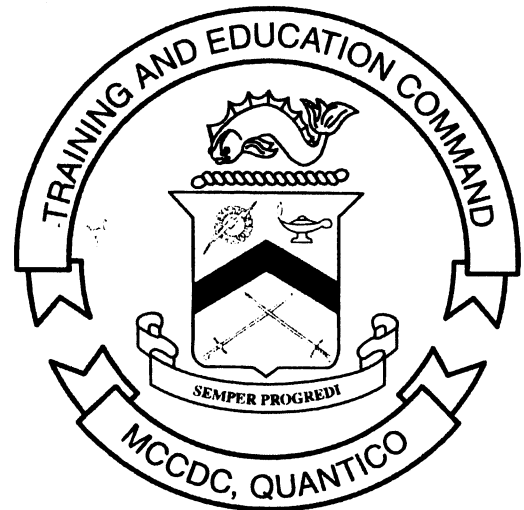


# MARINE CORPS INSTITUTE



## INFANTRY SQUAD LEADER: WEAPONS AND FIRE SUPPORT

MARINE BARRACKS  
WASHINGTON, DC



## UNITED STATES MARINE CORPS

MARINE CORPS INSTITUTE  
WASHINGTON NAVY YARD  
912 POOR STREET SE  
WASHINGTON, DC 20391-5680

03.82  
30 Mar 98

### MCI 03.82, INFANTRY SQUAD LEADER: WEAPONS AND FIRE SUPPORT

1. **Purpose.** MCI course 03.82, Infantry Squad Leader: Weapons and Fire Support, has been published as a part of the Marine Corps continuing education program to provide distance training to all Marines.
2. **Scope.** MCI course 03.82, Infantry Squad Leader: Weapons and Fire Support, is designed to provide the squad leader with the basic knowledge of weapons organic to the Infantry Battalion, supporting arms available to him and the information to call for and adjust those supporting arms.
3. **Applicability.** This course is intended for instructional purposes only. It is designed for use by Marines in the ranks of Pvt-GySgt in MOS 03XX.
4. **Recommendations.** Comments and recommendations on the contents of the course are invited and will aid in subsequent course revisions. Please complete the course evaluation questionnaire located at the end of the text and return it to:

Director (DLTD Spt Team)  
Marine Corps Institute  
Washington Navy Yard  
912 Poor Street SE  
Washington, DC 20391-5680

A handwritten signature in black ink, appearing to read "G. White".

G. WHITE  
Lieutenant Colonel, U.S. Marine Corps  
Deputy Director



## ERRATUM CHANGE PAGE TO COURSE MATERIAL

1. Purpose. The purpose of this change is to give the student current instructions regarding the instructions for the Review Lesson Examination page.

2. Action. Change the instructions found on page R-1 of this book to read as follows:

“The purpose of the review lesson examination is to prepare you for your final examination. We recommend that you try to complete your review lesson examination without referring to the text, but for those items (questions) you are unsure of, restudy the text. When you finish your review lesson and are satisfied with your responses, check your responses against the answers provided at the end of this review lesson examination.

Select the ONE answer that BEST completes the statement or that answers the item. For multiple choice items, circle your response. For matching items, place the letter of your response in the space provided.”

3. This page is to be filed directly behind the Promulgation Letter of this course.





# INFANTRY SQUAD LEADER: WEAPONS AND FIRE SUPPORT

## CONTENTS

	Page
Contents .....	i
Student Information .....	iii
Study Guide .....	v
Study Unit 1      Weapons Organic to the Company .....	1-1
Work Unit 1    Characteristics, Operation, Immediate Action, Runway Gun Procedures, and Maintenance for the M60E3 Machinegun	1-1
Work Unit 2    Characteristics, Ammunition, and Fuzes for the M224, 60-MM Mortar .....	1-6
Work Unit 3    Characteristics, Immediate Action, and Maintenance for the MK 153 SMAW .....	1-13
Work Unit 4    Offensive Employment of Company Weapons .....	1-18
Work Unit 5    Defensive Employment of Company Weapons .....	1-22
Study Unit 2      Weapons Organic to the Battalion .....	2-1
Work Unit 1    Characteristics and Capabilities of the M2, .50 Caliber Machinegun .....	2-1
Work Unit 2    Characteristics and Capabilities of the M19, 40MM Machinegun .....	2-2
Work Unit 3    Characteristics and Capabilities of the M47 Dragon .....	2-4
Work Unit 4    Characteristics and Capabilities of the M29, M29A1, 81 Mortar .....	2-6
Study Unit 3      Supporting Arms .....	3-1
Work Unit 1    Field Artillery .....	3-1
Work Unit 2    Naval Gunfire .....	3-5
Work Unit 3    Close Air Support .....	3-9
Study Unit 4      Calling for and Adjusting Mortars and Artillery .....	4-1
Work Unit 1    Tools and Equipment .....	4-1
Work Unit 2    Locating Targets .....	4-6
Work Unit 3    The Call for Fire .....	4-8
Work Unit 4    Spotting, Adjusting, and Fire for Effect .....	4-18

**CONTENTS—cont'd**

<b>Study Unit 5</b>	<b>Naval Gunfire and Close Air Support .....</b>	<b>5-1</b>
<b>Work Unit 1</b>	<b>The Call for Fire (Naval Gunfire) .....</b>	<b>5-1</b>
<b>Work Unit 2</b>	<b>Call for Close Air Support .....</b>	<b>5-14</b>
<b>Work Unit 3</b>	<b>Adjusting Close Air Support .....</b>	<b>5-21</b>
<b>Review Lesson</b>	<b>.....</b>	<b>R-1</b>

## Student Information

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<b>Number and Title</b>	MCI 0382 INFANTRY SQUAD LEADER: WEAPONS AND FIRE SUPPORT
<b>Study Hours</b>	14
<b>Course Materials</b>	Text
<b>Review Agency</b>	The Basic School Quantico, VA
<b>Reserve Retirement Credits (RRC)</b>	4
<b>ACE</b>	Not applicable to civilian training/education
<b>Assistance</b>	For administrative assistance, have your training officer or NCO log on to the MCI home page at <a href="http://www.mci.usmc.mil">www.mci.usmc.mil</a> . Marines CONUS may call toll free 1-800-MCI-USMC. Marines worldwide may call commercial (202) 685-7596 or DSN 325-7596.

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# Study Guide

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## **Congratulations**

Congratulations on your enrollment in a distance education course from the Distance Learning and Technologies Department (DLTD) of the Marine Corps Institute (MCI). Since 1920, the Marine Corps Institute has been helping tens of thousands of hard-charging Marines, like you, improve their technical job performance skills through distance learning. By enrolling in this course, you have shown a desire to improve the skills you have and master new skills to enhance your job performance. The distance learning course you have chosen, MCI 0382, *Infantry Squad Leader: Weapons and Fire Support* was designed to provide the squad leader with the basic knowledge of weapons organic to the Infantry Battalion, supporting arms available to him and the information to call and adjust those supporting arms.

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## **Your Personal Characteristics**

- **YOU ARE PROPERLY MOTIVATED.** You have made a positive decision to get training on your own. Self-motivation is perhaps the most important force in learning or achieving anything. Doing whatever is necessary to learn is motivation. You have it!
  - **YOU SEEK TO IMPROVE YOURSELF.** You are enrolled to improve those skills you already possess, and to learn new skills. When you improve yourself, you improve the Corps!
  - **YOU HAVE THE INITIATIVE TO ACT.** By acting on your own, you have shown you are a self-starter, willing to reach out for opportunities to learn and grow.
  - **YOU ACCEPT CHALLENGES.** You have self-confidence and believe in your ability to acquire knowledge and skills. You have the self-confidence to set goals and the ability to achieve them, enabling you to meet every challenge.
  - **YOU ARE ABLE TO SET AND ACCOMPLISH PRACTICAL GOALS.** You are willing to commit time, effort, and the resources necessary to set and accomplish your goals. These professional traits will help you successfully complete this distance learning course.
- 

*Continued on next page*

## Study Guide, Continued

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**Beginning Your Course** Before you actually begin this course of study, read the student information page. If you find any course materials missing, notify your training officer or training NCO. If you have all the required materials, you are ready to begin.

To begin your course of study, familiarize yourself with the structure of the course text. One way to do this is to read the table of contents. Notice the table of contents covers specific areas of study and the order in which they are presented. You will find the text divided into several study units. Each study unit is comprised of two or more lessons, lesson exercises, and finally, a study unit exercise.

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**Leafing Through the Text** Leaf through the text and look at the course. Read a few lesson exercise questions to get an idea of the type of material in the course. If the course has additional study aids, such as a handbook or plotting board, familiarize yourself with them.

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**The First Study Unit** Turn to the first page of study unit 1. On this page, you will find an introduction to the study unit and generally the first study unit lesson. Study unit lessons contain learning objectives, lesson text, and exercises.

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**Reading the Learning Objectives** Learning objectives describe in concise terms what the successful learner, you, will be able to do as a result of mastering the content of the lesson text. Read the objectives for each lesson and then read the lesson text. As you read the lesson text, make notes on the points you feel are important.

