 5. Placement of fuel cans on a pallet of ammunition.

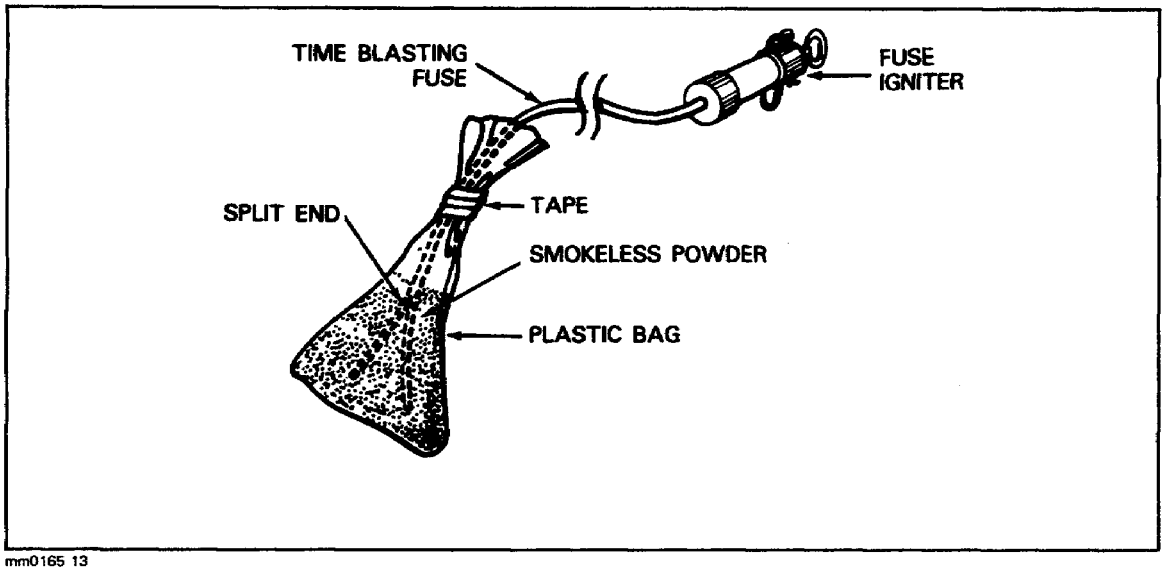


Figure 6. Nonelectric ignition train.

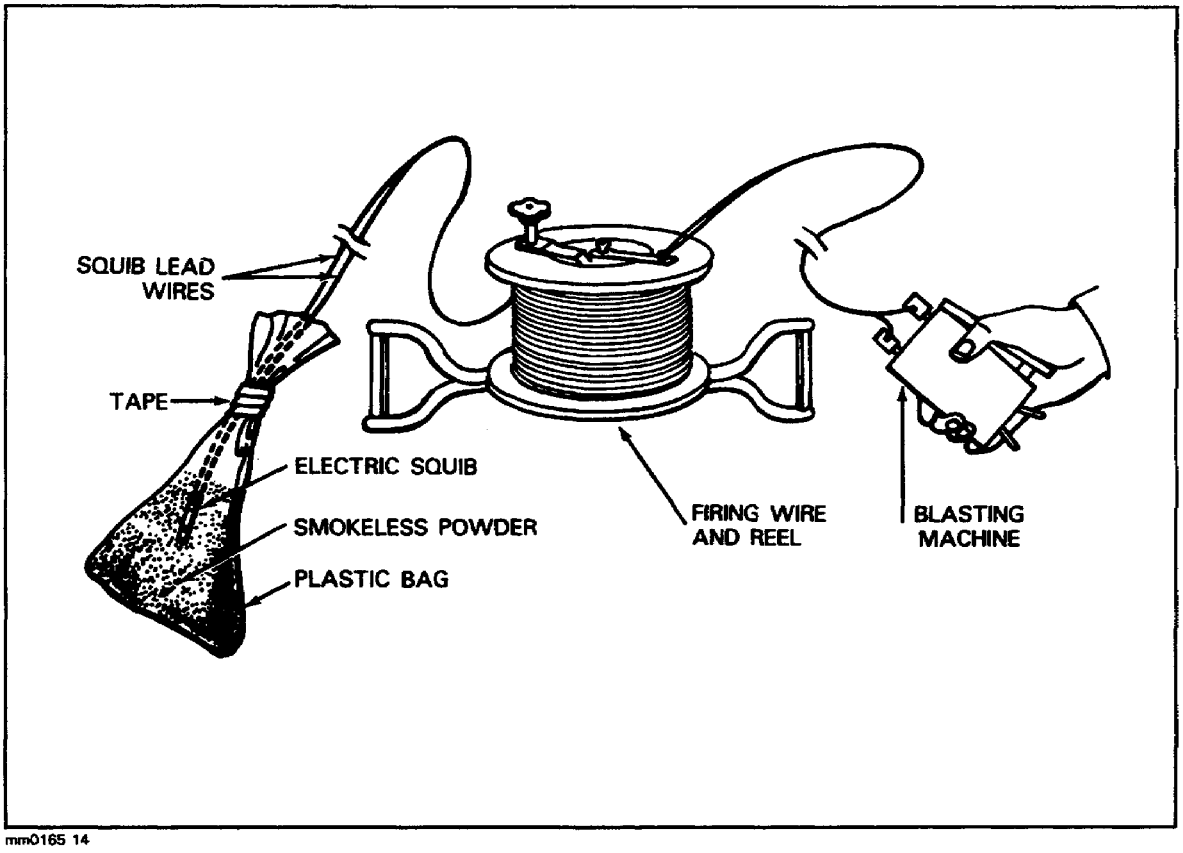


Figure 7. Electric ignition train.

DESTRUCTION BY DETONATION

As discussed earlier, certain types of ammunition may be disposed of by detonation. Disposal by detonation is accomplished by placing demolition charges on the ammunition to be destroyed, priming the charges, and then detonating the charges from a distance.

To perform ED by detonation, you must have the material and equipment to assemble and test the electric and nonelectric firing systems, the combination dual-firing system, and the detonating cord system. You must also have demolition charges.

DEMOLITION MATERIALS

A sufficient amount of demolition materials to destroy all ammunition in the storage facility should be available. Demolition materials may be placed into three categories-standard military explosives, substitute materials, and foreign military explosives.

Standard Military Explosives

Standard military explosives are designed for demolition operations. They include the following:

- NT block demolition charge, 1/2-pound and 1-pound blocks (Figure 8).
- M112 block demolition charge, composition C4 (Figure 9).
- M118 block demolition charge, PETN/RDX (FLEX-X)(Figure 10).
- M37 demolition charge assembly, composition C4 (Figure 11, Page 12).
- M183 demolition charge assembly, composition C4 (Figure 12, Page 13).
- M10 universal explosive destructor (Figure 13, Page 13).

Note. Never use any type of dynamite for ED operations. The explosive energy is not powerful enough for ED purposes.

Substitute Demolition Materials

Substitute demolition materials may be used to assist in ED operations. These may be standard demolition materials that are used for purposes other than for what they were designed. These materials include the following.

- Fifteen-pound M2A3 and M2A4 demolition charges.
- Forty-pound M3 and M3A1 shaped demolition charges.
- Bangalore torpedoes (amatol or composition B).
- M15, M19, and M21 antitank (AT) land mines (defuzed).
- HE artillery projectiles.
- HE aerial bombs (250-pound through 2,000-pound). Do not use cluster bombs or CBUs for ED purposes.
- Rocket motors and warheads if no other HE items are available.

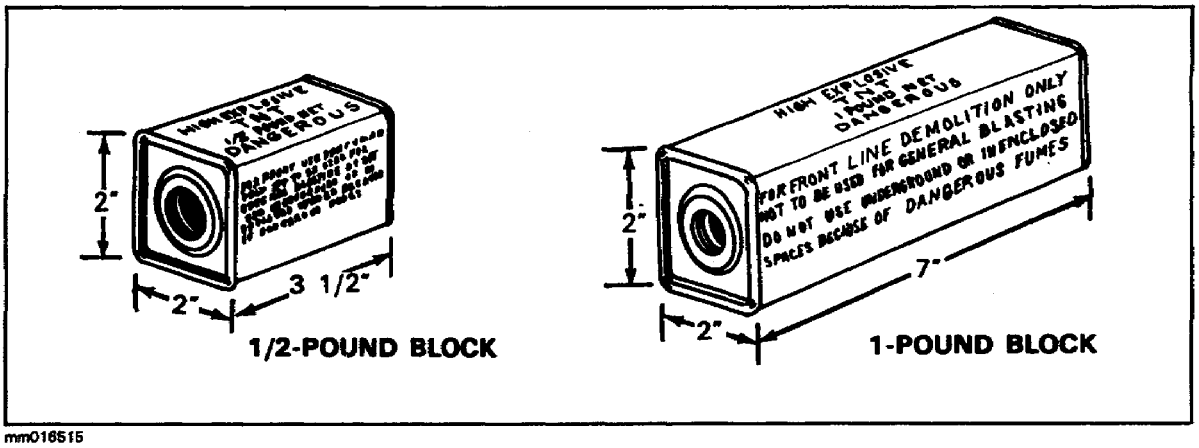


Figure 8. TNT block demolition charges.

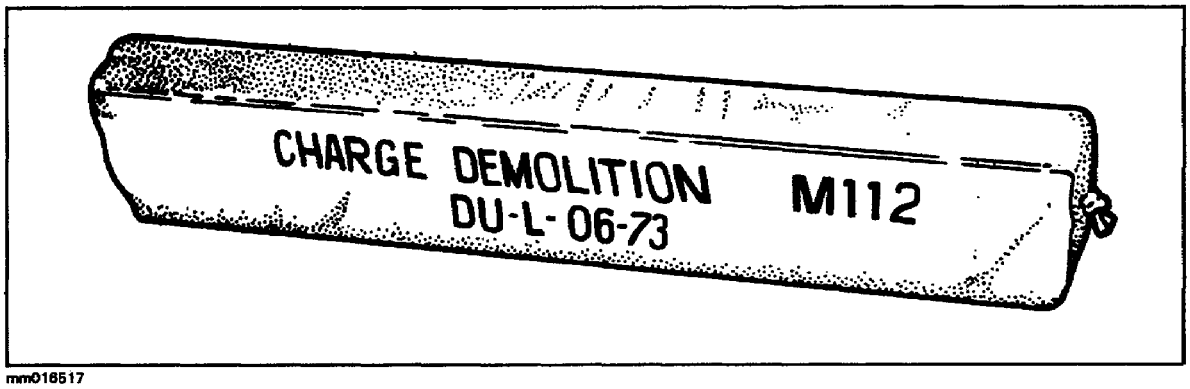


Figure 9. M112 block demolition charge.

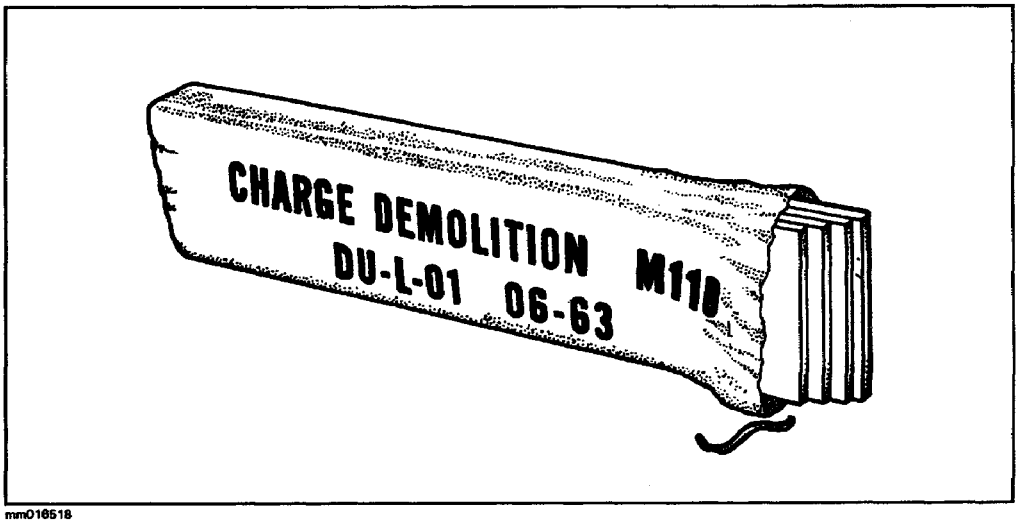


Figure 10. M118 block demolition charge.

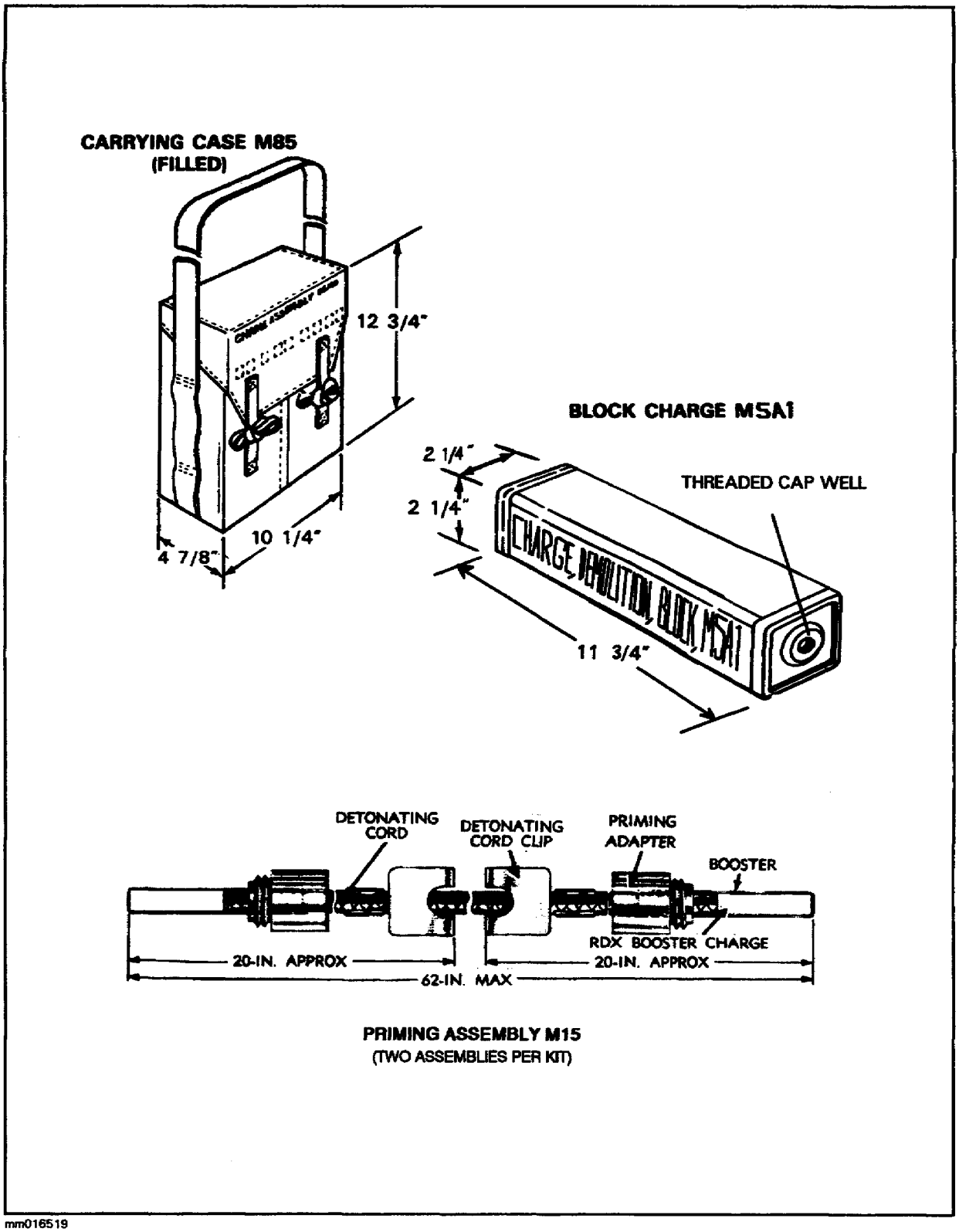


Figure 11. M37 demolition charge assembly.

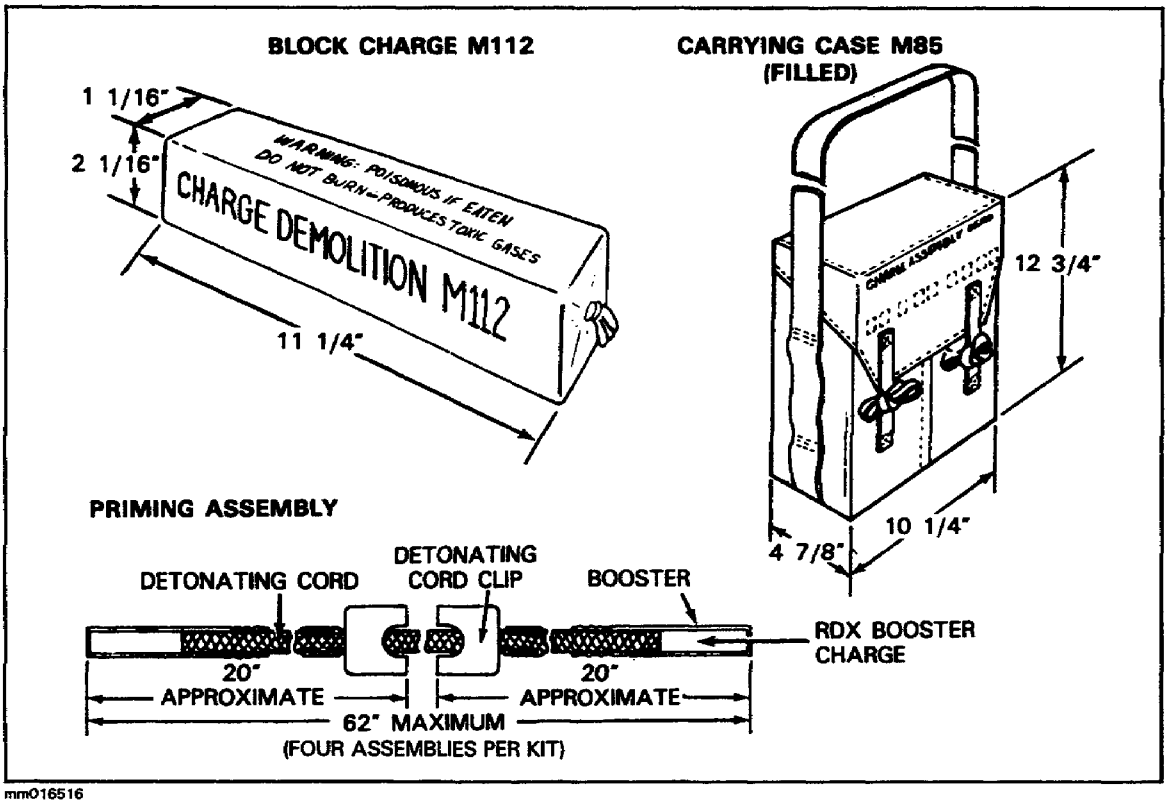


Figure 12. M183 demolition charge assembly.