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**Completing the Exercises** To determine your mastery of the learning objectives and text, complete the exercises developed for you. Exercises are located at the end of each lesson, and at the end of each study unit. Without referring to the text, complete the exercise questions and then check your responses against those provided.

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*Continued on next page*

## Study Guide, Continued

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### Continuing to March

Continue on to the next lesson, repeating the above process until you have completed all lessons in the study unit. Follow the same procedures for each study unit in the course.

---

### Preparing for the Final Exam

To prepare for your final exam, you must review what you learned in the course. The following suggestions will help make the review interesting and challenging.

- **CHALLENGE YOURSELF.** Try to recall the entire learning sequence without referring to the text. Can you do it? Now look back at the text to see if you have left anything out. This review should be interesting. Undoubtedly, you'll find you were not able to recall everything. But with a little effort, you'll be able to recall a great deal of the information.
- **USE UNUSED MINUTES.** Use your spare moments to review. Read your notes or a part of a study unit, rework exercise items, review again; you can do many of these things during the unused minutes of every day.
- **APPLY WHAT YOU HAVE LEARNED.** It is always best to use the skill or knowledge you've learned as soon as possible. If it isn't possible to actually use the skill or knowledge, at least try to imagine a situation in which you would apply this learning. For example make up and solve your own problems. Or, better still, make up and solve problems that use most of the elements of a study unit.
- **USE THE "SHAKEDOWN CRUISE" TECHNIQUE.** Ask another Marine to lend a hand by asking you questions about the course. Choose a particular study unit and let your buddy "fire away." This technique can be interesting and challenging for both of you!
- **MAKE REVIEWS FUN AND BENEFICIAL.** Reviews are good habits that enhance learning. They don't have to be long and tedious. In fact, some learners find short reviews conducted more often prove more beneficial.

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*Continued on next page*



## Study Guide, Continued

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### **Tackling the Final Exam**

When you have completed your study of the course material and are confident with the results attained on your study unit exercises, take the sealed envelope marked "FINAL EXAM" to your unit training NCO or training officer. Your training NCO or officer will administer the final examination and return the examination and the answer sheet to MCI for grading. Before taking your final examination, read the directions on the DP-37 answer sheet carefully.

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### **Completing Your Course**

The sooner you complete your course, the sooner you can better yourself by applying what you've learned! HOWEVER--you do have 2 years from the date of enrollment to complete this course.

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### **Graduating!**

As a graduate of this distance education course and as a dedicated Marine, your job performance skills will improve, benefiting you, your unit, and the Marine Corps.

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*Semper Fidelis!*

STUDY UNIT 1

WEAPONS ORGANIC TO THE COMPANY

STUDY UNIT GOALS: TO RECOGNIZE AND UNDERSTAND THE CHARACTERISTICS, OPERATION, IMMEDIATE ACTION, RUNAWAY GUN PROCEDURES, AND MAINTENANCE FOR THE M60E3 MACHINEGUN AND SMAW; ALSO, THE CHARACTERISTICS, AMMUNITION, AND FUZES FOR THE M224, 60-MM MORTAR.

Work Unit 1-1. CHARACTERISTICS, OPERATION, IMMEDIATE ACTION, RUNAWAY GUN PROCEDURES, AND MAINTENANCE FOR THE M60E3 MACHINEGUN

TERMINAL LEARNING OBJECTIVE: Identify the characteristics, operation, immediate action, runaway gun procedures, and maintenance for the M60E3 Machinegun.

ENABLING LEARNING OBJECTIVES:

- 1.1.1a State the key characteristics of the M60E3 Machinegun.
- 1.1.1b State the methods for loading and changing the barrel of the M60E3.
- 1.1.1c List the steps in performing immediate action (hot barrel).
- 1.1.1d State the runaway gun procedures while in the assault fire position.
- 1.1.1e State the maintenance steps before, during, and after firing.

\* \* \* \* \*

DESCRIPTION OF THE M60E3 MACHINEGUN

The M60E3 Machinegun (fig 1-1) is a belt fed, gas-operated, air-cooled, automatic weapon. It fires from an open bolt and is fed by a disintegrating belt of metal links. The gas from firing one round provides the energy for firing the next. Thus, the gun functions automatically as long as it is supplied with ammunition and its trigger is held to the rear. The M60E3 may be fired from pedestal, bipod, or tripod mounts or as a shoulder weapon. Its barrel has a fixed headspace and can be changed in a matter of seconds. This quick-change feature allows for rapid cooling, extends the life of the barrel, and accounts for the M60E3's increased rates of fire over those of less modern machineguns.

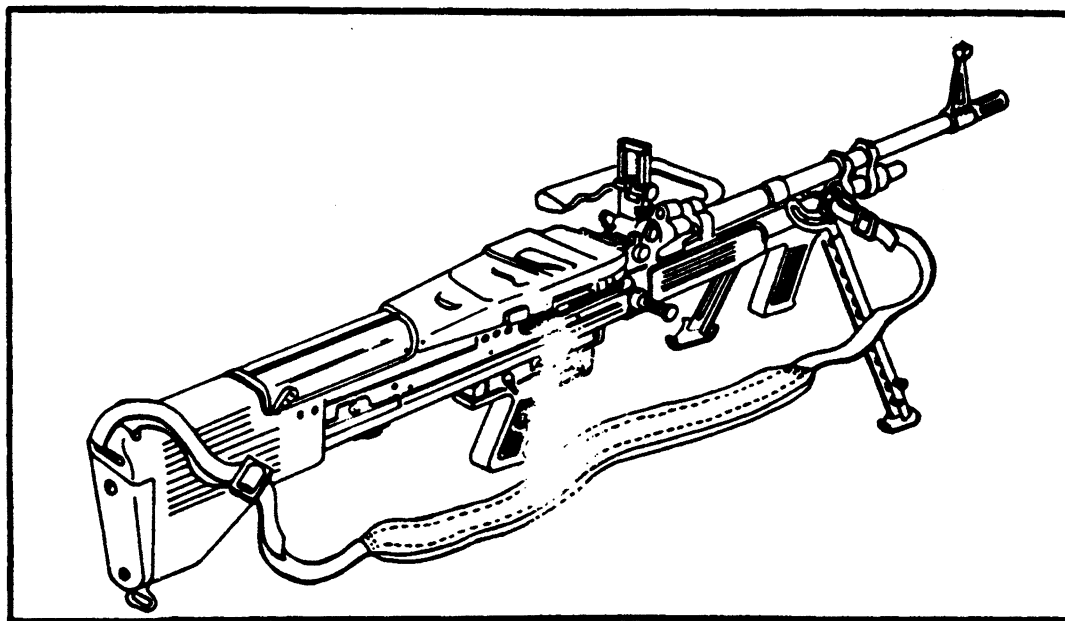


Fig 1-1. M60E3 Machinegun.

1.1.1a CHARACTERISTICS, M60E3

Weight:	
M60E3 . . . . .	18.5 lbs
Ranges:	
Maximum . . . . .	3725 m
Maximum effective . . . . .	1100 m
Grazing fire . . . . .	600 m
Rates of fire:	
Cyclic . . . . .	550-600 rpm
Rapid . . . . .	200 rpm
Sustained . . . . .	100 rpm

EXERCISE 1.1.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. What is the maximum effective range for the M60E3 machinegun?

\_\_\_\_\_

2. What is the sustained rate of fire for the M60E3 machinegun?

\_\_\_\_\_

1.1.1b OPERATION

a. Loading. There are two methods to follow to safely load the M60E3 machinegun.

- (1) Cover Raised. To load with the cover raised, the preferred method, the bolt must be to the rear and the safety on safe. The team leader takes a belt of ammunition and places the first round in the feedtray groove with the open side of the link down. The gunner closes the cover and places the safety on fire. The gun is loaded and ready to fire.
- (2) Cover Closed. To load with the cover closed, an alternate method, the bolt must be forward and the safety on fire. The team leader takes a belt of ammunition, ensuring that the open side of the link is down. He forces the first round into the feedtray until he hears a distinct click. This indicates that the first round has passed to the right of the belt feed pawl and the belt holding pawl. The gunner pulls the cocking handle to the rear and returns it to the forward position. The gun is loaded and ready to fire.

b. Unloading. To unload, the gunner raises the cover and the team leader clears the feedtray of ammunition and links. The gunner inspects the chamber as the team leader runs a cleaning rod through the bore. The gunner sounds off "ALL CLEAR" when he sees the end of the cleaning rod. The gunner then closes the cover, grasps the cocking handle, palm up, pulls the trigger, and rides the bolt home to reduce damage to the bolt head and barrel and places the safety on safe.

NOTE: The M60E3 machinegun should always be cleared after unloading.

c. Barrel Change. To change barrels, the gunner pulls the cocking handle to the rear palm up and returns it forward, ensuring that the bolt is to the rear. He then places the safety on safe, raises the barrel lock lever with his right hand, and keeps his hand on the barrel lock lever throughout the change. The team leader removes the barrel and inserts the spare barrel. The gunner lowers the barrel lock lever and places the weapon on fire, and the gun team continues the mission. Do not allow the receiver to sit in the dirt or sand. Suggestion: Place the hot barrel on an ammunition can or flattened ammunition crate. Also, be careful to prevent contact of the hot barrel with the spare barrel case.

EXERCISE 1.1.1b: Answer the following items and check your responses against those listed at the end of this study unit.

1. What are the two methods for loading the M60E3 machinegun?

a. \_\_\_\_\_

b. \_\_\_\_\_

2. What must the gunner raise to allow the team leader to change barrels on the M60E3 Machinegun?

\_\_\_\_\_

### 1.1.1c IMMEDIATE ACTION

a. Immediate action is the procedure taken to reduce a stoppage and continue firing. The gunner keeps the weapon pointed in a safe line of fire, and performs one or more of the following steps:

STEP 1: Wait five seconds. This is to allow for the possibility of slow ignition of the propellant charge.

STEP 2: Pull the cocking handle to the rear. While pulling the cocking handle to the rear, the gunner must observe the ejection port and determine if a spent cartridge or live round was ejected, or if no cartridge was ejected. What happened determines the next steps.

#### Phase I

Cartridge was ejected either live or spent.

STEP 3: Push the cocking handle forward to the locked position and continue to fire.

STEP 4: If the weapon still fails to fire, pull the cocking handle to the rear observing the ejection port. If a round is ejected, attempt to fire again. If the weapons still fails, follow "subsequent action" in paragraph b.

#### Phase II

Cartridge was not ejected.

STEP 3: Place the weapon on safe.

STEP 4: Open the feed cover.

STEP 5: Remove ammunition.

STEP 6: Inspect the chamber first; next, the receiver. If a round is stuck in either the chamber or the receiver, or if loose links are stuck in the feed tray, make an attempt to clear them. If a round is firmly jammed in the chamber, use the cleaning rod to gently push the round out. Reload and resume firing.

Phase III  
(Hot Barrel)

A barrel is considered hot when 150 rounds or more have been fired in 1 minute.

Cartridge was ejected.

Follow Phase I procedures.

Cartridge was not ejected.

STEP 3: Place the weapon on safe.

STEP 4: Keep the weapon pointed down range, into the impact area. Clear the weapon when the barrel is cool (after 15 minutes). Gently push out the round with the cleaning rod.

When these three phases of immediate action fail and you can't resume firing, follow the subsequent action procedures listed below.

These steps apply to all field training when using both live and blank ammunition. Adhere to these during combat with the possible exception of firing the final protective fires (FPF). In this case, you may omit the waiting times of 5 seconds and 15 minutes.

b. Subsequent Action. If immediate action does not clear the stoppage, it is important to keep the weapon on target down range in the impact area. Clear the weapon when the barrel is cool (after a 15-minute waiting period) as follows:

- Pull the cocking handle rearward.
- If a round/fired case does not eject, place the weapon on safe.
- Open the feedcover and inspect the receiver, chamber, extractor, and ammunition belt.
- If a round is present in the chamber, lower the feed tray and close the feedcover.
- Return the cocking lever handle forward.
- Place the safety to the fire ("F") showing.
- Attempt to fire.
- If a round is fired and ejected, reload and continue firing.
- If the weapon does not fire or eject, clear and unload the weapon by inserting a cleaning rod into the muzzle end of the barrel and push the round out of the chamber.

NOTE: Check for broken extractor and/or dented primer.

- Turn the weapon in to the supporting ordnance maintenance facility if any repairs are required.

EXERCISE 1.1.1c: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the steps in performing immediate action if the barrel is hot (round not ejected).

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

#### 1.1.1d RUNAWAY GUN PROCEDURES

A runaway gun is a weapon that continues to fire after you release the trigger. The first thing you should check for when experiencing a runaway gun is a loose gas system. Normally, tightening the gas system will correct this malfunction. The action taken on experiencing a runaway gun is dependent on the method of firing.

- If the gun is mounted on a tripod, or pedestal mount, the gunner holds the gun on the target. The team leader twists the belt and breaks it.
- If the gun is being fired from one of the assault positions, the gunner holds the gun on target until all rounds are expended. No one will attempt to break the belt of ammunition because doing so would pull the gun off target and possibly endanger troops.

EXERCISE 1.1.1d: Answer the following item and check your response against that listed at the end of this study unit.

1. If the gunner experiences a runaway gun while firing in an assault firing position, what should he do?

\_\_\_\_\_

#### 1.1.1e MAINTENANCE

As a Squad/Fire Team Leader, you should know the proper maintenance steps and procedures for maintaining the M60E3 machinegun when it is attached to you or if its team has casualties.

a. Cleaning Materials and Lubricants

(1) Materials. Use CLP to clean the gas system, the chamber, and the bore.

b. Actions Before, During, and After Firing

(1) Before Firing. Inspect the weapon for cleanliness and proper mechanical condition. Remove the barrel and bolt, and check the locking recesses and locking lugs for cleanliness and burrs. Run a dry patch through the bore to remove excess lubrication and possible obstructions. Place a light coat of CLP on the bolt and receiver rails.

(2) During Firing. Maintain a light coat of CLP on moving parts where friction may occur. Change the barrel after firing the rapid rate of fire for 2 minutes or the sustained rate of fire for 10 minutes.

(3) After Firing. Thoroughly clean the gun for three consecutive work days to remove all powder residue. Inspect the gun for carbon deposits and remove them with brushes and CLP. Wipe these parts clean and apply a light clean coat of CLP.

c. Normal Maintenance

Clean and lubricate the gun weekly. Maintain a light coat of CLP on all metal parts except the piston, inside the gas cylinder, and the buffer. Ensure that lubricants do not get inside the buffer.

d. Special Maintenance

- (1) Extreme Cold Climate-Arctic: The gun must be kept free of excess lubricants and moisture which will cause it to operate sluggishly. If brought indoors, allow the gun to come to room temperature, then wipe it completely dry and lightly lubricate.
- (2) Hot, Wet Climate-Jungle: Inspect the gun frequently for signs of rust. Keep the gun free from moisture and lubricate with CLP.
- (3) Hot, Dry Climate Desert: Clean the gun daily. In sandy or dusty areas, keep the gun free of lubricants to prevent the collection of sand and dust in working parts.

EXERCISE 1.1.1e: Answer the following items and check your responses against those listed at the end of this study unit.

1. State the before firing maintenance steps.

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2. State the during firing maintenance steps

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3. State the after firing maintenance steps.

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Work Unit 1-2. CHARACTERISTICS, AMMUNITION, AND FUZES FOR THE M224, 60-MM MORTAR

TERMINAL LEARNING OBJECTIVE: Identify the characteristics of the ammunition, and fuzes for the M224, 60-mm mortar.

ENABLING LEARNING OBJECTIVES:

- 1.2.1a List the key characteristics of the ammunition for the M224, 60-mm mortar.
- 1.2.1b List the service ammunition for the M224, 60-mm mortar.
- 1.2.1c List the types of fuzes for the M224, 60-mm mortar.

\* \* \* \* \*

DESCRIPTION M224, 60-MM MORTAR

The M224 60-MM Mortar (fig 1-2) is characterized as a lightweight smooth-bore, muzzle loaded, high-angle-of-fire weapon. It can be fired either by drop firing or trigger in either the conventional mode with bipod or in the handheld mode. The mortar has three main components: cannon assembly M225, bipod assembly M170, and baseplates M7 or M8.

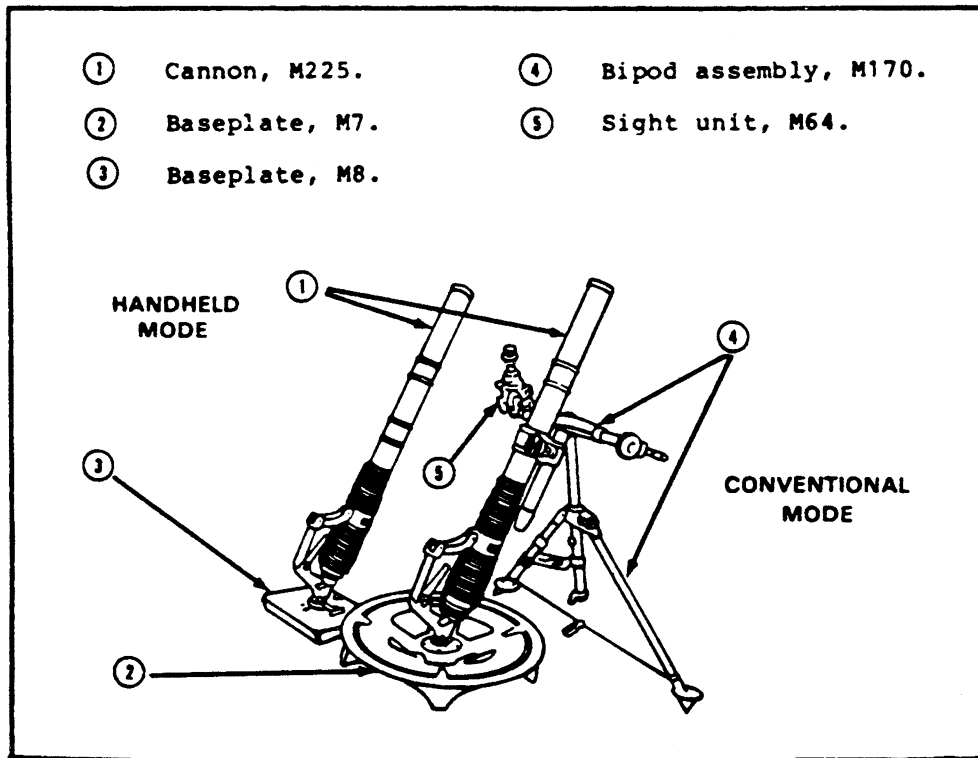


Fig 1-2. M224 Mortar (handheld mode and conventional mode).