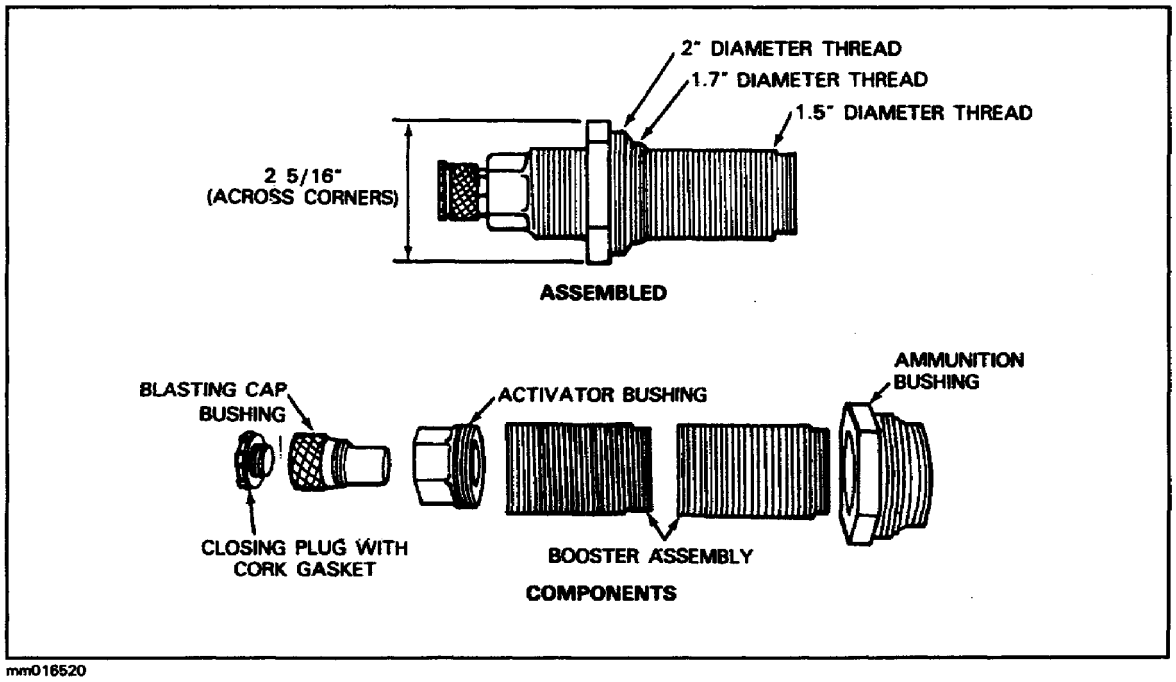


Figure 13. M10 universal explosive destructor.

Foreign Military Explosives

Foreign military explosives may be used as a last resort to supplement US demolition materials. Their use must be by explosive ordnance disposal (EOD) or experienced, demolition-trained personnel.

DEMOLITION FIRING SYSTEMS

There are two standard types of firing systems used for ED operations. These are the electric and the nonelectric firing systems. A firing system consists of an initiator, a transfer medium, and a detonator. A combination dual-firing system uses an electric and a nonelectric firing system. The detonating cord system is used to initiate charges as a component of an electric or nonelectric firing system.

Electric Firing System

The electric firing system is preferred when time allows its use. It can be used for destruction by detonation or by burning. It is preferred because it provides total control of when the shot will be fired. This system must not be used during electrical storms, when there is an electromagnetic radiation (EMR) hazard present, or when there are high levels of power from radio and/or radar transmissions.

The electric firing system may be used without a ring main to destroy an individual stack, a magazine, or to initiate a ring main. The electric firing system should be dual primed for individual shots, which means two blasting caps in the same explosive charge. When used in a combination dual-firing system, the independent electric system is used as a back up for the nonelectric system.

An electric firing system consists of an electric blasting machine M32 or M34, the firing wire and reel, and an electric blasting cap. See Figure 14. When the blasting machine is activated, it generates an electric impulse that travels through the firing wire to fire the electric blasting cap (either military or commercial). The tools and test equipment needed to assemble the electric firing system are shown in Figure 15. The proper methods and the sequence of electric priming operations are discussed in the following paragraphs.

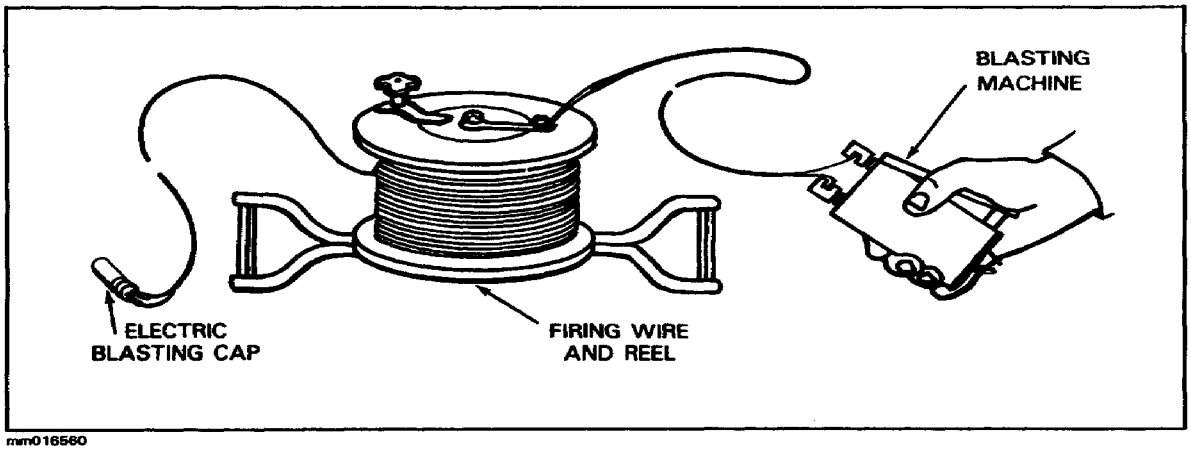


Figure 14. Electric firing system.

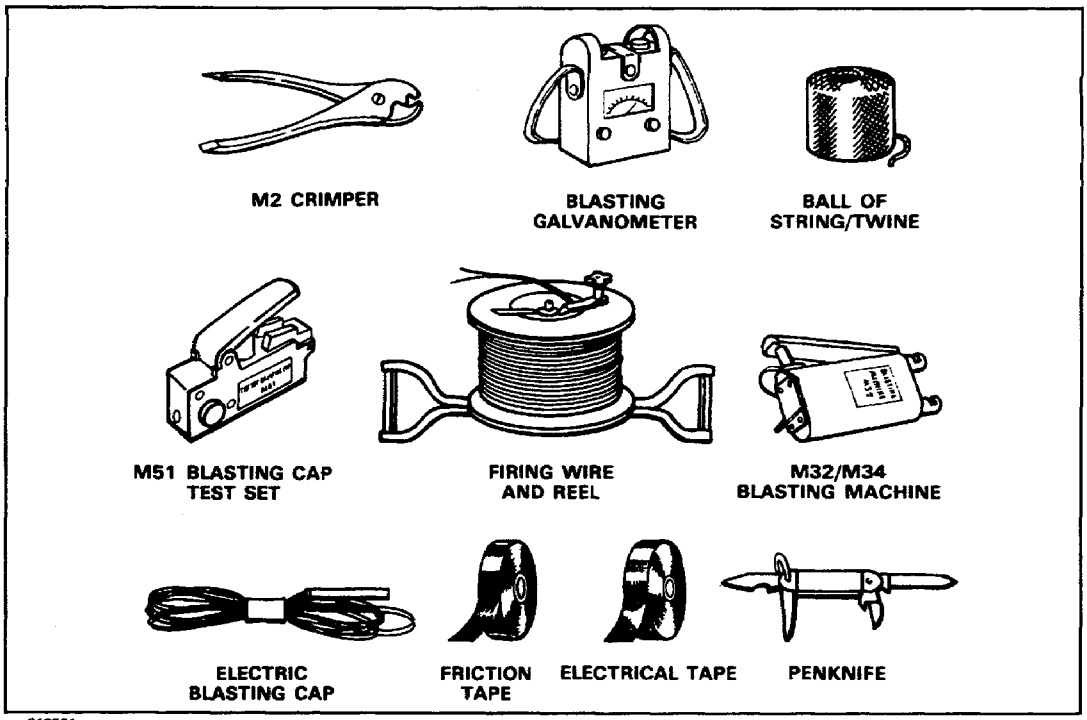


Figure 15. Tools and equipment for assembling an electric firing system.

Test Firing Wire. To test the firing wire, follow the steps listed below and refer to the figures.

- Lay out the firing wire from the charges to the firing position.
- Test the galvanometer or the M51 blasting cap test set for serviceability. See Figure 16.
- Test the firing wire for shorts and continuity using the galvanometer or the M51 blasting cap test set. See Figures 17 through 20, Pages 16 and 17.

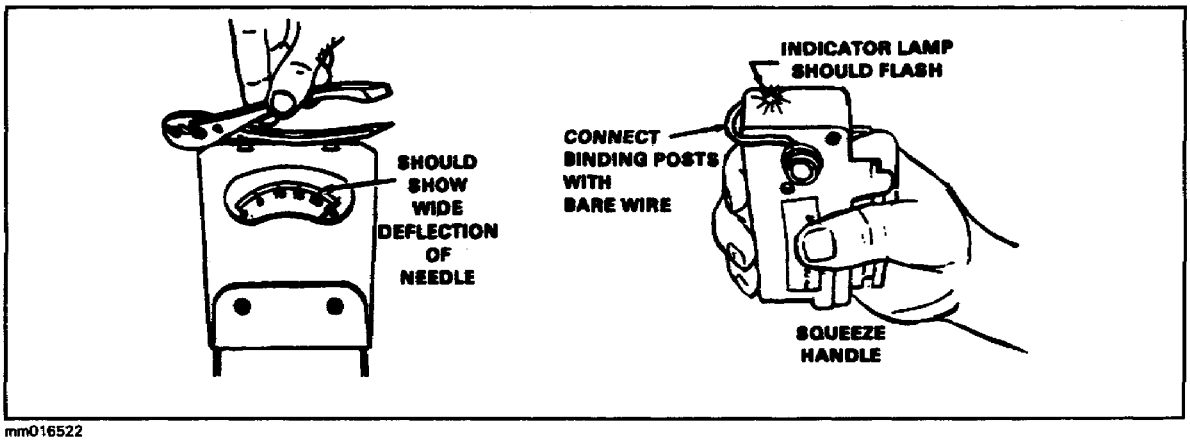


Figure 16. Testing the galvanometer or test set for serviceability.

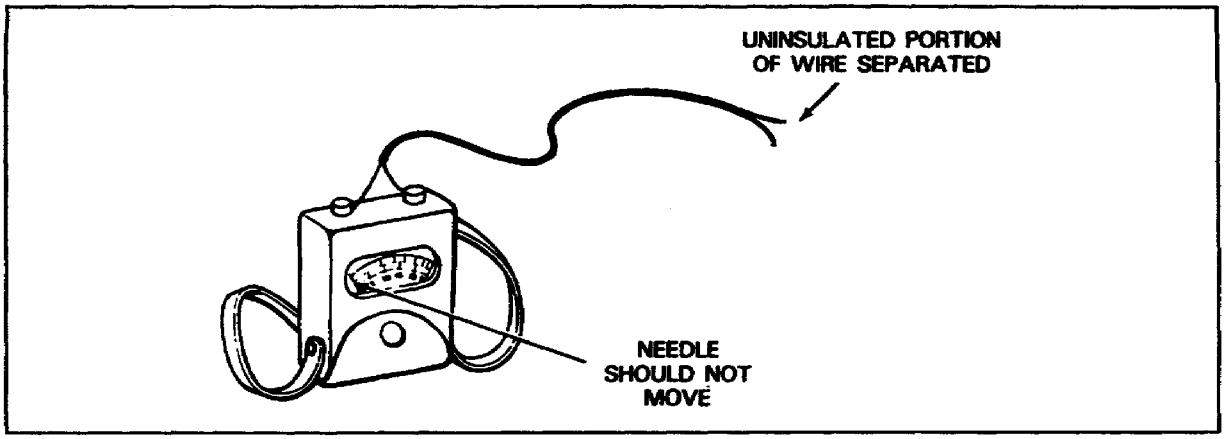


Figure 17. Testing for shorts using the blasting galvanometer.

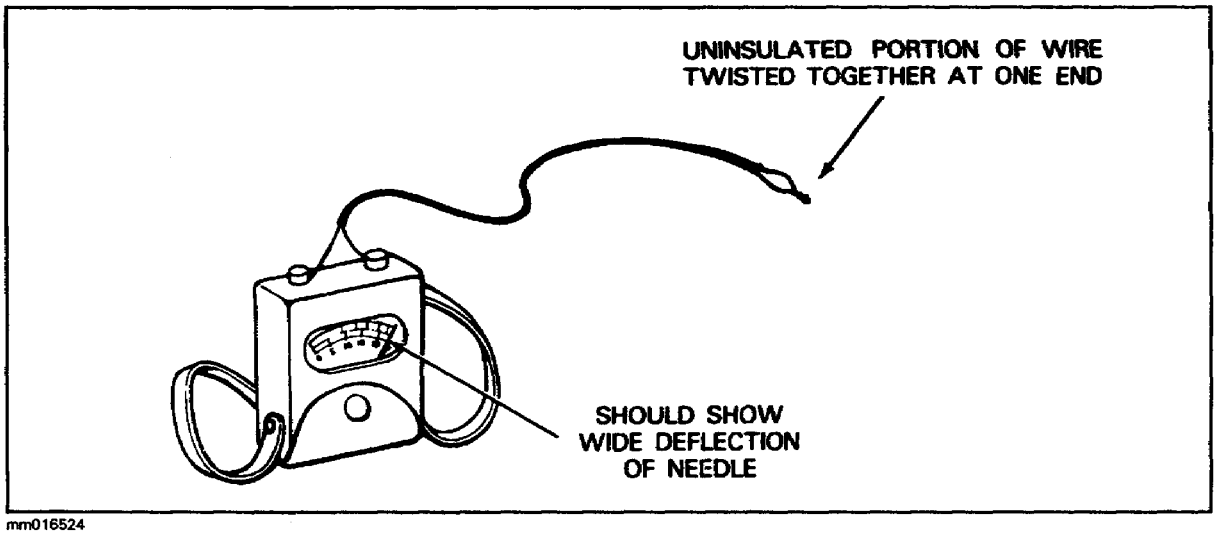


Figure 18. Testing for continuity using the blasting galvanometer.

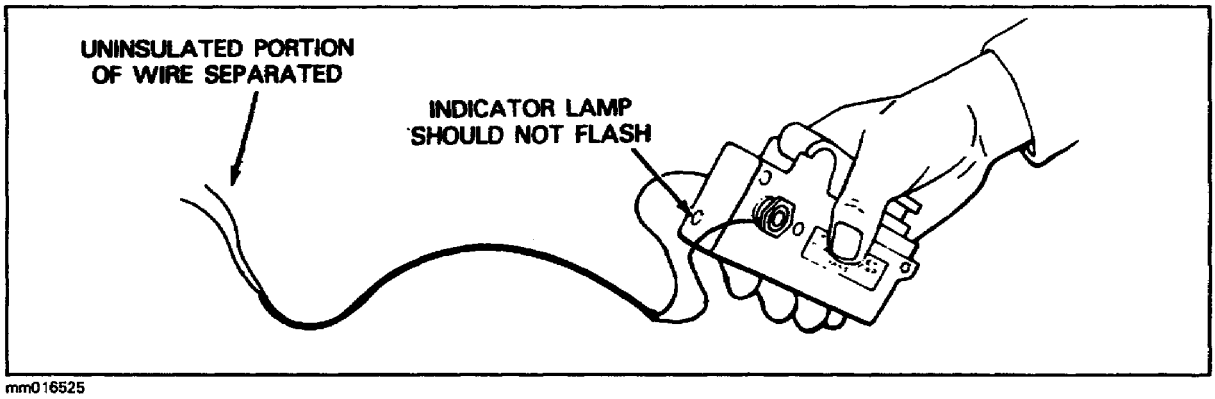


Figure 19. Testing for shorts using the M51 blasting cap test set.

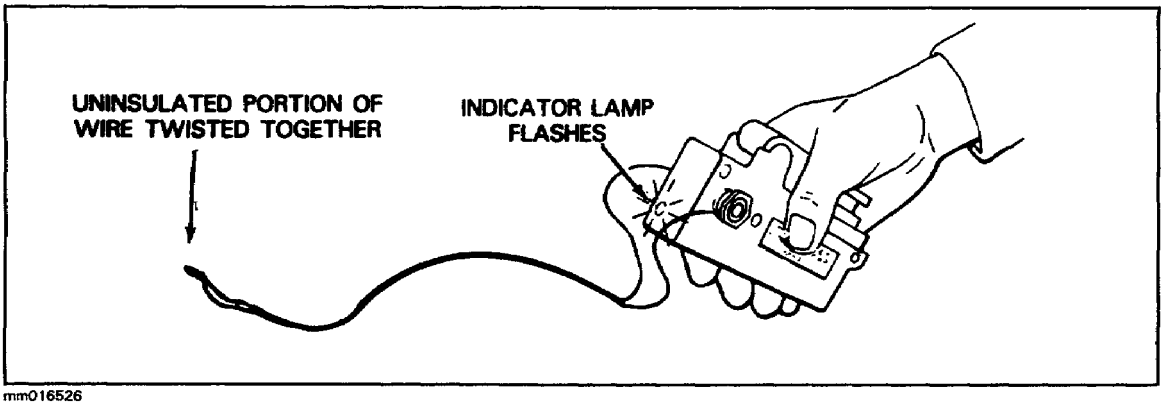


Figure 20. Testing for continuity using the M51 blasting cap test set.