1.2.1a CHARACTERISTICS

Range:

HE (M720) . . . . .	75-3,500 m
HE (M49A4) . . . . .	75-1,800 m
WP (M302A1) . . . . .	75-1,500 m
ILLUM (M83A3) . . . . .	75-1,000 m

Maximum Rate of Fire:

Rapid:

HE M720 . . . . .	30 rpm/4 min
HE M49A4 . . . . .	18 rpm/4 min

Sustained:

HE M720 . . . . .	20 rpm
HE M49A4 . . . . .	8 rpm



EXERCISE 1.2.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. List the minimum and maximum ranges for the M720 and M49A4 HE rounds.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  
2. List the minimum and maximum ranges for the M83A3 ILLUM round.  
\_\_\_\_\_
  
3. List the rapid rate of fire for the M720 and M49A4 HE rounds.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  
4. List the sustained rate of fire for the M720 and M49A4 HE rounds.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_

#### 1.2.1b 60-MM MORTAR AMMUNITION

##### DESCRIPTION

Mortar ammunition is classified as semifixed complete. Semifixed ammunition is characterized by accessible propelling charges. This allows the charge to be varied and gives greater flexibility in trajectory. Part of the complete propelling charge for a mortar consists of bags or sheets of a highly combustible material which is attached to the fin assembly. Ammunition is complete if it has all the necessary components to fire. For mortars, such ammunition is a cartridge, but it is more commonly called a round.

Service ammunition is fired in combat. It may be high explosive (HE), white phosphorous (WP), or illuminating (ILLUM).

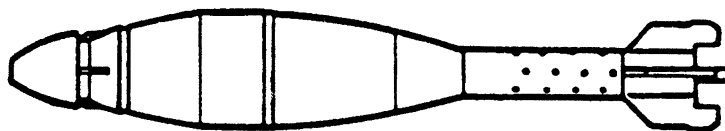
Target practice (TP) is used in training forward observers. The shell is filled with a small black powder pellet and plaster of paris.

Training ammunition is used in training mortar crews. It has an inert filler and is propelled by an ignition cartridge only.

a. Body. The body of the 60-mm mortar round is used to hold the filler and provide a place to attach the fuze and shaft of the fin assembly. The body is made of various metals in different shapes depending on the type of round. In addition to holding the filler, the body of high explosive rounds will produce fragments when the round detonates.

- (1) M720 High Explosive (HE) round (fig 1-3). This round is the standard high explosive projectile provided for the 60-mm mortar. It is used more than any other authorized round. It is used chiefly against personnel and is very effective in producing casualties because the fragments of the shell fly in all directions at the instant the shell hits the ground or any other solid object. It has a casualty-producing area of approximately 20 meters wide and 10 meters deep.

M720 SERIES CARTRIDGE



Classification: High Explosive Comp. B.

Identification: Olive Drab w/Yellow Markings.

Fuzes: M734 Multioption Fuze.

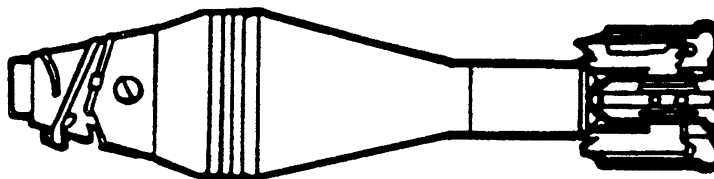
Weight: Complete round . . . . 3.25 lbs.

Remarks: Causes troop casualties and damage to light material.

Fig 1-3. M720 Series Cartridge.

- (2) M49A4 High Explosive (HE) round (fig 1-4). This round is being phased out of the Marine Corps' inventory. It was originally designed for the old 60-mm mortar. It also has a casualty-producing area of approximately 20 meters wide and 10 meters deep.

M49A4 SERIES CARTRIDGE



Classification: High Explosive Comp. B

Identification: Olive Drab w/Yellow Markings.

Fuzes: M525A1 Point Detonating Fuze.

Weight . . . . 3.25 lbs.

Remarks: Causes troop casualties and damage to light material.

Fig 1-4. M49A4 Series Cartridge.

- (3) M302A1 Smoke (WP) round (fig 1-5). The smoke round is used as a screening, signaling, casualty-producing, or incendiary agent. This round is similar in design to the HE shell. It has a longer body, a thinner shell, and a filler of white phosphorous. The bursting charge is designed to burst the shell casing and scatter the white phosphorous which ignites when exposed to air. The round has a casualty-producing radius of 10 meters.

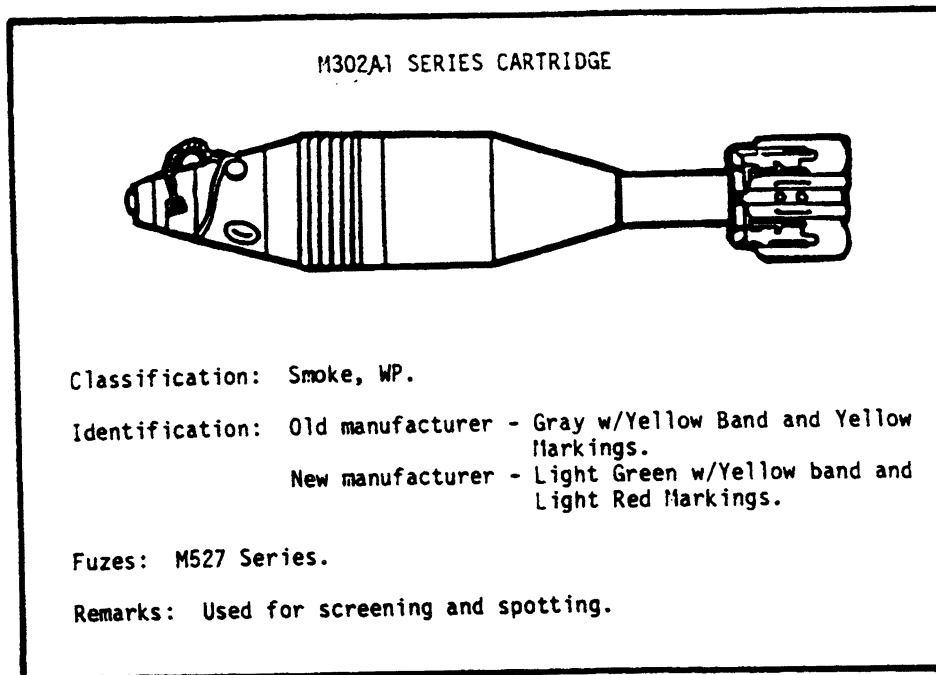


Fig 1-5. M302A1 Series Cartridge.

- (4) M83A3 Illuminating (ILLUM) round (fig 1-6). The illuminating round is used in night missions to assist ground troops in observation. The illuminating charge burns for at least 30 seconds with a minimum of 250,000 candlepower.

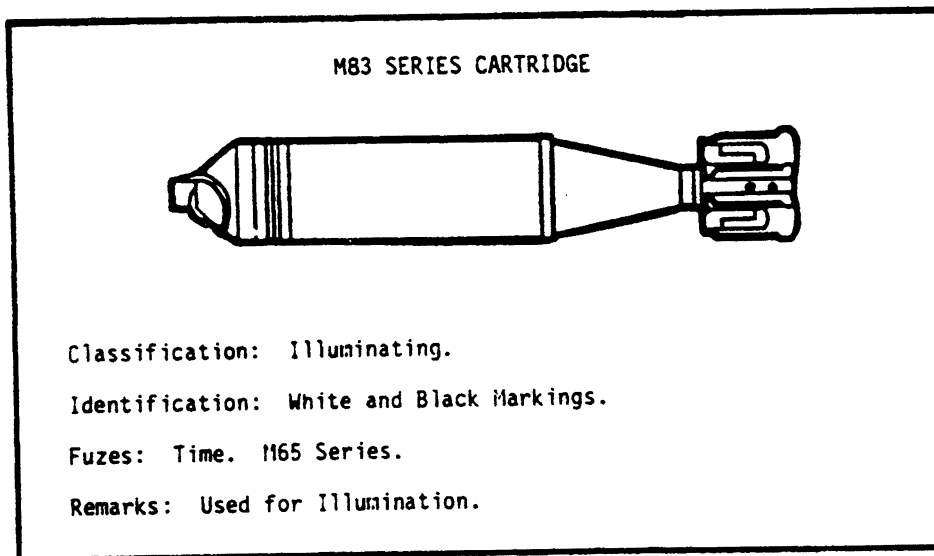


Fig 1-6. M83 Series Cartridge.

EXERCISE 1.2.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the service ammunition for the M224, 60-mm mortar.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

1.2.1c FUZES

The fuzes used on mortar rounds cause the fired round to function at the desired time or place. The fuzes for the 60-mm mortar ammunition are classified as multioption, point detonating, impact, and fixed.

a. Multioption Fuze, M734 (fig 1-7). You can set the multioption fuze for the M720 HE round to function as (1) proximity burst, (2) near-surface burst, (3) impact burst, or (4) delay burst. Should the selected option fail, the fuze circuitry is designed to activate the next one in sequence.

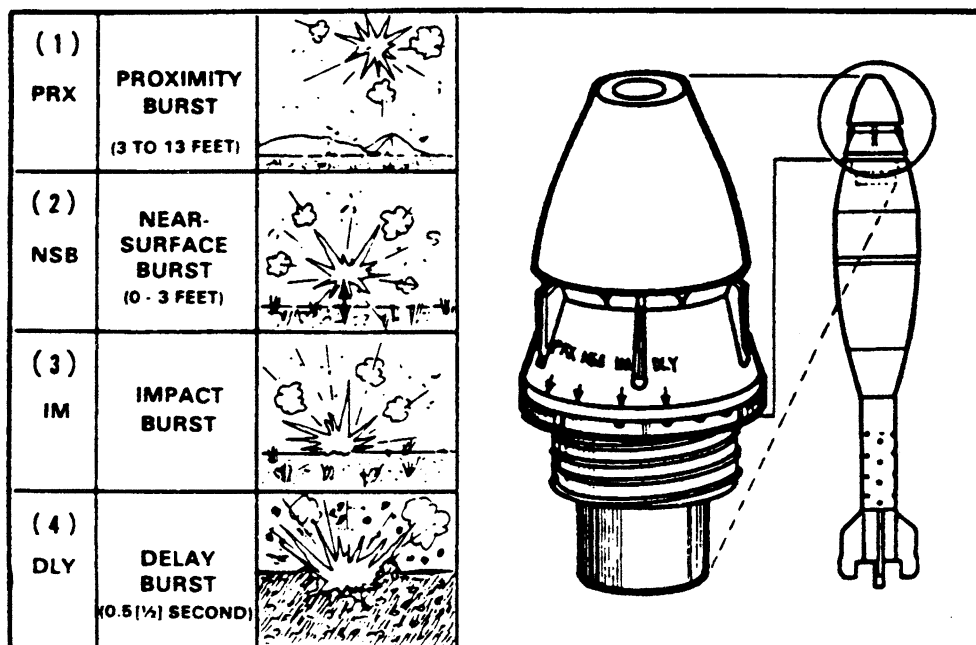


Fig 1-7. Multioption Fuze, M734.

b. Point Detonating Fuze, PD, M935 (fig 1-8). You can set the PD fuze to function as (1) super quick, or (2) delay. The super quick setting will cause the round to burst upon impact with a solid object. The delay setting will cause the round to burst 0.5 seconds after impact.

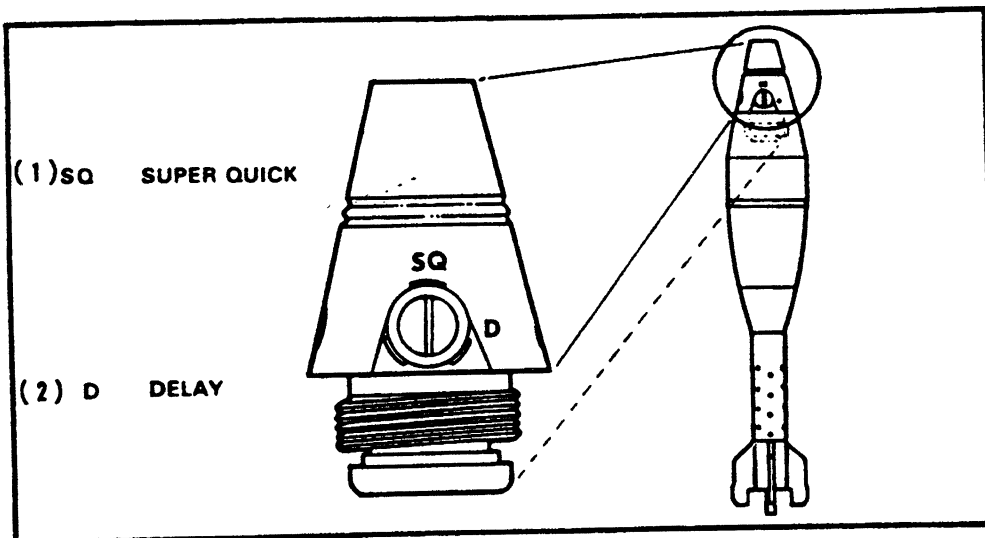


Fig 1-8. Point Detonating Fuze, PD, M935.

c. Impact Fuzes, M52A1 and M525B1. These fuzes will cause the round to function when it comes in contact with an object. Point detonating fuzes function immediately upon impact and are called super quick (SQ). The SQ-type fuze is used with the older high explosive rounds, the smoke and practice rounds.

d. Fixed-time Fuze, M65A1. This fuze causes the round to function at a prescribed time after the round is fired. The fixed-time fuze is used only with the illuminating round.

EXERCISE 1.2.1c: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the four types of fuzes for the M224, 60-mm mortar.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

Work Unit 1-3. CHARACTERISTICS, IMMEDIATE ACTION, AND MAINTENANCE FOR THE MK153 SMAW

TERMINAL LEARNING OBJECTIVE: Identify the characteristics, immediate action, and maintenance for the MK 153 SMAW.

ENABLING LEARNING OBJECTIVES:

- 1.3.1a List the key characteristics of the MK 153 SMAW.
- 1.3.1b List the steps in performing immediate action.
- 1.3.1c List the maintenance steps.

\* \* \* \* \*

**DESCRIPTION MK153, SMAW**

a. The Assault Rocket Launcher, MK 153, 83-mm (SMAW) (fig 1-9) is a smooth bore, filament wound, fiberglass tube. It is 3.27 inches in diameter, 29.9 inches long, and weighs 16.9 pounds. The launcher features a spotting rifle which improves the first rocket hit probability of the weapon by defining exact target range. A sight mount, attached to the launch tube, accommodates either the MK42 MOD telescopic sight or the night vision sight (AN/PVS4). You can aim the launcher using open sights which are permanently mounted on the launcher forward and aft ends.

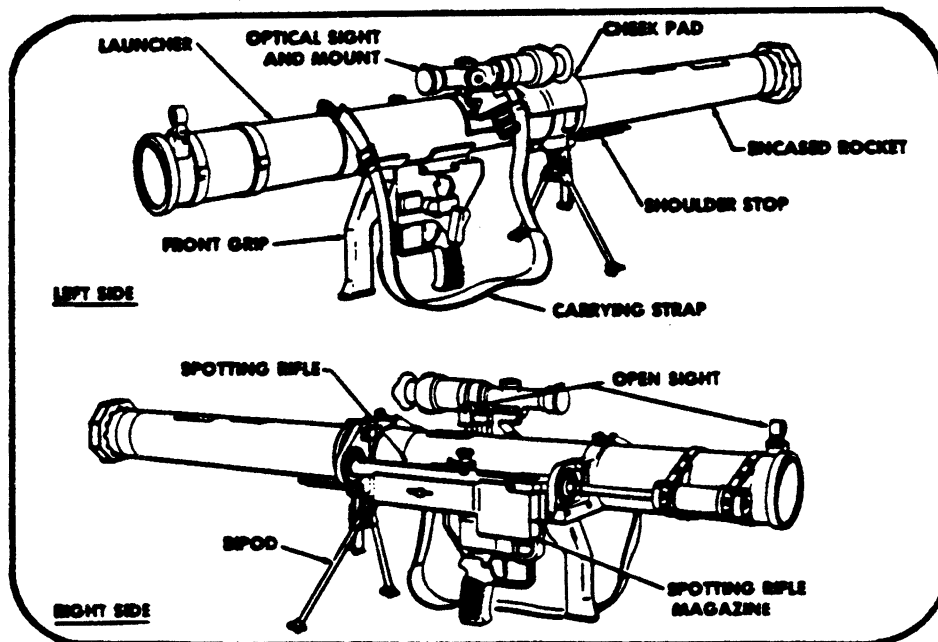


Fig 1-9. MK 153 SMAW with encased rocket installed.

b. Attached to the lower portion of the launch tube are a front pistol grip and the firing mechanism (fig 1-10). The firing mechanism fires either the spotting rifle or the rocket. It requires continuous forward pressure during the firing sequence.

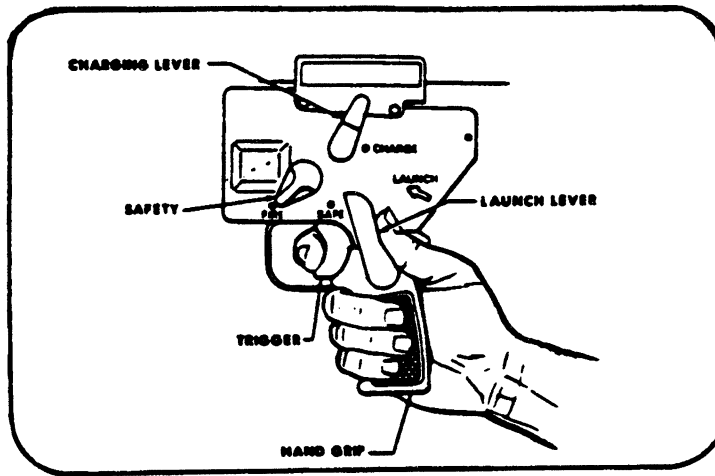


Fig 1-10. Firing mechanism.

c. The encased rocket connects the launcher both mechanically and electrically with one simple twist locking motion. After firing the rocket, remove and discard the encasement. The rocket launcher is the reusable portion of the weapon system.

d. One magazine of six spotting cartridges comes with each encased rocket for use in the launcher mounted spotting rifle. The spotting cartridges match the rocket ballistically (i.e., the rocket will follow the same trajectory as the spotting cartridge round).