Test Electric Blasting Caps. Test the electric blasting caps using the steps that follow.

- Place the blasting cap under a sandbag.
- Uncoil or unfold the blasting cap lead wires.
- If using the galvanometer, touch one cap lead wire to one galvanometer post and the other lead wire to the other post. If the galvanometer's needle deflects widely, the cap is satisfactory. See Figure 21.
- If using the M51 blasting cap test set, attach one cap lead wire to one binding post. Tie the other lead wire to the other post and squeeze the test set handle. The blasting cap is satisfactory if the indicator lamp flashes. See Figure 21.

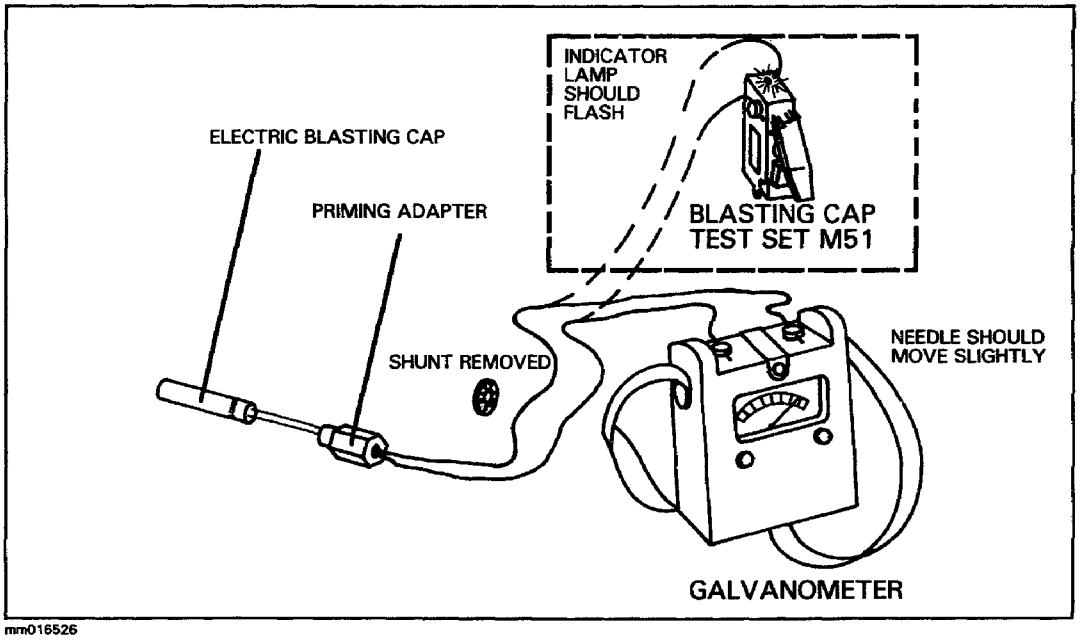


Figure 21. Testing electric blasting cap.

Splice the Electric Blasting Cap to the Firing Wire. Splice the blasting cap to the firing wire using the steps that follow.

- Strip 3 inches of insulating material from the blasting cap lead wires and the firing wire leads using the M2 crimpers.
- Two wires may be spliced as shown in Figure 22. This procedure is called the Western Union pigtail splice. The Western Union pigtail is the Army's standard field wire splice.

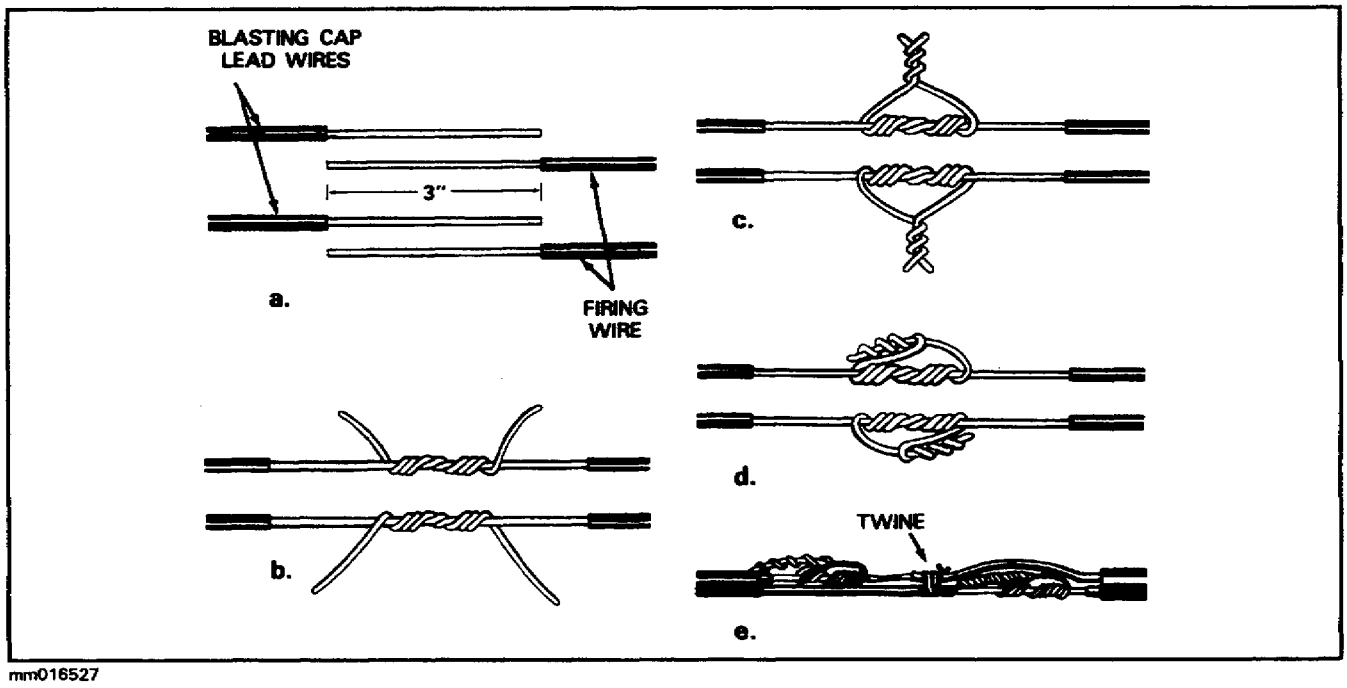


Figure 22. Splicing the electric blasting cap to the firing wire using the Western Union pigtail splice.

Connect Series Circuit. Connect the series circuit using the steps that follow.

- Connect the blasting cap lead wires into the common series circuit or the leapfrog series circuit if two or more blasting caps are used. See Figure 23.
- Splice the blasting cap lead wires to the firing wire.

Prime the Charge. Prime a demolition charge using a blasting cap with a priming adapter (Figure 24) and the steps that follow.

- Untwist the free ends of the lead wires and fasten them to the firing wire.
- Pass the lead wires through the slot in the adapter.
- Pull the cap into place in the adapter.
- Insert the cap into the cap well of the demolition block and screw the adapter in place.

Prime a charge using a blasting cap without a priming adapter (Figure 25, Page 20) and the steps that follow.

- Untwist the free ends of the lead wires and fasten them to the firing wire.
- Insert the electric cap into the cap well.

- Tie the lead wires around the block by using two half hitches.
- Allow some slack in the wires between the blasting cap and the tie in order to prevent any pull on the cap.

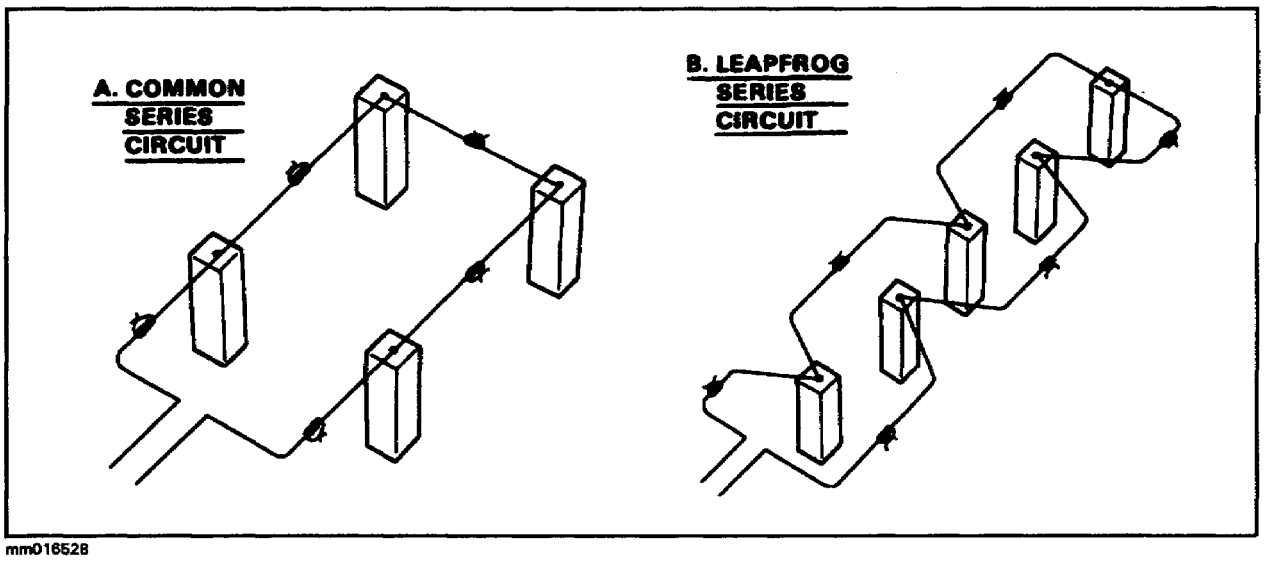


Figure 23. Connecting series circuit.

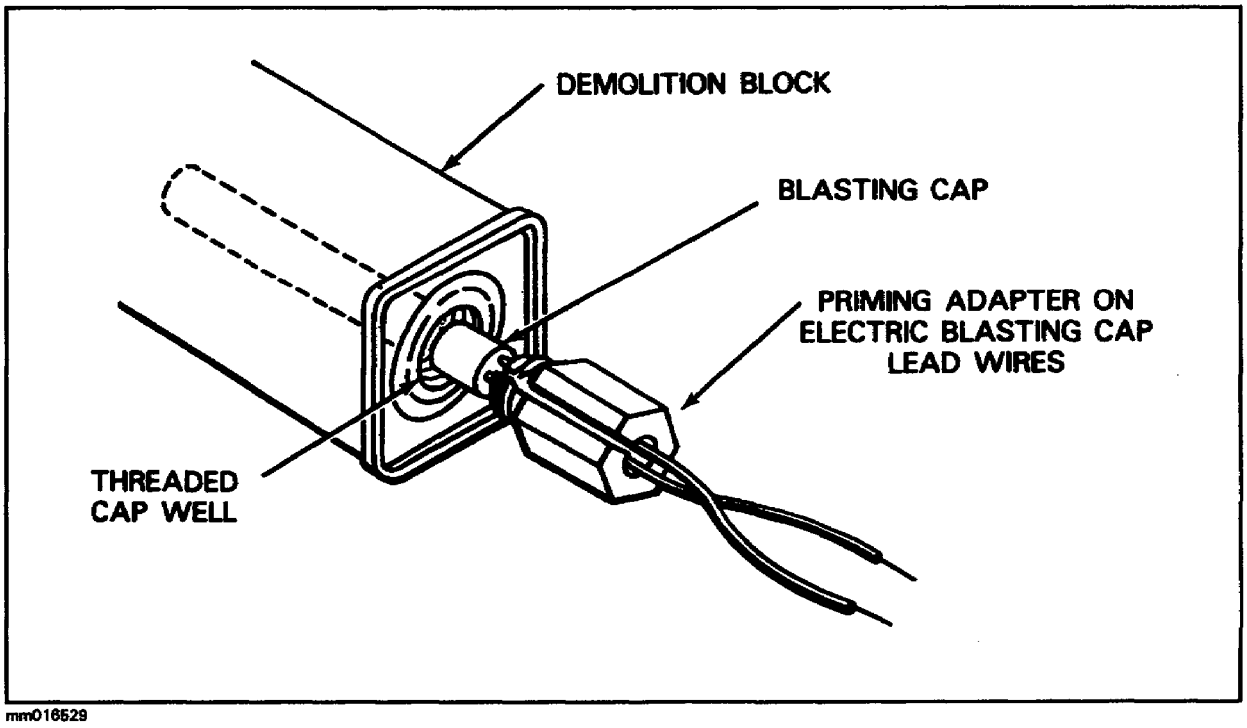


Figure 24. Priming a charge using a blasting cap with a priming adapter.

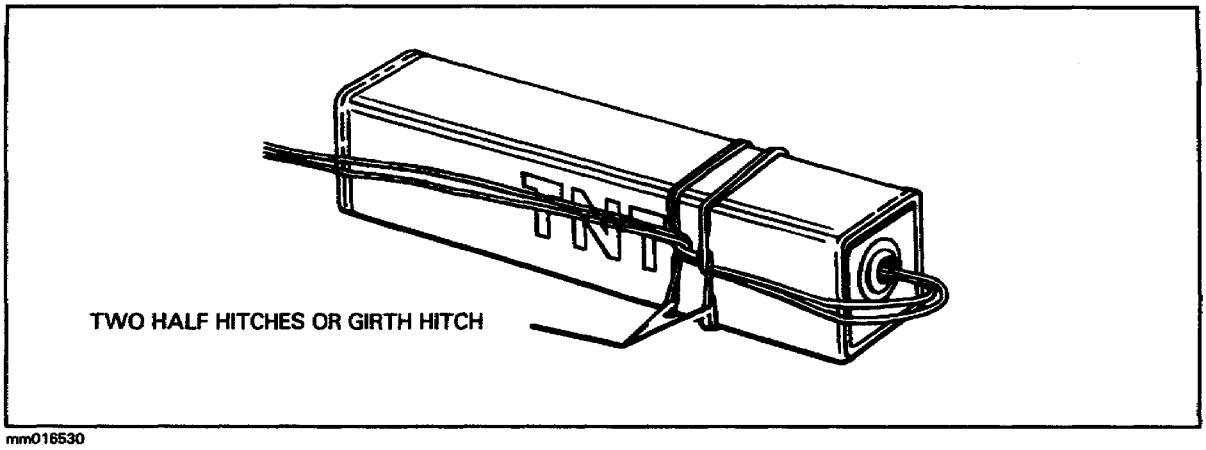


Figure 25. Priming a charge using a blasting cap without a priming adapter.

Test Series Circuit. Test the series circuit using the steps that follow.

- Connect the free ends of the firing wire to the binding posts when using the M51 blasting cap test set. The indicator lamp should flash. If the lamp does not flash, the circuit is defective.
- Touch the free ends of the firing wire to the galvanometer posts. This should cause a wide deflection of the needle. The extent of the deflection depends on the number of caps and the length of the firing wire.

Test Operate the Blasting Machine. Test operate the blasting machine (Figure 26) using the steps that follow.

- Free the D ring that holds the plunger handle against the machine's body. The plunger is spring-loaded, so the handle is in the ready-to-fire position when freed from the D ring.
- Stroke the handle three or four times. The neon indicator lamp located within the plastic housing between the two terminals should glow briefly.

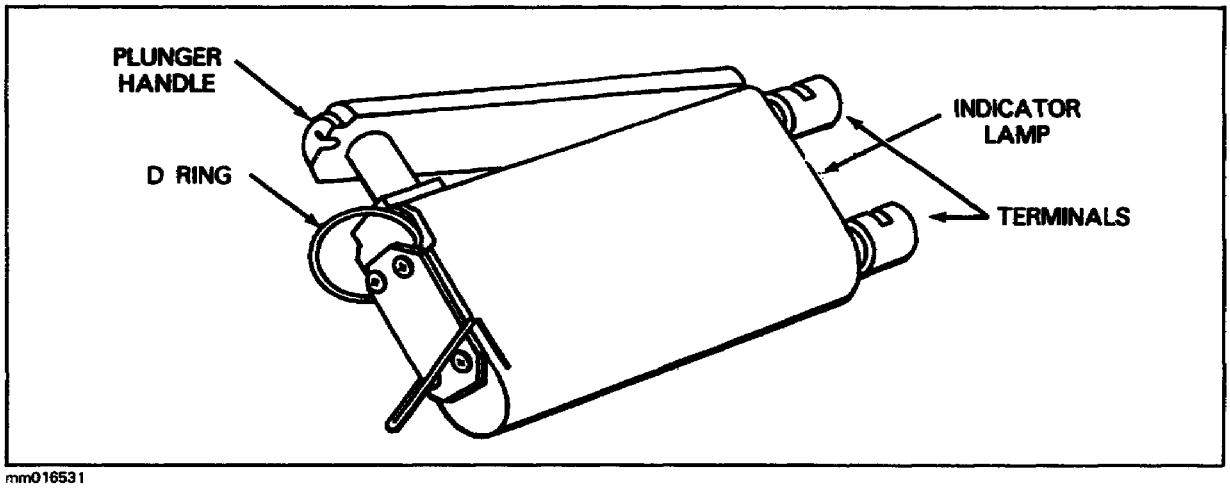


Figure 26. M32/34 blasting machine.

Connect Blasting Machine to Firing Circuit. Connect the blasting machine to the firing circuit using the steps that follow.

Warning. Do not connect the blasting machine to the firing wire until all prefiring tests have been completed and a signal is received from the supervisor that the area has been cleared of all personnel and equipment.

- Before connecting the blasting machine, make sure that all blasting caps are included in the firing circuit; that all connections between the blasting cap wires, connecting wires, and firing wire are properly made; and that the number of blasting caps in any circuit does not exceed the rated capacity of the blasting machine being used.
- Connect the blasting machine to the firing circuit by fastening the ends of the firing wire to the two terminals of the blasting machine.

Nonelectric Firing System

The nonelectric firing system is used when full control of the shot is not required. When the electric firing system is not feasible, the nonelectric firing system will be used. Unlike the electric firing system, it can be used in all weather conditions and is not affected by EMR hazards or radio/radar transmissions.

Like the electric firing system, the nonelectric firing system must also be dual primed. The nonelectric firing system consists of the fuse igniter, time blasting fuse, and the nonelectric blasting cap. See Figure 27. The nonelectric explosive initiating demolition equipment set is shown in Figure 28, Page 22. There are four steps in assembling the nonelectric firing system.