1.3.1a CHARACTERISTICS

<u>Weight:</u>			
Weapon ready to fire . . . . .			29.01 lb
<u>Length:</u>			
Weapon ready to fire . . . . .			53.1 in
<u>Ammunition:</u>			
Caliber . . . . .		SMAW 83.3mm	Spotting Rifle 9mm
Type . . . . .			Dual Mode
<u>Range:</u>			
Maximum . . . . .			400 m
Optimum . . . . .			250 m
Minimum . . . . .			50 m
<u>Penetration capabilities:</u>			
Brick/Concrete . . . . .			12 in/8 in
Sandbag . . . . .			7 ft
Steel/Metal . . . . .			1 in
<u>Safety Zones:</u>			
Danger Area . . . . .			30 m
Caution Area . . . . .			60 m

EXERCISE 1.3.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. What is the firing weight of the MK 153 SMAW?

\_\_\_\_\_

2. What is the optimum firing range for the MK 153 SMAW?

\_\_\_\_\_

3. List the danger and caution area distances of the MK 153 SMAW.

a. \_\_\_\_\_

b. \_\_\_\_\_

### 1.3.1b IMMEDIATE ACTION

The MK 153 SMAW combines two different weapons into one. They both use the same firing mechanism and the same sights. However, each weapon has its own misfire procedures.

a. Spotting Rifle. In the event of a misfire, perform the following:

(1) Keep the weapon pointing down range, weapon on "SAFE". Hold the weapon on target for 15 seconds.

(2) Eject the round by pulling the cocking lever to the rear and chamber a new round. Ensure that the bolt is fully forward in the ready-to-fire position.

(3) Place the weapon on "FIRE" and continue with target engagement.

NOTE: During training, should a misfire occur, inspect the round for firing pin indentation. Return the round to range ordnance personnel.

b. Launcher. If a rocket misfires, perform the following steps:

(1) Hold the weapon on target for an additional 15 seconds to ensure that you do not have a delayed firing.

(2) Release the trigger and launch lever. Place the weapon on SAFE.

(3) Reset the charging lever to "CHARGE" position.

(4) Place the weapon on "FIRE." Re-engage the target and attempt to fire the rocket again.

If the rocket does not fire on the second engagement, repeat the above steps under Launcher up to resetting the charging lever. Remove the encasement by rotating it counterclockwise and pulling it rearward out of the launcher. Rotate the encasement one-half turn from its original position, remate to launcher and attempt another engagement.

If the rocket still does not fire, remove the encased rocket from the launcher. Place it on the ground with the projectile directed down range. Obtain another encased rocket and continue with the target engagement. If the new rocket fails to fire, you possibly have a faulty launcher. If the new rocket fires, then the first rocket is a dud.

NOTE: During training, should a misfire occur with the rocket, reinstall the front end cap. Return the encased rocket to the range ordnance personnel for failure analysis and disposal. Ensure that they know the rocket has had firing voltage applied to it.



EXERCISE 1.3.1b: Answer the following items and check your responses against those listed at the end of this study unit.

1. List the steps in performing immediate action on the spotting rifle.

- a. \_\_\_\_\_  
\_\_\_\_\_
- b. \_\_\_\_\_  
\_\_\_\_\_
- c. \_\_\_\_\_  
\_\_\_\_\_

2. List the steps in performing immediate action on the launcher.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

### 1.3.1c MAINTENANCE

As a Squad/Fire Team Leader, you must maintain the weapons assigned to you. To accomplish this you must have a basic knowledge of the maintenance procedures for each and every weapon and weapons system. The next figure shows the cleaning gear provided with the MK 153 SMAW and the steps that you can use to ensure that the weapons system is being maintained properly.

a. Cleaning Kit, (fig 1-11). The SMAW cleaning kit is in a plastic bag provided with each launcher. It contains the tools and materials necessary for operator maintenance of the launcher. Some of the items included are a nylon cleaning brush, chamber and bore brushes for the spotting rifle, a camel's hair brush for cleaning lenses, and lens cleaning tissue.

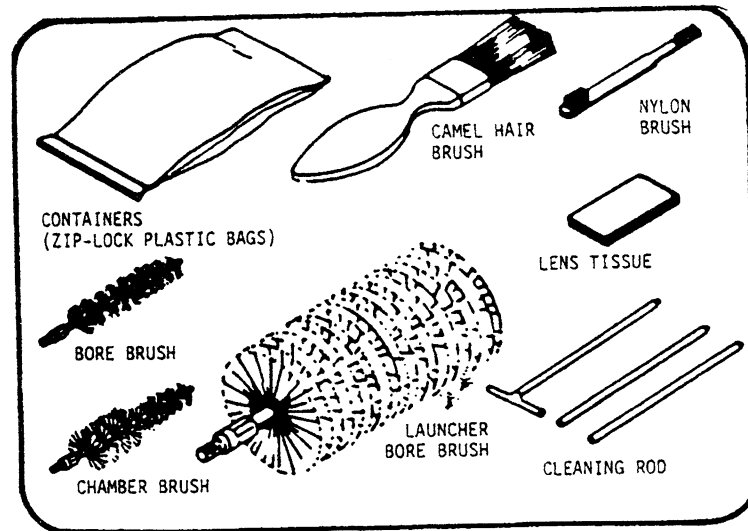


Fig 1-11. MK 153 SMAW cleaning kit.

b. Maintenance areas (fig 1-12). Separate the launcher into four areas to further implant the requirements for cleaning each part.

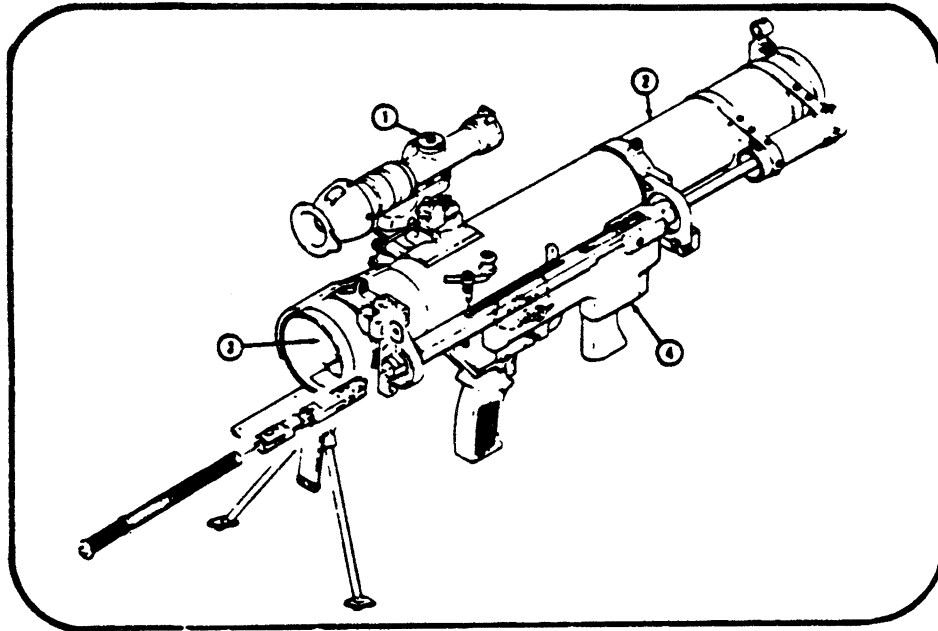


Fig 1-12. Maintenance areas.

- (1) Clean the telescopic sight using a mild detergent and water on the extractor surfaces and ethyl alcohol and lens tissue on the lenses.
- (2) Clean the exterior of the launcher using mild detergent and water. Care must be taken not to immerse the firing mechanism in water. The electrical wire contacts are potted and waterproof but the triggering assemblies are not.
- (3) Clean the interior of the launcher using CLP (Cleaning, Lubricating, Preservant). The entire bore is cleaned with CLP and wiped dry.
- (4) Field strip the spotting rifle before cleaning; use CLP mixture to clean the interior and exterior of the spotting rifle components.

EXERCISE 1.3.1c: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the maintenance steps for cleaning the SMAW.

- a. \_\_\_\_\_  
\_\_\_\_\_
- b. \_\_\_\_\_  
\_\_\_\_\_
- c. \_\_\_\_\_  
\_\_\_\_\_
- d. \_\_\_\_\_  
\_\_\_\_\_

Work Unit 1-4. OFFENSIVE EMPLOYMENT OF COMPANY WEAPONS

TERMINAL LEARNING OBJECTIVE: Identify the methods of employment for the weapons platoon and the missions of the machinegun section, the assault section, and the mortar section.

ENABLING LEARNING OBJECTIVES:

- 1.4.1a List the methods of employment of the weapons platoon.
- 1.4.1b State the mission of the machinegun section in the offense.
- 1.4.1c State the mission of the assault section in the offense.
- 1.4.1d State the mission of the mortar section in the offense.

\* \* \* \* \*

1.4.1a METHODS OF EMPLOYMENT

a. In the attack, the weapons platoon provides maneuvering rifle platoons of the company with Machinegun, 60mm Mortar, SMAW, and limited demolition support. The weapons platoon provides the main source from which rifle platoons may be reinforced for specific operations. Elements of the weapons platoon may be employed by the following methods to support the company and its rifle platoons in offensive combat operations.

- (1) General Support. The company commander retains total control of those weapons elements he decides to employ in general support. In this respect, the company commander (assisted by the weapons platoon commander) plans for the fires of weapons units in general support, directs their tactical employment, and is responsible for their administrative and logistical support. Given optimum conditions, general support is the preferred method of employment as it permits massing of fires at the critical time and place and allows for maximum flexibility.
- (2) Direct Support. When the company commander considers it necessary to dedicate the fires of a weapons section or squad to a particular platoon in order for it to accomplish the assigned mission, he may assign the selected crew-served weapons unit to be in direct support of the rifle platoon concerned. In this situation, the rifle platoon commander assigns fire missions directly to the weapons unit providing the support. The weapons unit leader retains tactical control and responsibility for the administrative and logistical support of his unit, but he must employ his unit in such a manner as to be able to fire the missions assigned by the supported rifle platoon commander. In other words, the rifle platoon commander designates targets and when to fire on them. The supporting crew-served weapons leader selects and occupies firing positions to accomplish the fire missions assigned and arranges for his own administrative and logistical support.
- (3) Attachment. The company commander attaches crew-served weapons squads to one or more rifle platoons when they cannot provide adequate fire support from general support positions or cannot occupy direct support positions so as to be retained under the tactical, administrative, and logistical control of their parent section. Use this method when close terrain limits observation and fields of fire, or the platoon(s) concerned is (are) operating at distances which prohibit effective fire support from general support or direct support positions. Attached crew-served weapons squads provide close-in fire support under control of the rifle platoon commander concerned, but the company commander has lost the flexibility to quickly shift fires from one platoon's zone of action to another. The rifle platoon commander has total tactical, administrative, and logistical control/responsibility of any attached weapons squad.

b. The primary mission of the weapons platoon of the rifle company is to provide supporting direct and indirect fires (including close-in antitank fires and demolitions) for maneuvering elements of the rifle company. To accomplish this mission, crew-served weapons elements of the weapons platoon may be employed in general support, direct support, or by attachment. To decide on the method, the company commander considers the capabilities and characteristics of the type weapons concerned. Consequently, the weapons platoon may be employed using a combination of methods as appropriate to the situation, i.e., an assault squad may be attached to each attacking platoon while the remainder of the platoon is retained in general support. However, under optimum operating conditions with good fields of fire and observation, the preferred method of employment is in general support under the company commander.

EXERCISE 1.4.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the methods of employment of the weapons platoon.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

1.4.1b MISSION OF THE MACHINEGUN SECTION IN THE OFFENSE

a. Mission. The mission of machineguns in the offense is to support by fire the advance of the rifle platoons. These fires will fall into one or more of four general classifications:

- (1) Close Support Fires. These are fires directed against positions opposing the rifle platoon's advance. These fires are delivered as assault fires when the guns accompany the assault squads or fires delivered as part of the base of fire.
- (2) Long-Range Fires. These are fires against targets in the rear of the hostile forward position. A long-range mission is often assigned to machineguns in the base of fire; the long-range fires commence when friendly troops reach lateral or overhead safety limits.
- (3) Flank Protection Fires. When the location or advance of a company creates an exposed flank, the company commander may use his machineguns to protect this weakness.
- (4) Protection Against Counterattack. Expect enemy counterattack following seizure of an objective. Use machineguns to protect the company's reorganization at this time.

b. Concept of Employment A machinegun squad consists of two machinegun teams, each team having one gun. The basic unit of employment of machineguns is by squad. Teams should not be split and attached to rifle squads. Of all the weapons available to a reinforced platoon, the machinegun is capable of delivering the greatest volume of flat-trajectory small arms fire at the greatest effective range (1,1000 meters). The basic offensive mission of an attached machinegun squad is to establish a base of fire and to support the advance of attacking rifle squads by fire, but it may accompany the assaulting squads if required by limited observation and fields of fire.

- (1) The preferred concept of employment, when observation and fields of fire permit, is to position the machinegun squad near the line of departure from which the squad delivers suppressive fires on the objective. In some situations, it may be necessary to initially advance behind the attacking squads to a position or successive positions forward of the line of departure in order to acquire the fields of fire necessary to provide fire support.
- (2) If fields of fire and observation are extremely limited, the machinegun squad accompanies the maneuvering rifle squads. Initially, the machinegun squad may follow the leading squads, advancing by bounds to avoid enemy fire until they identify suitable targets. It then deploys and goes into action to engage the enemy. A machinegun squad may employ fire and movement and accompany assaulting rifle squads all the way through the objective, employing its machineguns as assault weapons.

c. Concept of Firing Positions.

- (1) The best position on the ground to accomplish the mission is the primary position for the machinegun squad. Any other position to accomplish this mission can be fired as an alternate position.
- (2) The position should offer fields of fire.
- (3) Observation of the objective and friendly maneuvering units is vital.
- (4) Direct fire should be possible without premature masking.

- (5) Good cover and concealment should be available.
- (6) For the purpose of resupply and occupation, seek covered routes to the position.
- (7) The position should offer adequate dispersion between weapons, (normally 35 meters).

**EXERCISE 1.4.1b:** Answer the following items and check your responses against those listed at the end of this study unit.

1. State the mission of the machinegun section in the offense.

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2. List the four general classifications of fire for the machinegun section.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

3. What is the normal distance to allow for adequate dispersion between weapons placed in firing positions?

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**1.4.1c MISSION OF THE ASSAULT SECTION IN THE OFFENSE**

a. Mission. The mission of the assault section in the attack is to provide close in anti-tank protection and assault support (including rocket and assault demolition) to the rifle company.

b. Attachment. Assault teams are attached to rifle platoons when they cannot provide adequate fire support and/or anti-tank protection from general or direct support positions. Assault teams are also attached when attacking rifle platoons require their employment in an assault role by employment of rocket fires and/or assault demolitions against enemy prepared positions.

c. Concept of Employment. The basic unit of employment of assault weapons is by team. Each team consists of two gunners operating under the control of the unit leader. When functioning in an antitank role, however, numerous avenues of approach for enemy armor and/or limited observation and fields of fire may justify splitting the section and assigning separate missions to each team for coverage of different enemy armor avenues of approach. When the enemy armor threat is slight or nonexistent, the assault section may be positioned near the line of departure or advance following the platoons in the company assault.

- (1) Providing observation and fields of fire permit, the assault teams may initially be positioned near the line of departure when known or suspected enemy targets are within range (remember, the maximum effective range for the SMAW is approximately 200/250 meters). In some situations, it may be necessary to initially advance behind the attacking squads to a preplanned position or successive positions forward of the line of departure in order to acquire the fields of fire necessary to provide support.
- (2) The assault teams may also advance behind the attacking squads when suitable targets cannot be acquired from preplanned firing positions. The advance is by bounds when the attacking rifle squads begin fire and movement. In this situation, the assault teams go into action and engage suitable targets as they are uncovered.

**d. Characteristics of Firing Positions.**

(1) Basically, the same characteristics that we addressed in positioning the machinegun apply to the assault teams. With the assault teams, however, because enemy observation of the SMAW backblast makes frequent position changes necessary, alternate positions assume equal consideration with the primary positions. Desirable characteristics of the assault teams' positions are as follows:

- (a) Good fields of fire
- (b) Adequate observation of the target and maneuvering forces
- (c) Cover and concealment
- (d) Covered routes for occupation and resupply
- (e) Available and accessible alternate positions
- (f) Safety clearance for backblast. The SMAW requires an area 90 meters deep and 30 meters wide.

(2) Any assault team providing supporting fires should always have local security.

**EXERCISE 1.4.1c:** Answer the following items and check your responses against those listed at the end of this study unit.

1. State the mission of the assault section in the offense.

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2. The basic unit of employment of assault weapons is by

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3. What is the safety clearance for backblast for the SMAW?

a. 

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**1.4.1d MISSION OF THE 60MM MORTAR SECTION IN THE OFFENSE**

Because of the effective range of the 60mm mortar (3,500 meters) and its high-angle, indirect fire capabilities, mortars are seldom attached to rifle platoons but are retained in general support of the company or, if needed, are assigned a direct support mission to support an attacking rifle platoon.

a. Mission. The mission of the 60mm mortar section in the attack is to provide supporting high-angle fires which are rapidly responsive to the rifle company commander's requirements.

b. Concept of Employment. The 60mm mortar section is always employed as a unit. The mortar section may be positioned in proximity to the line of departure or may be assigned to move with the maneuver element.