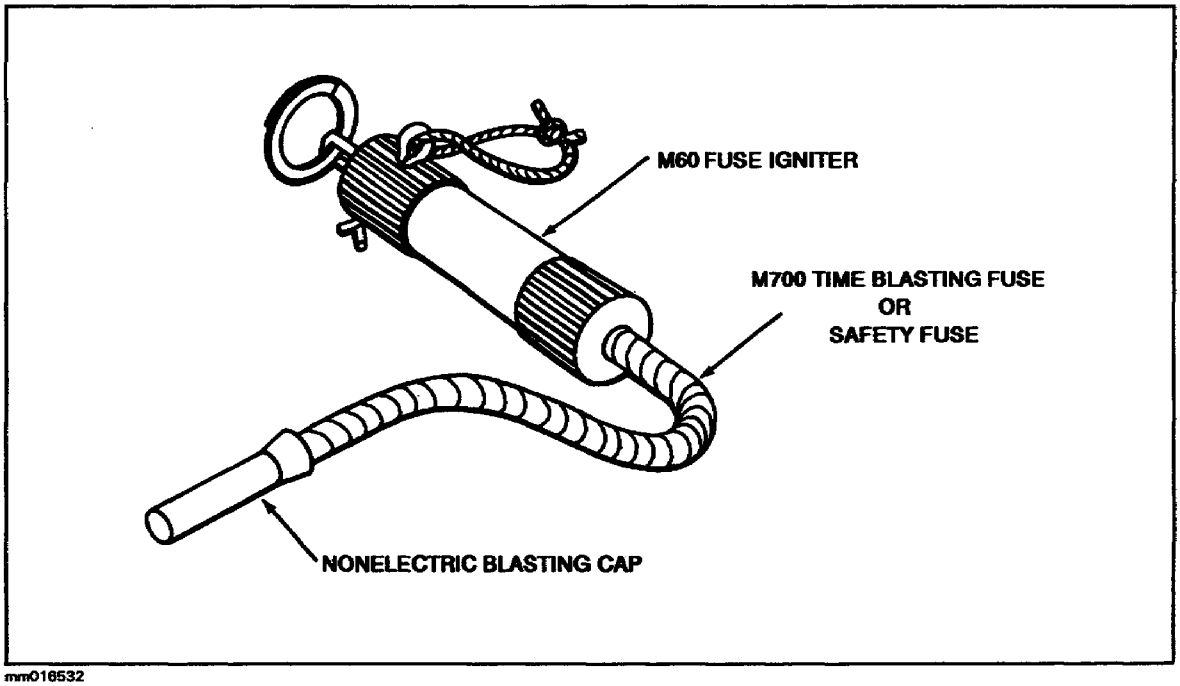


Figure 27. Nonelectric firing system.

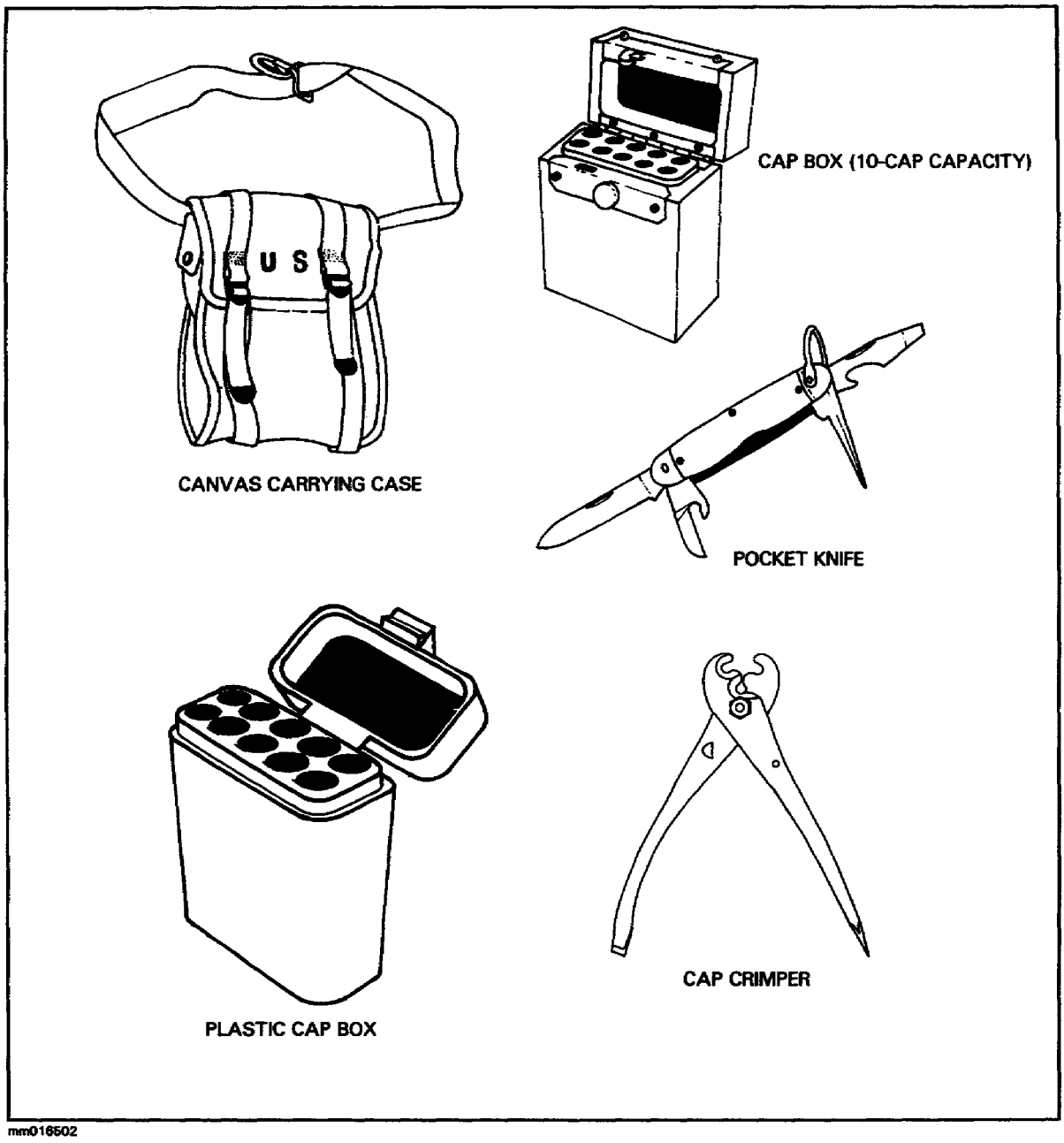


Figure 28. Nonelectric explosive initiating demolition equipment set.

Test Burning Rate of Time Blasting Fuse. There are two types of interchangeable fuses-safety fuse and M700 time fuse. See Figure 29. Using the M2 crimpers, cut off a 3-foot length of time blasting fuse. See Figure 30. Loosen the cap on the M60 fuse igniter and remove the shipping plugs. Attach the igniter to one end of each length of time fuse. To do this, insert the time fuse into the end of the igniter as far as possible. Tighten the fuse holder cap sufficiently to hold the fuse in place. See Figure 31. Ignite the fuse with the igniter. Note the time it takes for the fuse to burn. The burning rate will vary from 30 to 45 seconds per foot. Compute the burning rate per foot by dividing the time in seconds by the length in feet. See Figure 32, Page 24.

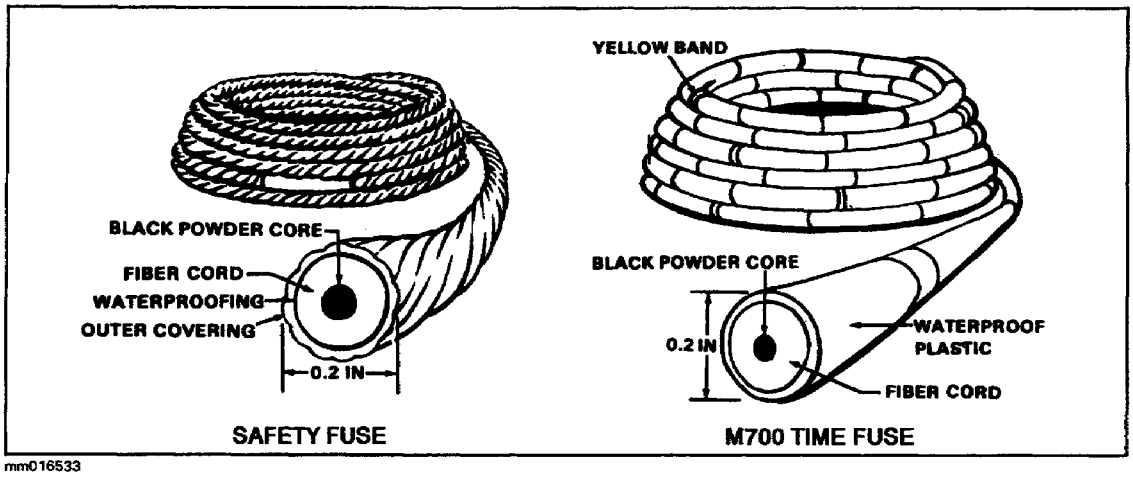


Figure 29. Time blasting fuse.

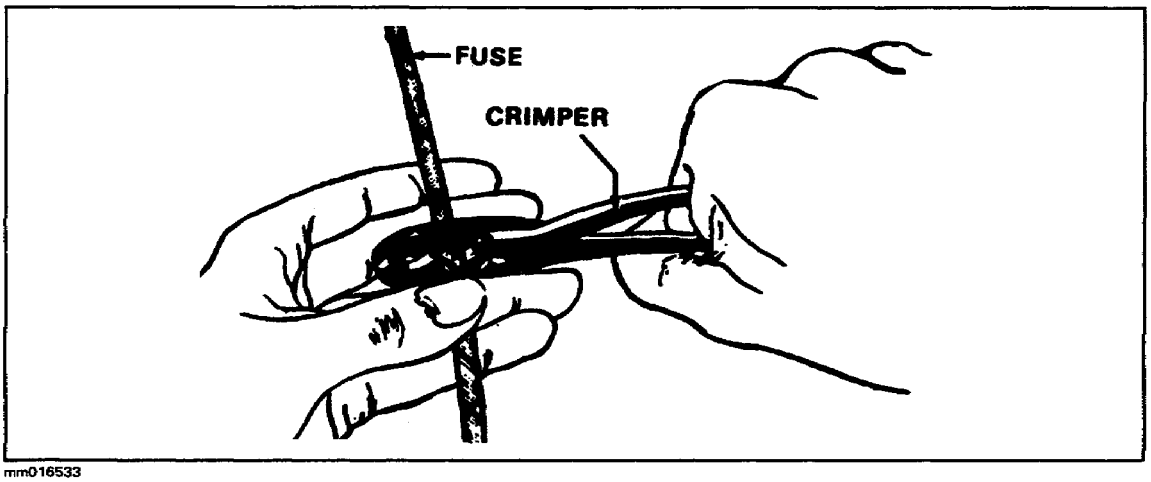


Figure 30. Cutting the fuse.

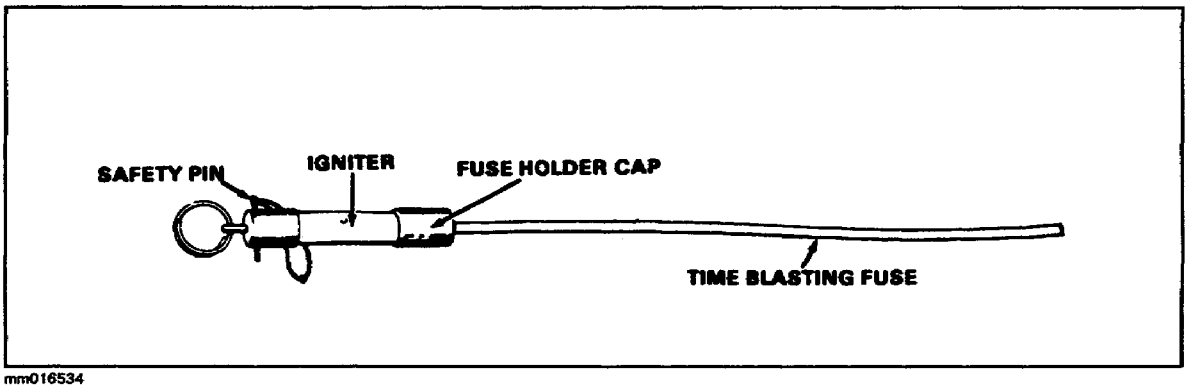


Figure 31. Inserting the time fuse into M60 fuse igniter.

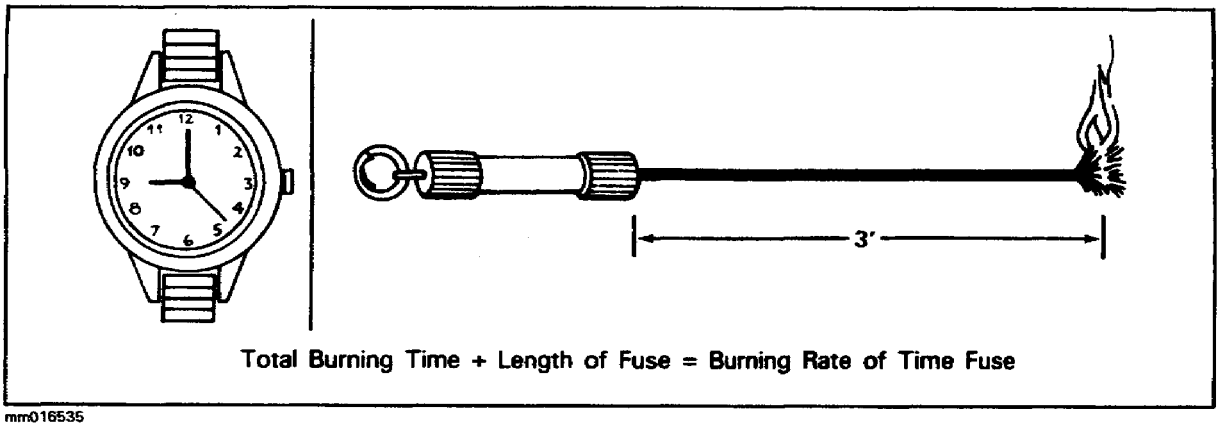


Figure 32. Timing the burning rate of the time blasting fuse.

Prepare Time Fuse. After the burn rate of the time fuse has been determined, cut the necessary length of time fuse. The length of the time fuse should be long enough to permit the person detonating the charge to reach a safe distance from the explosion by walking at a normal pace. Cut two lengths of time fuse and attach fuse igniter. One length is to be used for dual priming. The ED SOP will dictate burning time requirements.

Prepare Blasting Cap. Take a blasting cap (Figure 33) from the cap box. Gently slip the blasting cap over the free end of the M700 time fuse or the safety fuse. See Figure 34. Make sure the cap is in contact with the time fuse. Crimp the blasting cap at a point one-eighth to one-quarter of an inch from the open end. See Figures 35 and 36, Pages 25 and 26.

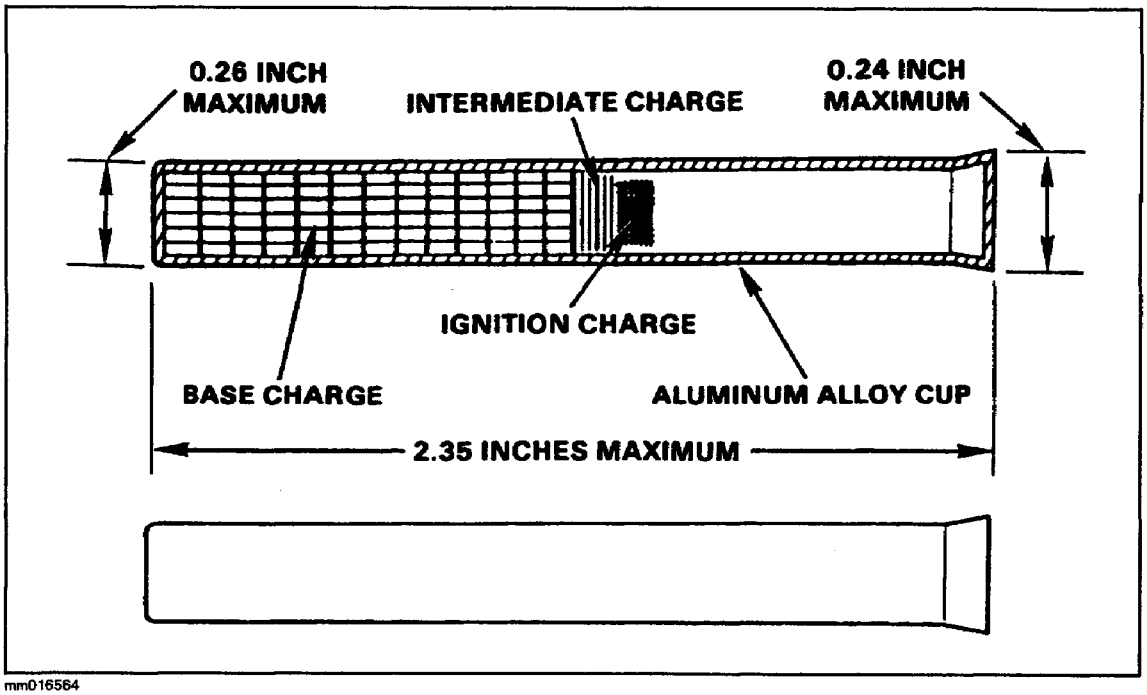


Figure 33. Nonelectric blasting cap.

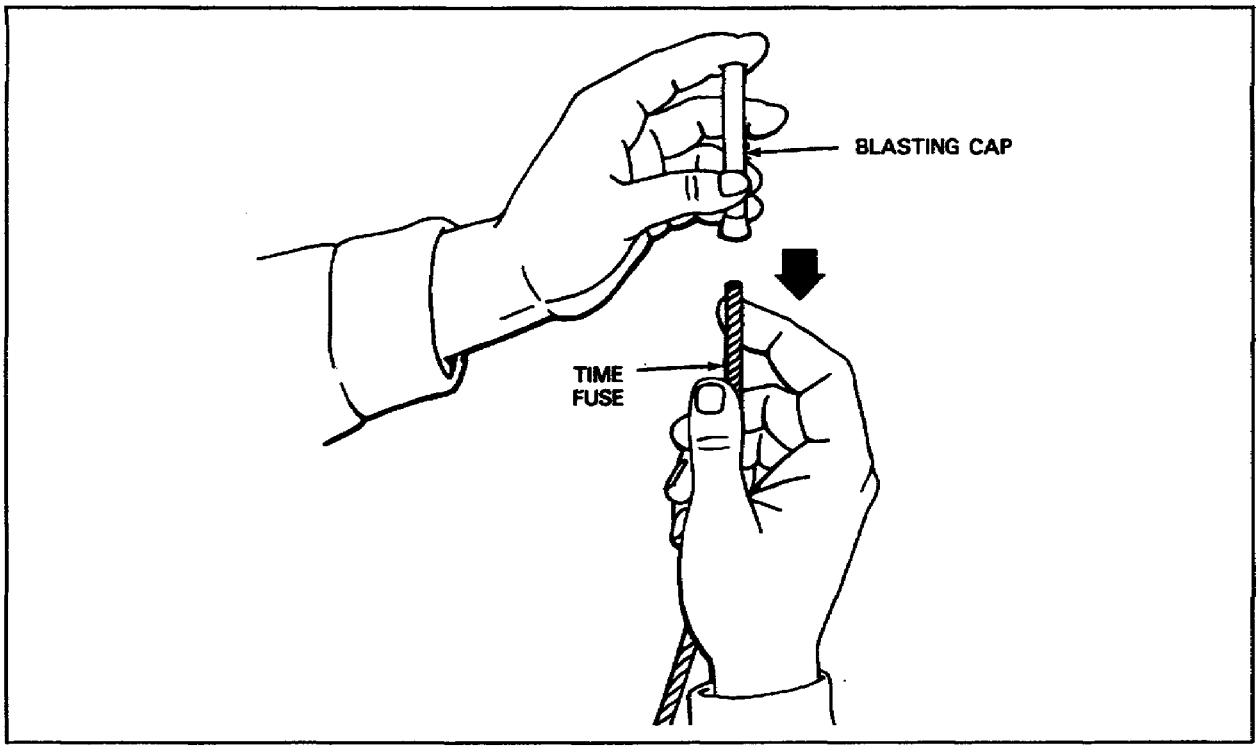


Figure 34. Placing a blasting cap over time fuse.

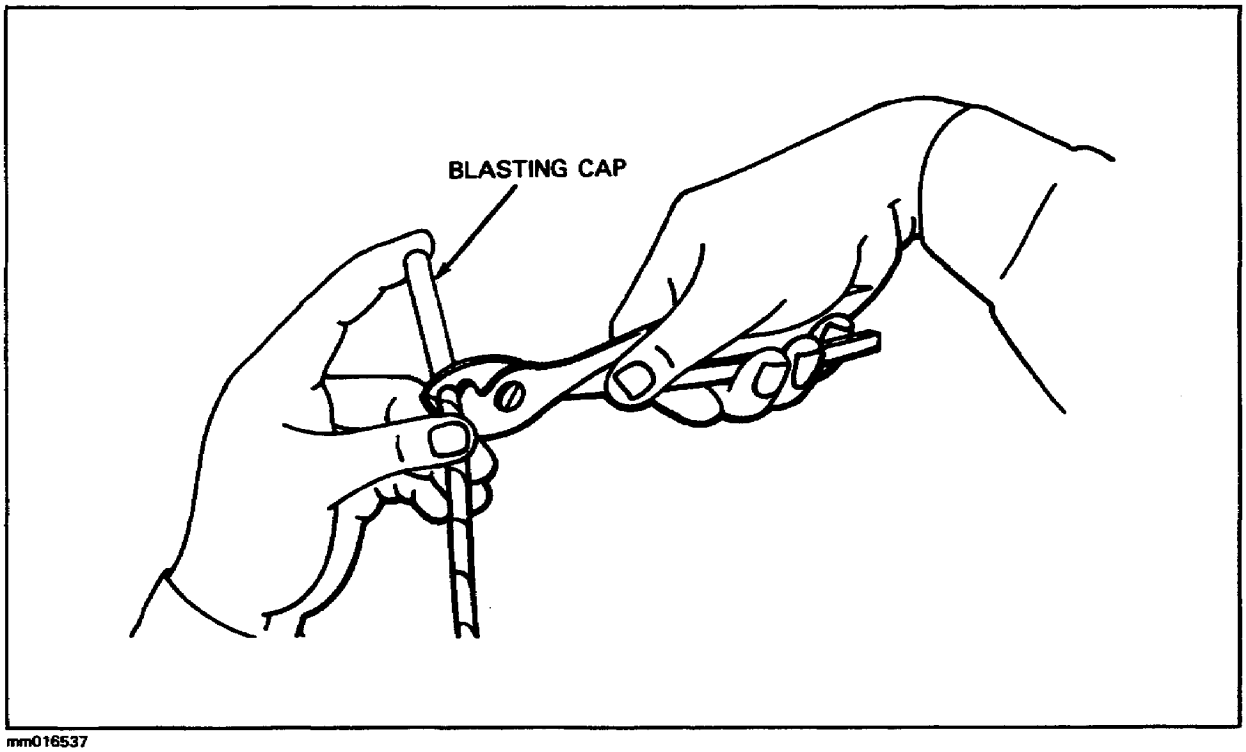


Figure 35. Starting the crimp.

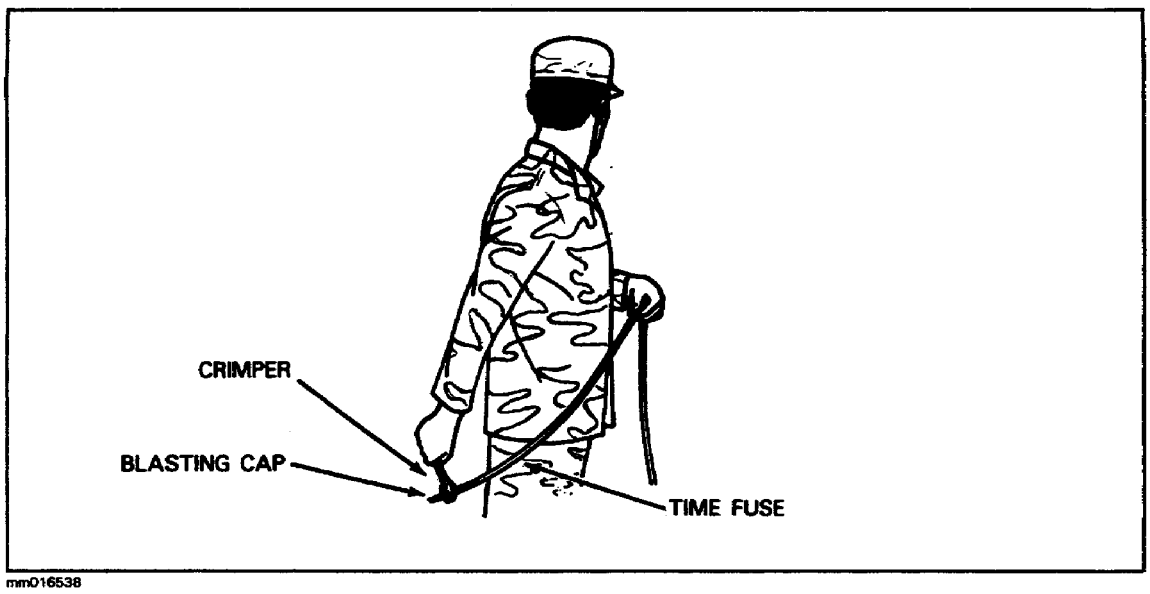


Figure 36. Completing the crimp.

Prime the Charge. Basically, the procedures for priming the nonelectric firing system are the same as those for the electric firing system. As with the electric firing system, a priming adapter should be used, if available, to prime a demolition block with a threaded cap well. See Figure 37. When a priming adapter is not available, prime a demolition block with threaded cap well as shown in Figure 38.

To prime a demolition block that has no cap well, use the pointed leg of the M2 crimper to make a hole in the end of the demolition block that is large enough to hold the blasting cap. Wrap string around the demolition block several times and tie a secure knot. Insert the fused cap into the hole. Tie the string around the time fuse at the top of the hole with two half hitches. See Figure 38.

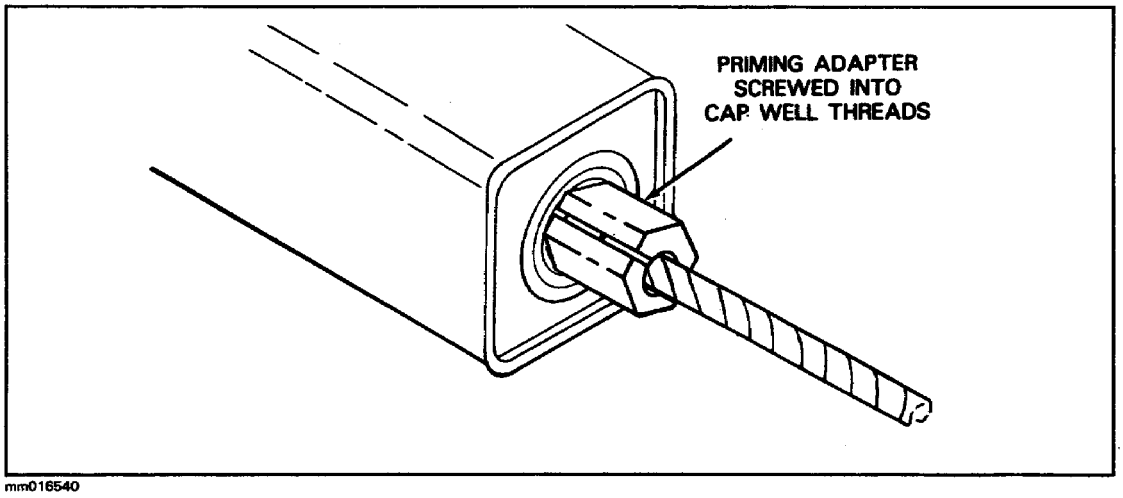


Figure 37. Nonelectric priming with priming adapter.

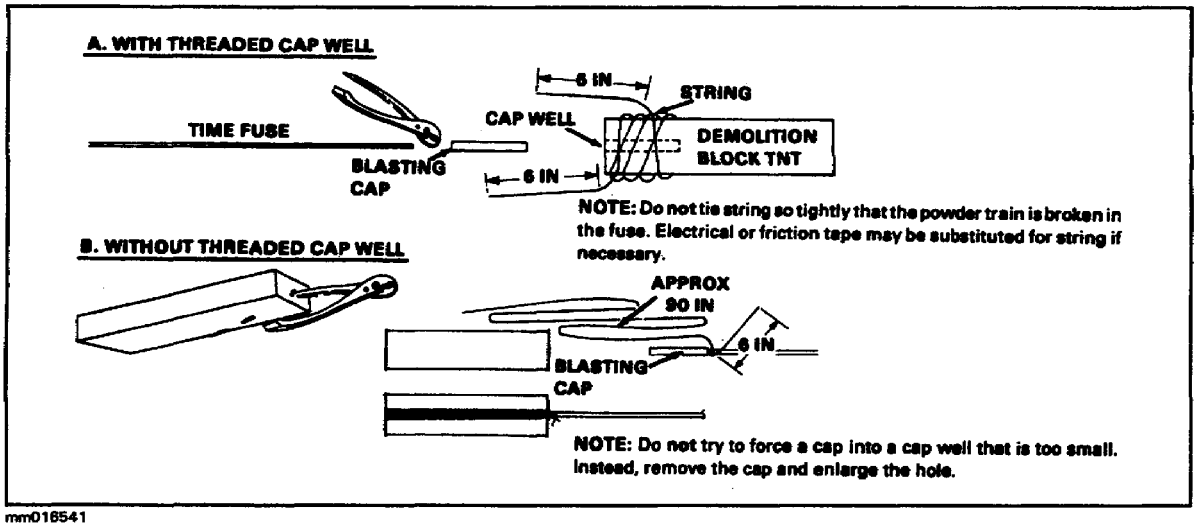


Figure 38. Nonelectric priming without priming adapter.

The nonelectric firing system is now ready to be hooked or taped to the detonating cord or the main charge. If an M60 fuse igniter is not available, the system may be ignited with a match. See Figure 39.

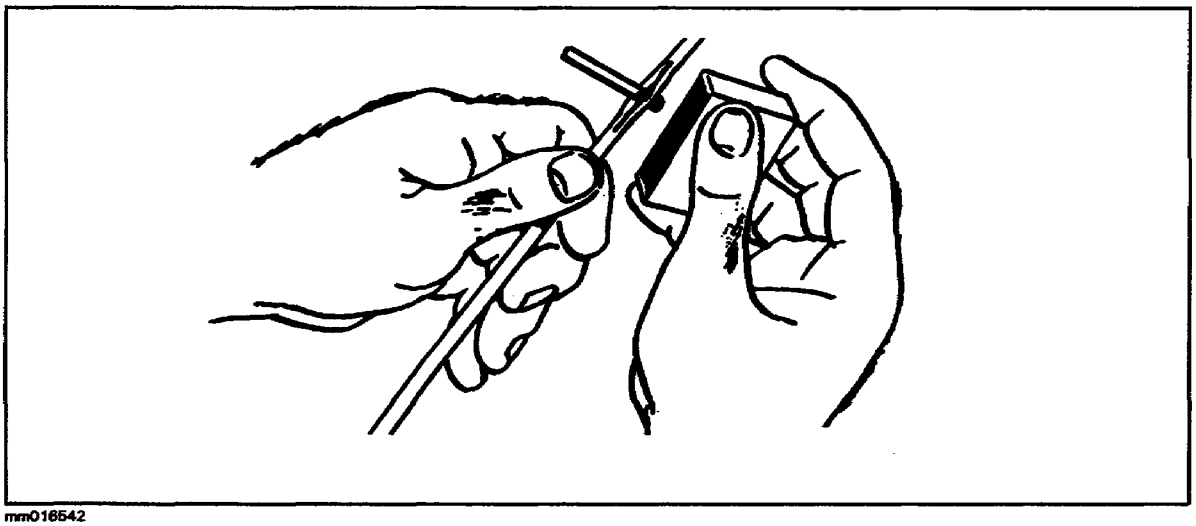


Figure 39. Lighting time fuse with a match.

Combination Dual-Firing System

The combination dual-firing system uses one electric and one nonelectric firing system tied to the main charge or the ring main. The nonelectric system is fired first. The electric system is used as a back up or command fire, if required.

Detonating Cord System

A detonating cord system consists of two or more branch lines of detonating cord primed to demolition charges that are connected to the ring main. The system is used to initiate explosive charges as a component of an electric or nonelectric firing system. It is used when more than one charge must be detonated simultaneously.

Detonating cord acts as an instantaneous fuse to transmit the explosive shockwave from the blasting cap to the demolition charge. See Figure 40. It is usable underground or underwater. The initiation of the cord is achieved by an electric or nonelectric blasting cap located above ground or above water.

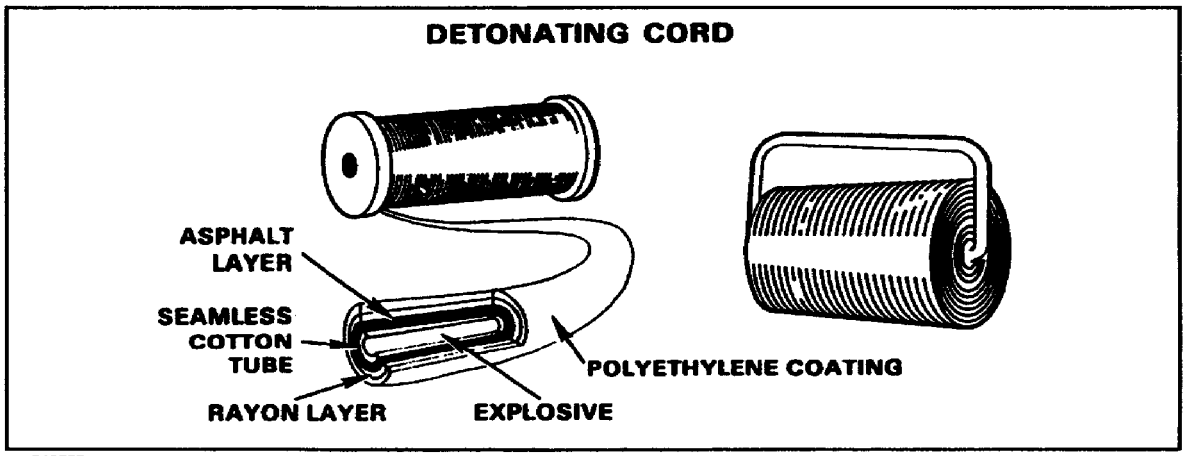


Figure 40. Reinforced Pliofilm-wrapped detonating.

Detonating cord is issued in 100-foot and 1,000-foot spools. The 1,000-foot spool is best suited for long tie-ins and the ring main. The 100-foot spool is best suited for branch lines and other small jobs.

In addition to general safety requirements, the precautions listed below should be followed when using detonating cord:

- Avoid sharp bends or kinks.
- When fastened together, make sure that the angle formed by a branch line and a main line is at least 90 degrees.
- Make sure that there is a clearance of at least 1 foot or the height of a full sandbag between crossed detonating cord lines. See Figure 41.

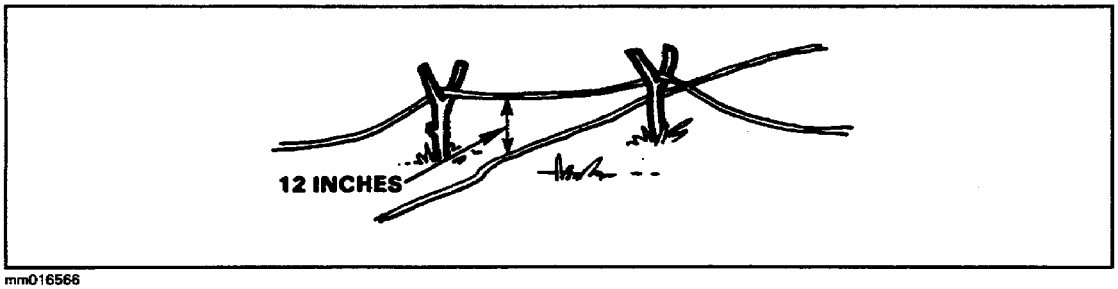


Figure 41. Minimum clearance between crossed detonating cord lines.

There are three steps in assembling a detonating cord system:

- Lay the ring main.
- Lay the branch lines and connect them to the ring main.
- Prime the charges.

Ring Main. A ring main is a continuous loop of detonating cord. See Figure 42. The loop is laid from the initiating point, past each group of munitions to be destroyed, and back to the initiating point. The ring main distributes the explosive energy shockwave from one point to another in order to explode several individual explosive charges simultaneously. The length of a ring main may range from a few feet to several miles, depending on the size of the mission. Because of its length, the ring main should be laid using the 1,000-foot spool of detonating cord. However, it may still be necessary to connect several spools of cord together in order to complete the ring main. If necessary, splice the cord together as follows:

- Splice using the M1 detonating cord clip. See Figure 43, Page 30.
- Splice using the detonating cord connector. See Figure 44, Page 30.
- Splice using a square knot. See Figure 45, Page 30.

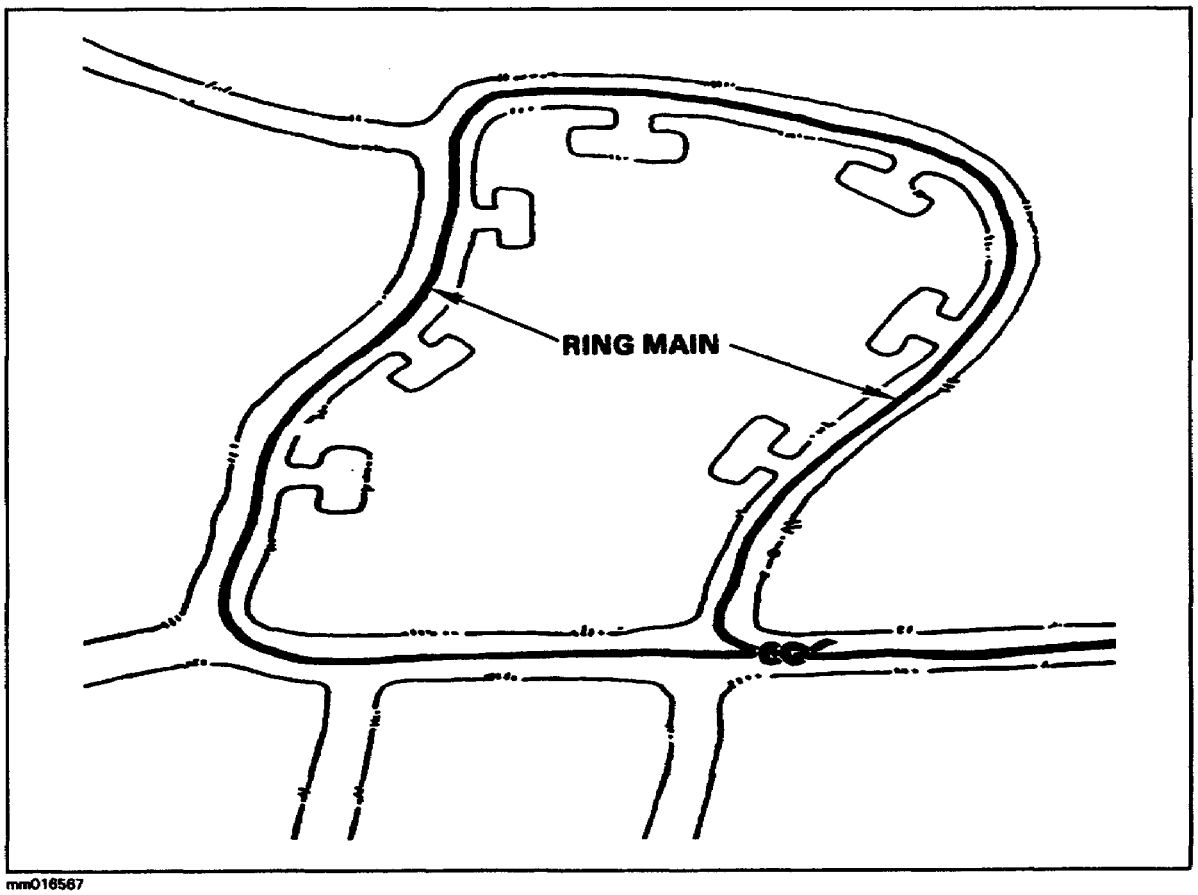


Figure 42. Ring main.

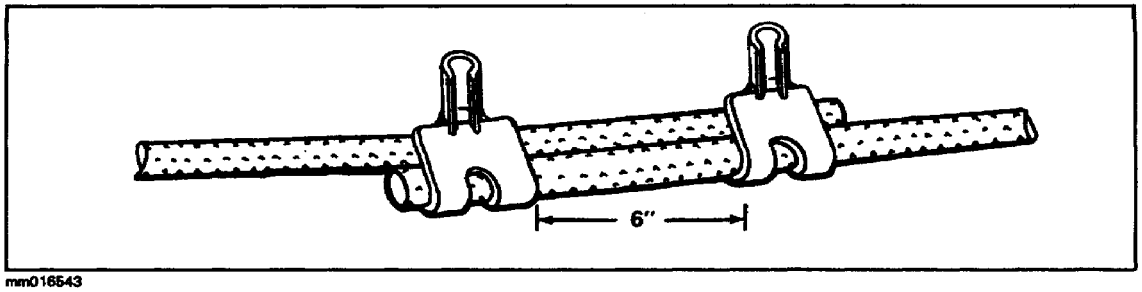


Figure 43. Splice using the M1 detonating cord clip.

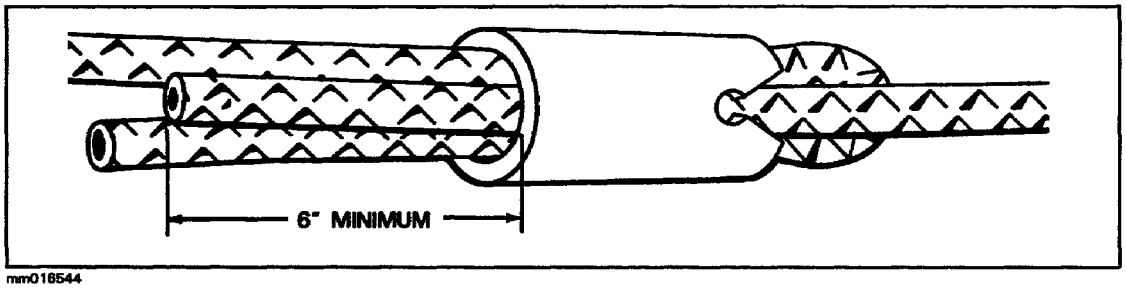


Figure 44. Splice using the detonating cord connector.

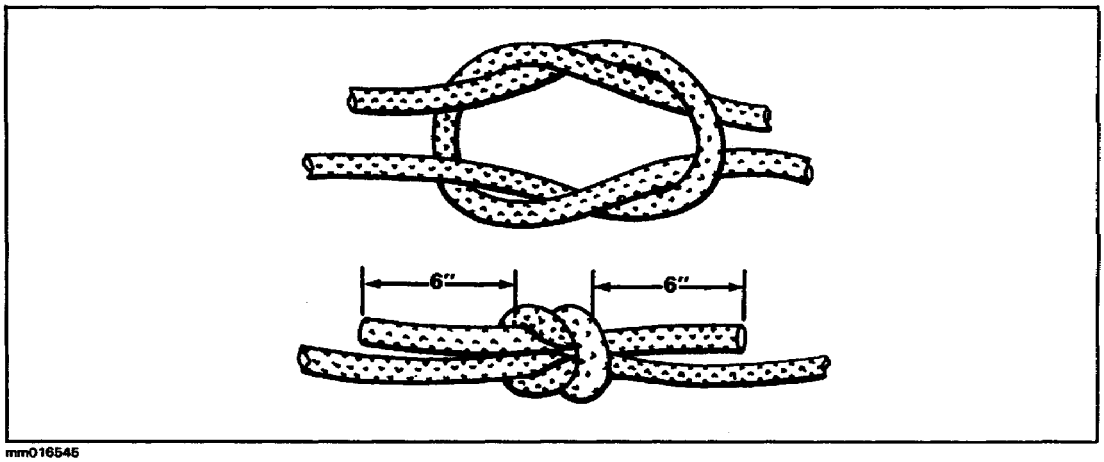


Figure 45. Splice using a square knot.

Branch Lines. Branch lines (detonating cord) are laid from the ring main to the items to be destroyed. The branch lines should be positioned so that the angle formed when they are connected to the ring main will be 90 degrees (a right angle). When connecting branch lines to the ring main, never connect at a point where the ring main has been spliced. Connect branch lines to the ring main as follows:

- Connect using the M1 detonating cord clip. See Figure 46.
- Connect using the detonating cord connector. See Figure 47.
- Connect using a girth hitch with one extra turn. See Figure 48.

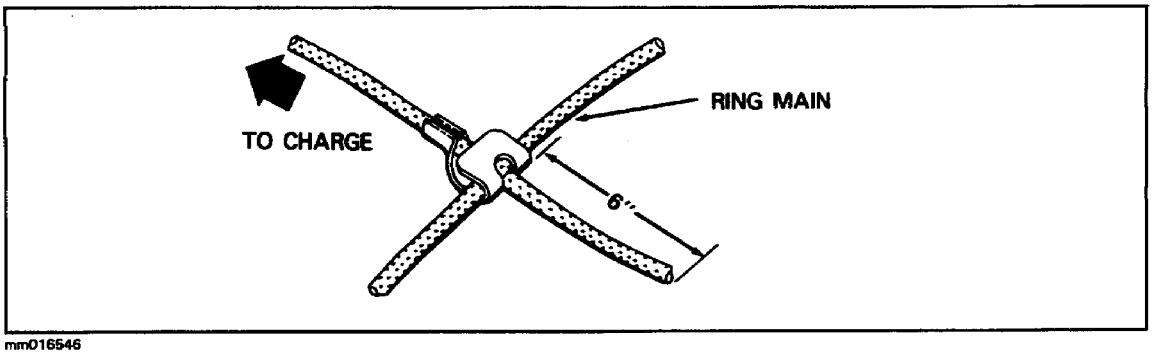


Figure 46. Branch line connection using the M1 detonating cord clip.

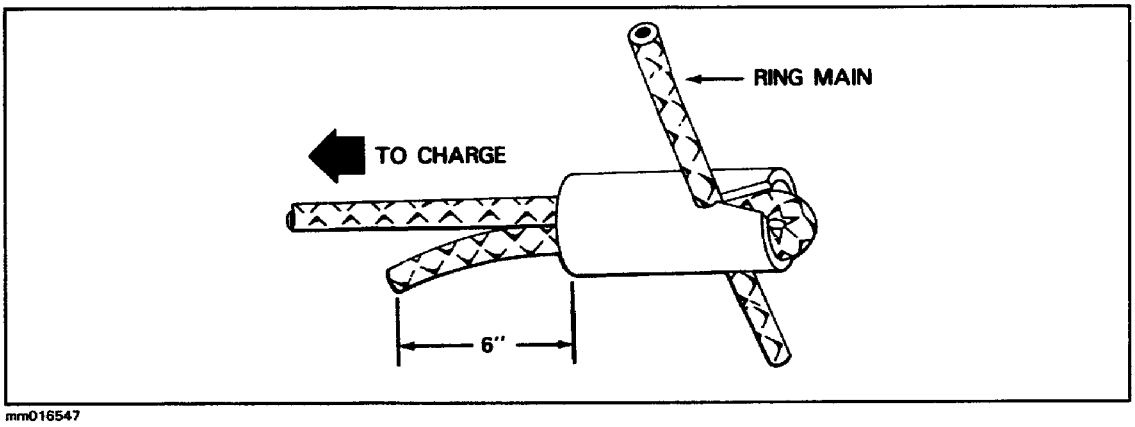


Figure 47. Branch line connection using the detonating cord connector.

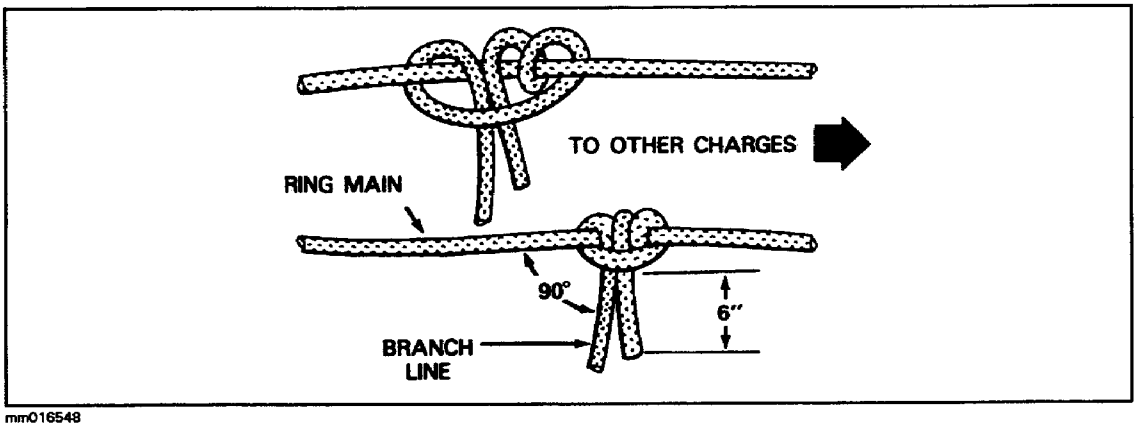


Figure 48. Branch line connection using a girth hitch with one extra turn.

Prime the Charges. Next, the charges must be primed. For the detonating cord system, priming consists of attaching the free end of the branch line to the demolition charge.
Procedures for priming different types of charges vary.
To prime plastic explosives (such as C4) with detonating cord, form either of the three knots shown in Figure 49, Page 32. Insert the knot into a block of explosive or a molded piece of explosive.

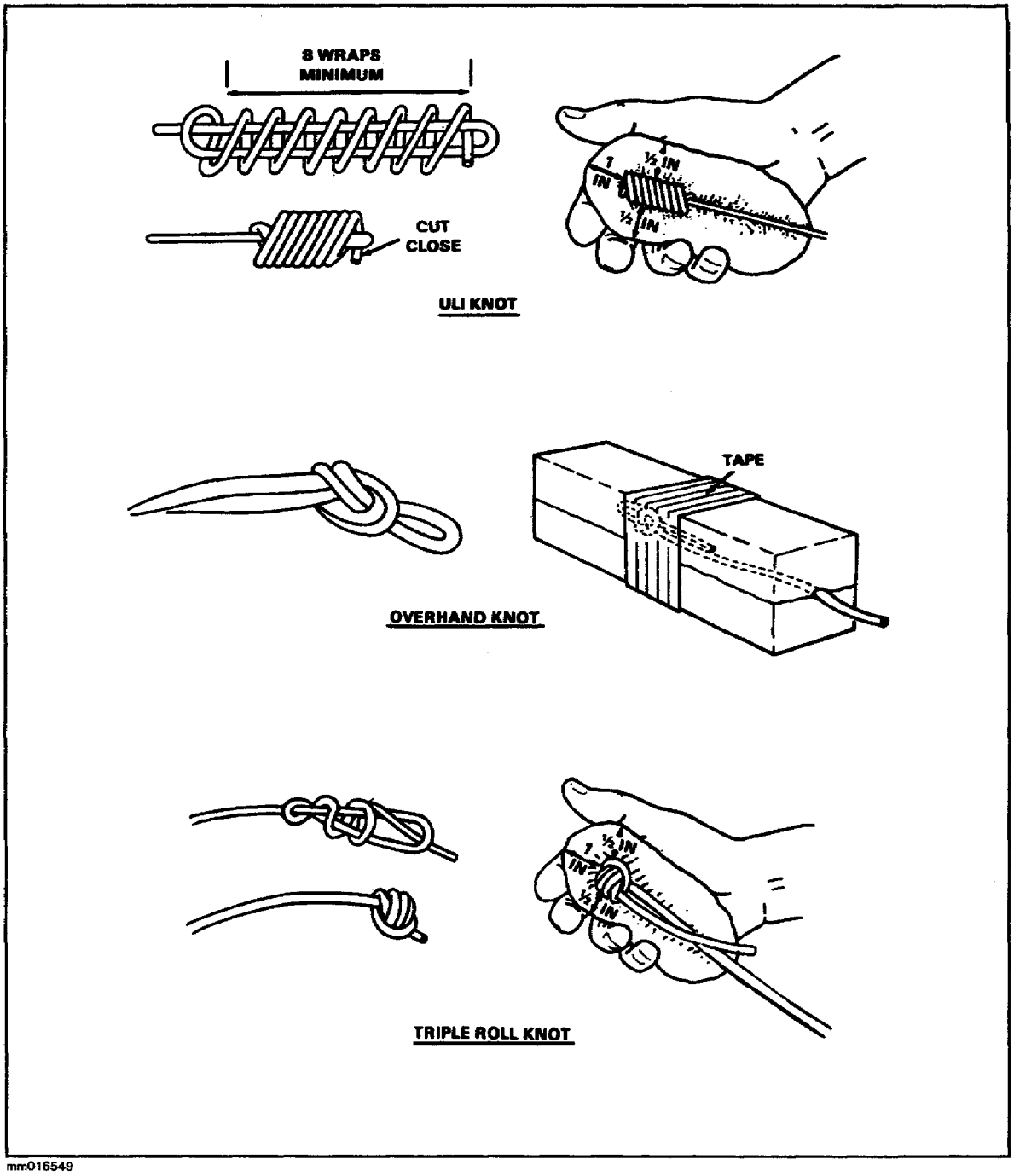


Figure 49. Detonating cord priming of plastic explosives.

Demolition blocks may be primed with detonating cord in several ways. Use the methods shown in Figure 50 to prime demolition blocks with noncapped detonating cord. To prime demolition blocks that have threaded cap wells, you may attach a blasting cap to the end of the detonating cord and use the M1A4 priming adapter. Secure the blasting cap and detonating cord following the same procedures as for nonelectric priming.

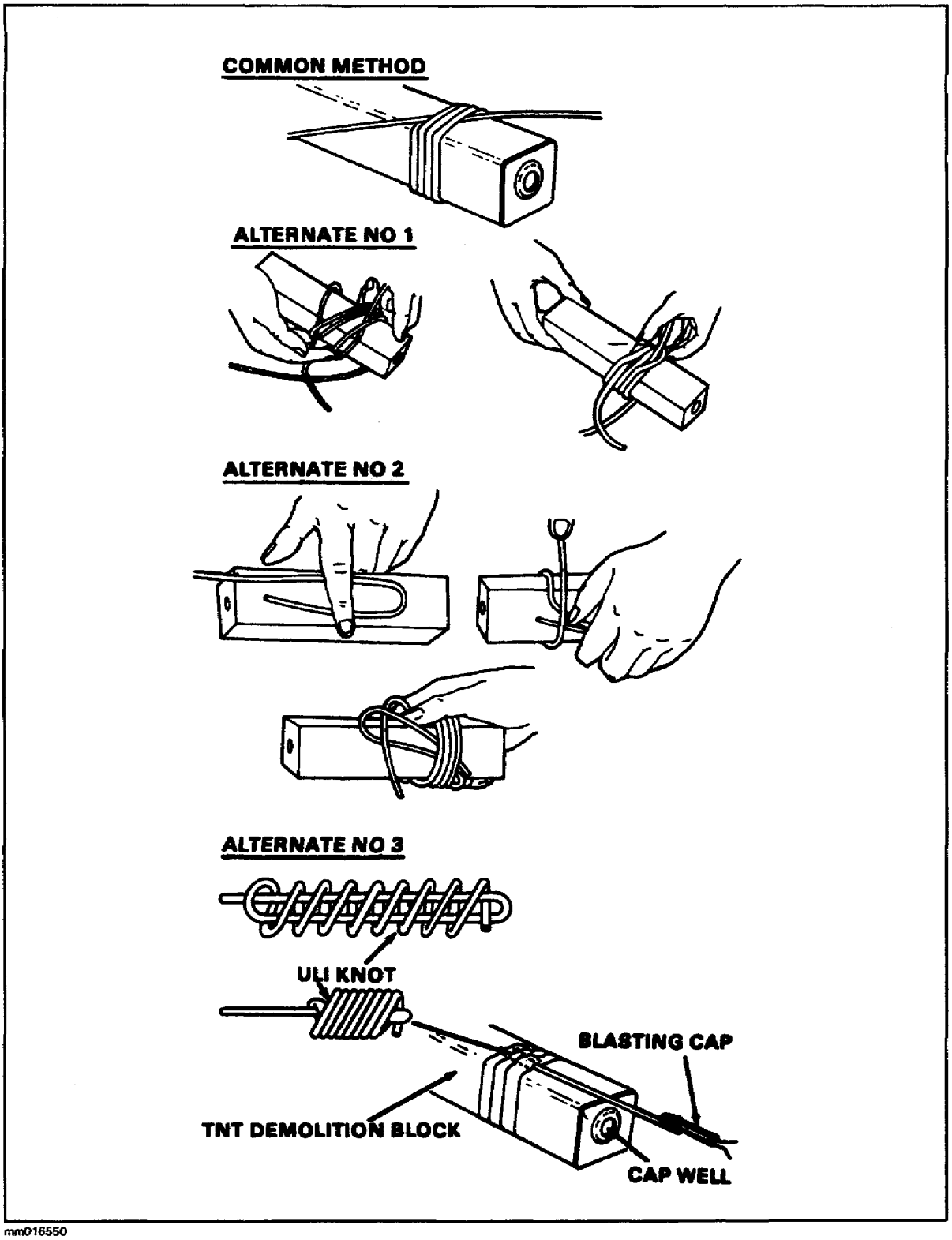


Figure 50. Detonating cord priming of demolition blocks.

Use the M8 blasting cap holder to prime M118 sheet explosives. The M8 blasting cap holder is a metal clip designed to attach and hold a blasting cap to sheet explosive. See Figure 51. It is supplied with M118 sheet demolition charges. The procedures for using the cap holder are as follows:

- Attach an M8 blasting cap holder to one end or to one side of the sheet explosive. The cap holder fastens to the sheet explosive with three slanted, protruding teeth that prevent its withdrawal. See Figure 52.

- Attach a blasting cap to the end of the detonating cord, and then insert the blasting cap into the cap holder until the end of the blasting cap presses against the sheet explosive. See Figure 52.

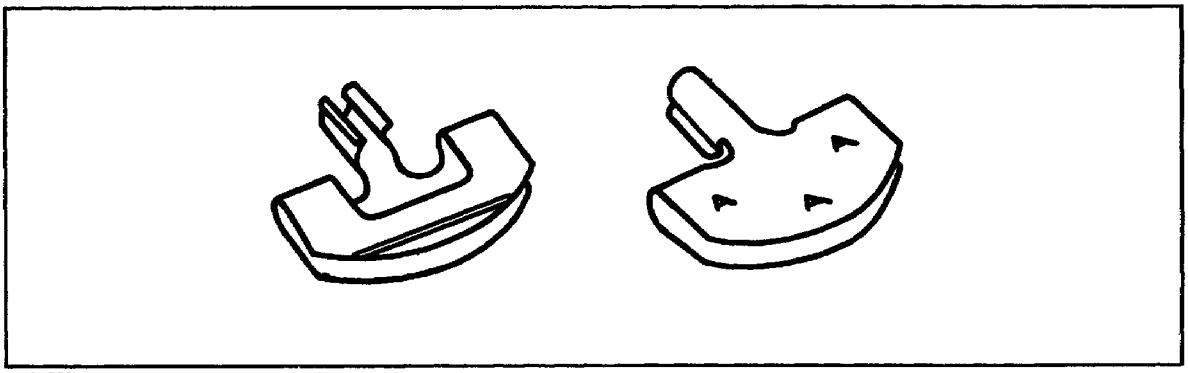


Figure 51. M8 blasting cap holder.

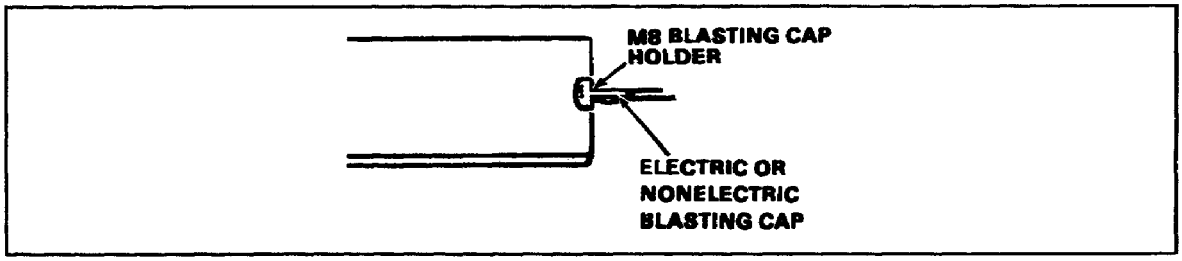


Figure 52. Priming sheet explosive with M8 blasting cap holder.

In addition to the demolition charges already discussed, the M10 universal destructor may be used to destroy separate-loading projectiles or bombs. The destructor converts loaded projectiles and bombs into improvised demolition charges. Prime the M10 universal destructor using a priming adapter as shown in Figure 53. The M10 is designed to fit ammunition with 1.5-, 1.7-, or 2-inch fuze wells. The M10 should be stored in an ASP for use in ED operations.

Attach the Firing System. The detonating cord system is initiated by an electric blasting cap when an electric firing system is used. It is initiated by a nonelectric blasting cap when a nonelectric firing system is used. The blasting cap of either firing system is attached to the detonating cord system at the initiation point using one of the methods shown in Figures 54, 55, and 56, Pages 35 and 36.

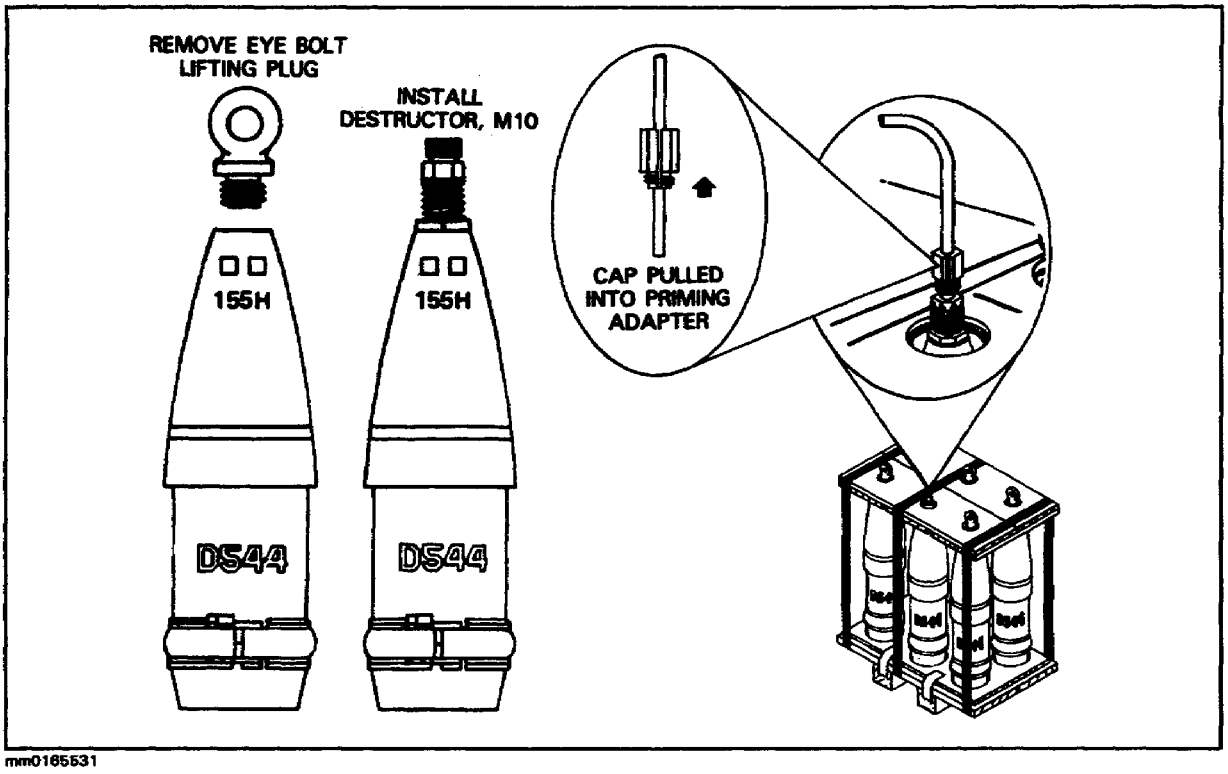


Figure 53. Placement and priming of an M10 universal destructor.

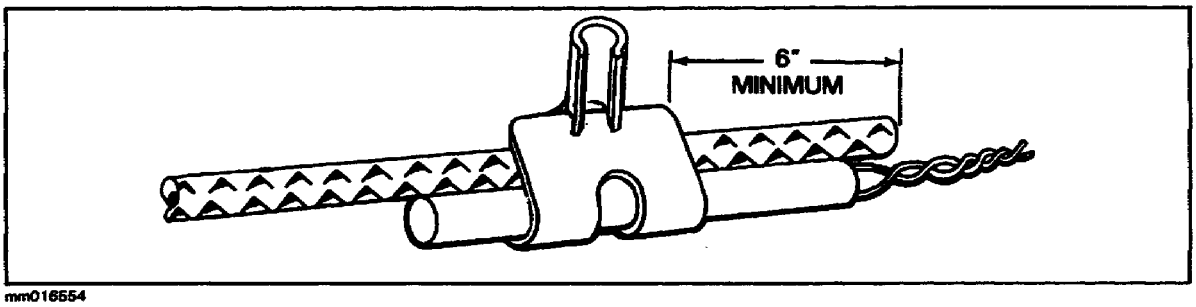


Figure 54. Attaching a blasting cap to the detonating cord system using an M1 detonating cord clip.

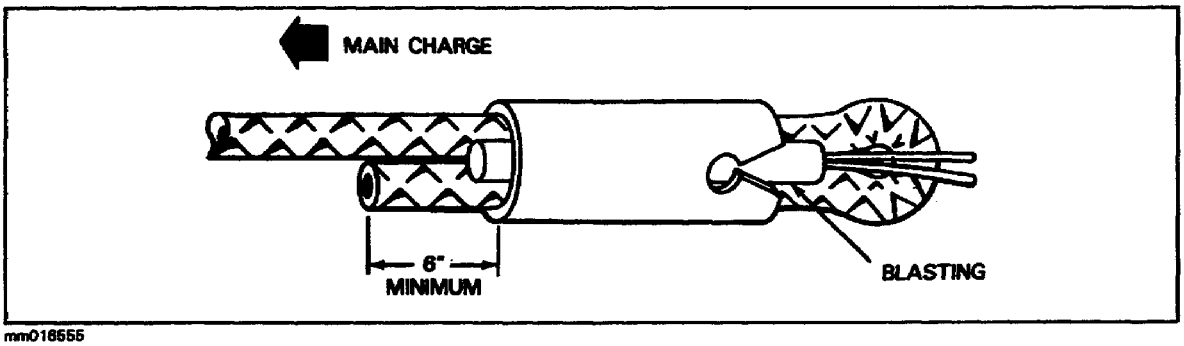


Figure 55. Attaching a blasting cap to the detonating cord system using a detonating cord connector.

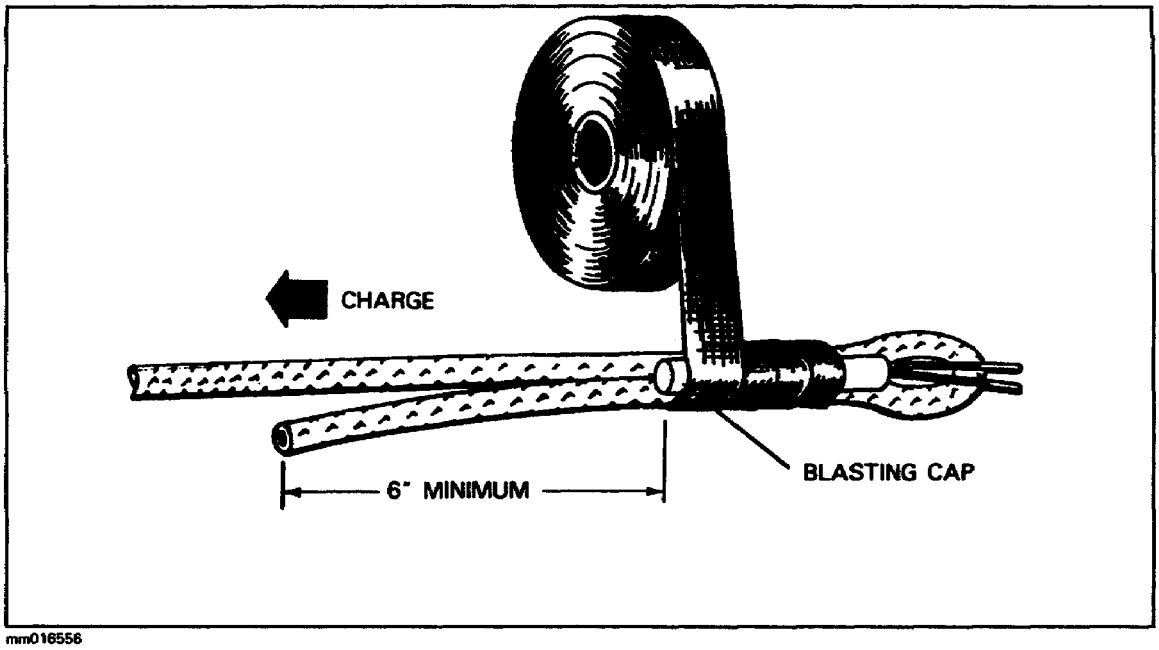


Figure 56. Attaching a blasting cap to the detonating cord system using tape.

AREA LAYOUT PLAN

The ED procedures and techniques employed in a combat situation may also be used to destroy permanent storage facilities. However, the time required to destroy a permanent facility will be longer due to the additional size of the area, increased tonnages, and required access to the magazines and igloos. The ED SOP should also address the destruction of permanent storage facilities.

A simple area layout of your ASP may be useful in planning ED operations and developing your ED SOP for a permanent storage facility. The area layout of ASP 109 (Figure 57) shows the following:

- Storage locations of munitions. Locations are usually numbered (for example, 118 through 129).
- Storage location for dunnage and fuel.
- Roadways in the area.
- Enemy direction.
- Escape routes (main supply route [MSR]).
- Other buildings located within the area.

Once you have identified storage locations, label each building/magazine as to the best method of ED for the type of munitions contained at the location. To do this, you must first identify the types of munitions that are stored in each location. For example, Building 128 contains small arms ammunition. You know that small arms ammunition is best destroyed by burning. This is an ideal situation because of the munitions nearness to the dunnage and fuel supply point. Therefore, identify the type of ED as "B" for burning on your layout. A "D" on the layout would indicate detonation as the best method of ED. "B/D" would indicate that either method, burning or detonation, could be used for ED. See Figure 58, Page 38.

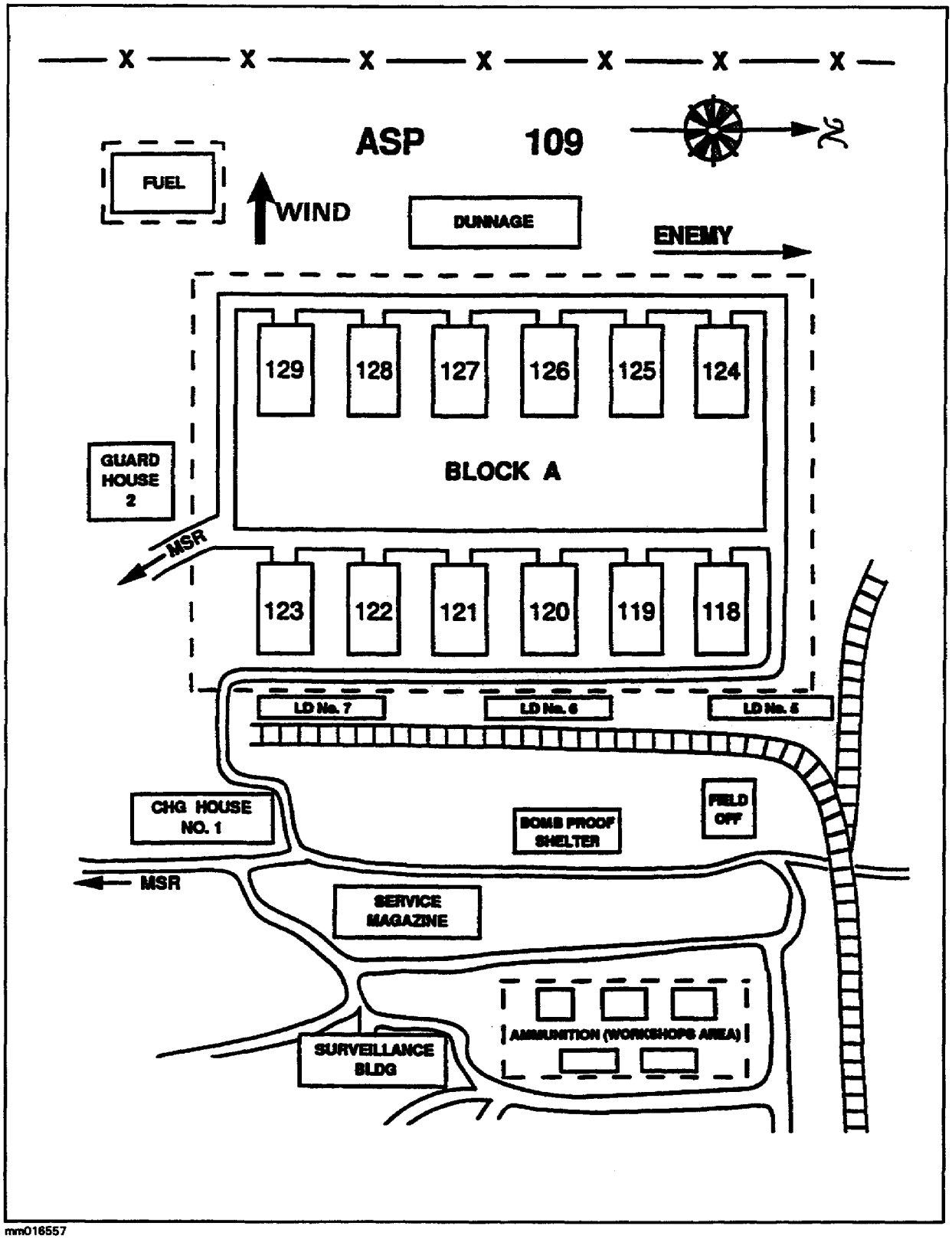


Figure 57. Area layout of a typical ASP.

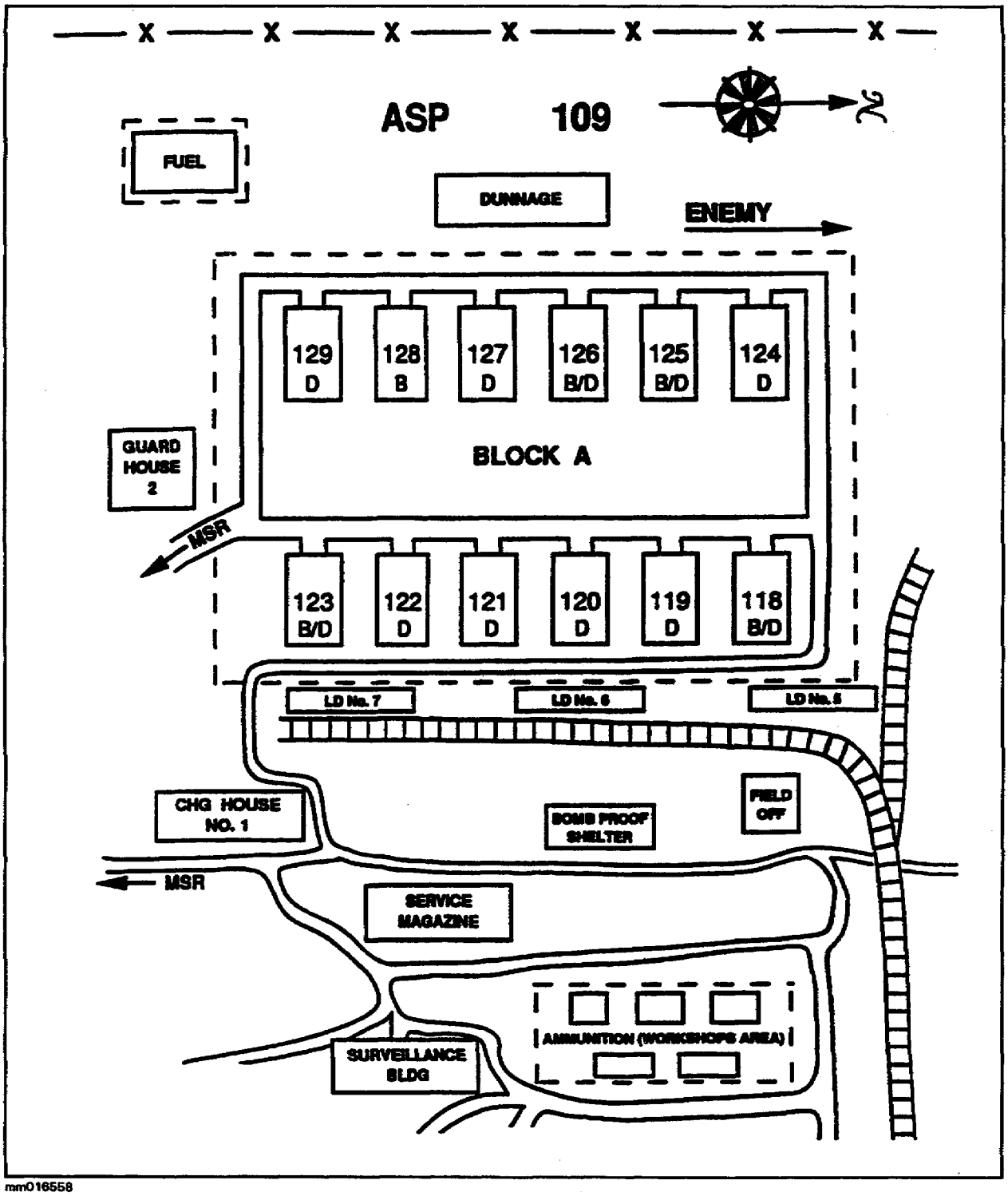


Figure 58. Area layout of a typical ASP showing type of destruction.

Now, you may begin to plot the layout of the ring main(s), branch lines, main charges, dunnage, and fuel for the burn site. The fuel point will also be burned during the ED. You must remember to ensure that all vehicles have enough fuel before you actually prepare the fuel point for ED.

After the demolition charges have been plotted, your layout should look similar to the one shown in Figure 59. This layout shows the ideal ED set up with a dual ring main, dual branch lines, and dual cap-ins at each magazine. This ED set up for ASP 109 assumes that you will have all of the personnel, explosives, and time you will need for this ED operation. You may have to do the job with a lot less, but with sound planning, realistic training, and a good SOP, you should be able to accomplish your assigned ED mission.

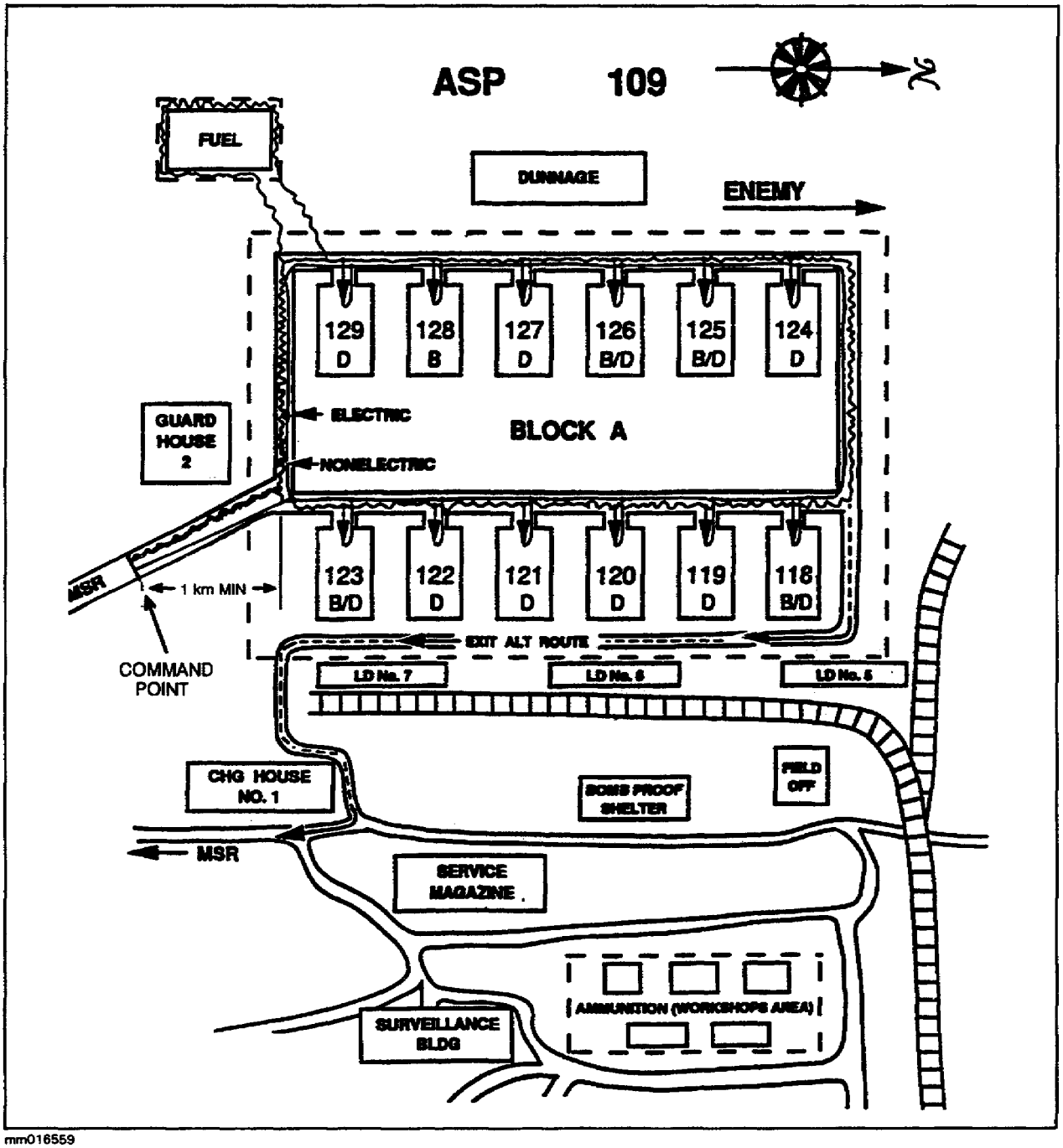


Figure 59. ASP 109 dual primed for ED.

STANDING OPERATING PROCEDURE

During the establishment of an ASP, many SOPs must be written to standardize and smooth out day-to-day operations. ED should be covered in one of these SOPs. The ED SOP should provide guidance for destroying all assets in the storage facility.

The ED SOP is written by the ammunition officer, the ammunition warrant officer, or the ammunition noncommissioned officer (NCO). Again, the ED SOP should be developed immediately after the facility is established. The ED SOP is a planning and operating document for local use. Therefore, its format varies depending on command guidance. Regardless of the format used, the SOP should contain the following information:

- Safety considerations (critical requirement).
- Priorities of materials to be destroyed (critical requirement).
- Demolition equipment and explosives (critical requirement).
- Methods of destruction and procedures to be followed.
- Transportation requirements.
- Communications, command, and control.
- Protective clothing and equipment.
- Decontamination requirements.
- Evacuation routes.
- Assembly point or command and control point (CP).
- Training requirements.
- Assigned missions and responsibilities of ED teams.
- Recall procedures.
- Name and position of the individual authorized to execute ED action.
- The ED SOP should be approved by the battalion or company commander and reviewed by team members and by EOD personnel, if available.

Personnel, Equipment, and Time Requirements

ED operations at ammunition storage facilities are a part of the unit's mission. As such, these operations must be planned for and personnel equipped and trained to ensure that if and when ED is required, it will be successful. The three major factors in ED are personnel, equipment, and time. The unit commander will organize his ED teams based on projected requirements. The assignment of personnel is very important, because these personnel must be available for ED operations when the requirement or situation arises.

Personnel. Personnel requirements will be based on the following factors:

- Size of the storage facility (ASP, CSA, TSA, or depot).
- Quantity (tonnage) and type of munitions on hand.
- Time available based on the situation.
- Personnel on hand.

Equipment. All of the equipment required for ED operations is equipment that is common to unit operations and is identified as such in the unit's table(s) of organization and equipment (TOE), table of allowance (TA), or tables of distribution and allowances (TDA). This equipment includes:

- Vehicles and trailers.
- Radios.
- Demolition kits.
- Miscellaneous items such as flashlights, engineer tape, et cetera.
- Motor oil, gasoline, and diesel fuel for use in vehicles and in ED operations.
- Individual weapons and equipment.

Time. In most ED operations, time is an important factor. The use of vehicles by the various teams is essential to destroying stocks within the time frame allowed. Demolition materials should be set aside and restricted from issue. This procedure ensures that materials are available for fast and simple ED operations. Repetitive training will also ensure that ED operations are performed quickly and successfully.

Demolition Equipment and Explosives

The ED SOP should define minimum explosive needs. See FM 5-25 for additional information. Examples of demolition materials and associated components are listed below:

- Demolition charges. At least one M37 or M138 charge per stack, magazine, or igloo.
- Detonating cord in 100- and 1,000-foot spools.
- M700 time fuse or safety fuse, as required.
- Electric (M6) and nonelectric (M7) blasting caps.
- M10 destructor. Two destructors per stack, magazine, or igloo should be on hand for ED operations.
- M60 fuse igniters, as required.
- M34 WP grenades to be used to start fires, if available.
- M14 thermite grenades to be used to start fires.
- Large munitions (for example: bombs, mines, and projectiles to supplement and/or use in lieu of demolition charges).

ED Training

The most important part of an effective ED plan is personnel training. As in any other military operation, a successful mission depends on good training. There are three factors to consider when conducting training at your storage facility.

- Each team member must know to which of the various stations he or she is to report. Do not rely on the team chiefs to direct personnel.
- Each team member must be knowledgeable of the mission of the whole team. In this way, team members can assist each other in accomplishing the mission.

- Each team member must be familiar with assembly points and evacuation routes. Team members must report to their assembly points after completing their missions. In this way, all team members can be accounted for prior to the final priming of the shot.

Demolition and ED training is conducted as part of the basic ammunition course at USAOMMCS. Special ED training may be provided by active Army or National Guard explosive ordnance disposal (EOD) units. Request such training through your supporting EOD unit. You should have their telephone numbers posted at your storage facility.

ED Teams

Personnel needs vary among storage facilities. However, any team handling explosives must always consist of at least two people. The different teams and their responsibilities are discussed in the following paragraphs.

Ring Main Team. Each ring main team should be assigned a 1 1/4-ton vehicle with trailer in order to transport large quantities of detonation cord (1,000-foot spools), sandbags, tools, and equipment. This team's job is to lay the detonating cord for the ring main or main lines. If time and materials permit, they should lay a dual system.

Branch Line Team. The branch line teams attach detonating cord branch lines to the ring main and lay them to the prepared charges. These teams may also assist the charge teams.

Charge Team. Charge teams are responsible for preparing and setting up the charges and connecting them to the branch lines. This team may also act as the branch line team.

Firing Team. There is only one firing team. One of the other teams should be designated as a backup for the firing team. The firing team performs the test burn of the time fuse and checks out the electric caps and the firing wire. The team performs final hookup of the firing system. The team performs a final check of the situation, personnel, and the system. The firing team fires the charges (after all personnel are accounted for) from the command post (CP).

Road Guards. Road guards are responsible for keeping unauthorized personnel out of the area and restricting traffic into and within the area. They also warn of an approaching enemy. Another duty is to prevent damage to the ring main. If they find any damage, they notify the team chief of the problem.

Command Post and Assembly Area

A CP should be established to serve as the command and control center for ED operations.
The approach to the CP and assembly area should be upwind, if possible, and located on the friendly forces side of the ED site. The site should also be located a safe distance from the ED site. Prior to firing the demolition charges, all personnel must be accounted for at the assembly area.

The following exercise will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you complete the exercise, check your answers with the answer key that follows. If you answer any question incorrectly, study again that part of the lesson that contains the portion involved.

1. You are planning ED operations. When should you consider the wind direction?
   A. Only when chemical munitions are used.
   B. Always; ED operations may produce toxic smoke and residue.
   C. Only when considering the enemy's NBC capability.
   D. Never; wind direction presents no real concern.

2. An ED SOP should address which of the concerns listed below?
   A. Address US munitions only.
   B. Address when, where, and how to conduct ED operations.
   C. Address the enemy to include their political and economic situation.
   D. Address host-nation support.

3. When may enemy explosives be used in an ED operation?
   A. Never, they may be booby trapped.
   B. Only as a last resort to supplement US explosives.
   C. Never, because of their poor quality.
   D. Only to destroy other enemy munitions.

4. Who has the authority to conduct ED operations?
   A. The division commander or a higher-level commander.
   B. Any officer or NCO (E7 or above) at the ASP.
   C. Only the ammunition officer.
   D. The battalion commander, the XO, or the S4.

5. For what purpose is detonating cord used?
   A. To replace safety fuse.
   B. To transmit the explosive shockwave to the charge.
   C. To replace the electric firing system.
   D. To replace the nonelectric firing system.

6. When or for what purpose is gasoline used during ED operations?
   A. To start fires.
   B. To supplement demolition explosives.
   C. To destroy the POL and FAAR pads.
   D. Only used when it is listed in the ED SOP.

7. During ED operations, when must safety factors be considered?
   A. During all training and peacetime operations, and as required by the MACOM.
   B. During peacetime only.
   C. Always.
   D. When spelled out in the ED SOP.

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8. When may dynamite be used for ED?

   A. When other explosives are in short supply.
   B. When destroying land mines.
   C. Never.
   D. When authorized by the MACOM.

9. What precaution should you take when burning ammunition or explosives?

   A. Notify the fire department.
   B. Only notify those units down wind.
   C. Stand by for a high-order detonation.
   D. Call out "Fire in the hole."

10. What document at the ASP shows you where ammunition is located?

   A. The planograph.
   B. The SOP.
   C. The commander's smart book.
   D. The ASP operations plan.

Item	*Correct Answer and Feedback*
1.	B. Always; ED operations may produce toxic smoke and residue. (Page 4)
2.	B. Address when, where, and how to conduct ED operations. (Page 2)
3.	B. Only as a last resort to supplement US explosives. (Page 14)
4.	A. The division commander or a higher-level commander. (Page 2)
5.	B. To transmit the explosive shockwave to the charge. (Page 28)
6.	A. To start fires. (Page 7)
7.	C. Always. (Page 4)
8.	C. Never. (Page 10)
9.	C. Stand by for a high-order detonation. (Page 4)
10.	A. The planograph. (Page 3)