(1) A position is selected near the line of departure when the mortar section, from that position, can deliver continuous and effective supporting fires without excessive displacements.

- (2) The mortar section frequently follows the maneuvering rifle platoons in the attack when suitable firing positions are not available near the line of departure, and/or when nonorganic fires are sufficient to ensure initial fire superiority for the maneuver element. The section may advance by bounds from one firing position to another. During the assault, the mortar section may remain in a firing position near the final coordination line and may move forward once the objective has been secured.
- (3) In either case, unit leaders must position themselves to function as forward observers and to control the fires of the mortars.

**EXERCISE 1.4.1d:** Answer the following item and check your response against that listed at the end of this study unit.

1. State the mission of the 60mm mortar section in the offense.

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**Work Unit 1-5. DEFENSIVE EMPLOYMENT OF COMPANY WEAPONS**

**TERMINAL LEARNING OBJECTIVE:** Identify the missions of the machinegun, assault, and mortar sections in the defense.

**ENABLING LEARNING OBJECTIVES:**

- 1.5.1a State the mission of the machinegun section in the defense.
- 1.5.1b State the mission of the assault section in the defense.
- 1.5.1c State the mission of the mortar section in the defense.

\* \* \* \* \*

**1.5.1a MISSION OF THE MACHINEGUN SECTION IN THE DEFENSE**

a. **Mission.** The mission of the machinegun section in defense is to provide close and continuous fire support for the frontline platoons. To help ensure a continuous volume of fire and to provide an additional degree of reliability, it is desirable to employ the machineguns by squad (that is, in pairs). Consistent with the company commander's ability to observe and control the fires of the machineguns, general support is the preferred method of employment. The machinegun section provides the preponderance of the company's final protective fires.

b. **Firing Position.** As with any other weapons system, there are three general types:

- (1) **Primary Position.** The best location from which to accomplish the assigned mission.
- (2) **Alternate Position.** A location from which the primary mission can still be accomplished and can be is manned when the primary position becomes untenable or otherwise unsuitable for carrying out the assigned mission. Occupation of alternate positions may be made on the authority of the weapons squad leader.
- (3) **Supplementary Position.** A location from which a secondary or separate mission can be accomplished, such as protecting a flank or limiting a penetration. Movement to supplementary positions must be authorized by the company commander unless weapons units are attached to rifle platoons.

c. Characteristics of Machinegun Defensive Fires

- (1) Sector of Fire (fig 1-13). A wedge-shaped piece of terrain designated by right and left lateral limits. A machinegun team is responsible for engaging all predesignated targets and targets of opportunity within effective range in its assigned sector of fire. Machinegun sectors of fire do not normally exceed 800 mils in width.

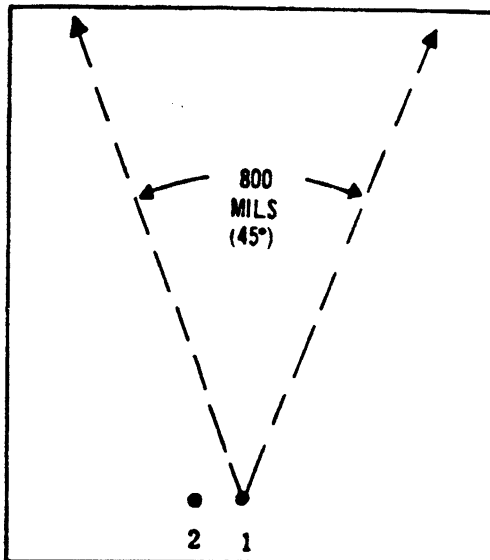


Fig 1-13. Sector of Fire.

- (2) Final Protective Line (FPL) (fig 1-14). A predetermined line of grazing machinegun fire designed to break up an enemy assault.
- (a) FPL's are characterized by flanking, interlocking, and grazing fire.
1. Flanking fire increases the effectiveness of our machineguns against an enemy frontal assault, as the beaten zone of our fires coincides with the long axis of the target.
  2. Interlocking fire provides mutual support.
  3. Grazing fire maximizes the kill zone.
- (b) FPL's are the backbone of the rifle company's final protective fires and, as such, are fired only on prearranged signal from the company commander.
- (c) FPL's are fired at the rapid rate (200 rounds per minute) for the first 2 minutes, then dropped back to the sustained rate (100 rounds per minute) until ordered to cease fire.
- (d) A machinegun FPL should correspond to the right or left lateral limit of its sector of fire.



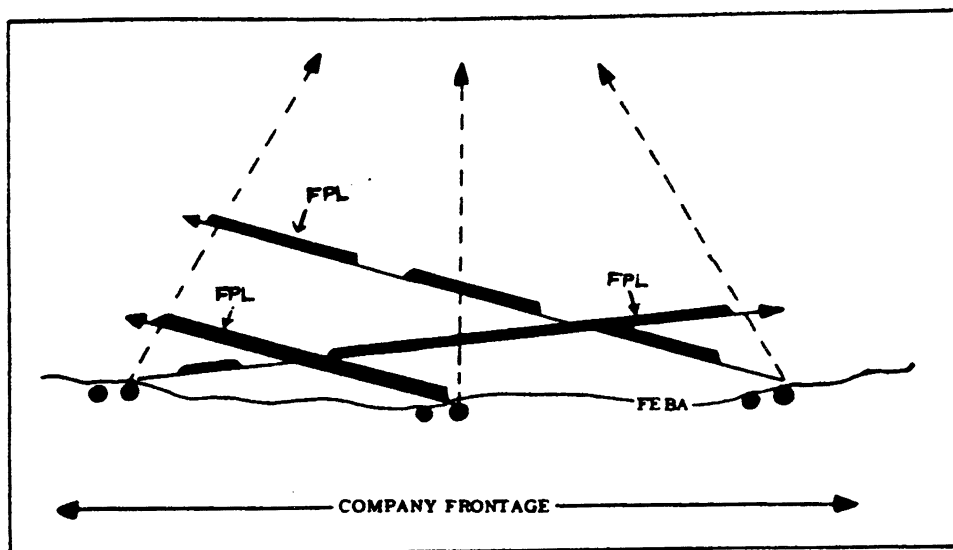


Fig 1-14. Three machinegun squads firing the FPL.

- (3) Principal Direction of Fire (PDF). The preferred method of employing machineguns on the FEBA is by assigning them a sector of fire and FPL. However, when the terrain does not permit planning effective FPL's or when required because of the situation (such as operations on the combat outpost), machineguns may be assigned a PDF covering a dangerous avenue of approach. A machinegun PDF may fall within the sector of fire or comprise either of its boundaries.

Machineguns are always assigned a sector of fire. In addition to the sector of fire, machineguns may also be assigned an FPL or a PDF but never both.

d. Barbed Wire Entanglements. The three types of wire used in conjunction with the company plan of the defense have a close relationship with the fires of the machineguns.

- (1) Tactical wire is used to break up enemy assault formations and to hold up the enemy in areas covered by the most intense defensive fires. Its placement is dictated by the trace of machinegun FPL's.
- (2) Protective wire is located to prevent surprise assault from points close to defensive positions. Particular emphasis is made to ensure that all crew-served weapons are protected by it.
- (3) Supplementary wire is used to break up the pattern of tactical wire, to deceive the enemy as to the location of our FPL's, and to channelize him into areas of intense fire.

EXERCISE 1.5.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. State the mission of the machinegun section in the defense.

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2. Define the Final Protective Line.

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### 3. Define the Principal Direction of Fire.

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#### 1.5.1b MISSION OF THE ASSAULT SECTION IN THE DEFENSE

a. Mission. The mission of the assault section in the defense is to provide close-in antitank protection for the rifle company and, in the absence of an armored threat, provide close range fires support.

b. Employment. The assault weapons are normally employed by teams in close proximity to one another covering the same avenue of approach. The section may be split when there are numerous avenues of approach or when terrain is so close as to limit observation and fields of fire.

c. Selection of Positions. Since the assault weapons have a tendency to disclose their position on firing (backblast), a team should have several alternate positions and routes thereto, selected to back up the primary position. In some situations, the section or team may wait in a covered position where it can best observe its sector of fire and move when necessary to that position which offers the best opportunity for engaging the target.

d. Antiarmor Range Cards. Antiarmor range cards (fig 1-15) should always be prepared, when time permits, for positions employing the SMAW. An antiarmor range card is an oriented sketch prepared by a gunner, showing his sectors of fire and responsibility. The card serves as a ready reference and as an aid to the gunner in determining the range to targets within his sector. Determining the ranges to likely target areas within the gunner's sector, before the enemy's attack, is important since effectiveness of SMAW fire is greatly increased when the range to the target is accurately known. To be effective, antiarmor range cards should be prepared for primary, alternate, and supplementary positions. Antiarmor range cards show the position of the SMAW, ranges and directions to prominent terrain features, and anticipated target engagement areas.

- ① Boundaries of the sector of fire, to include the maximum engagement line.
- ② Location and distance to anticipated target engagement locations.
- ③ Location of target reference points in or near the sector of fire.
- ④ Deadspace.
- ⑤ The LAW symbol.
- ⑥ Marginal data, to include --

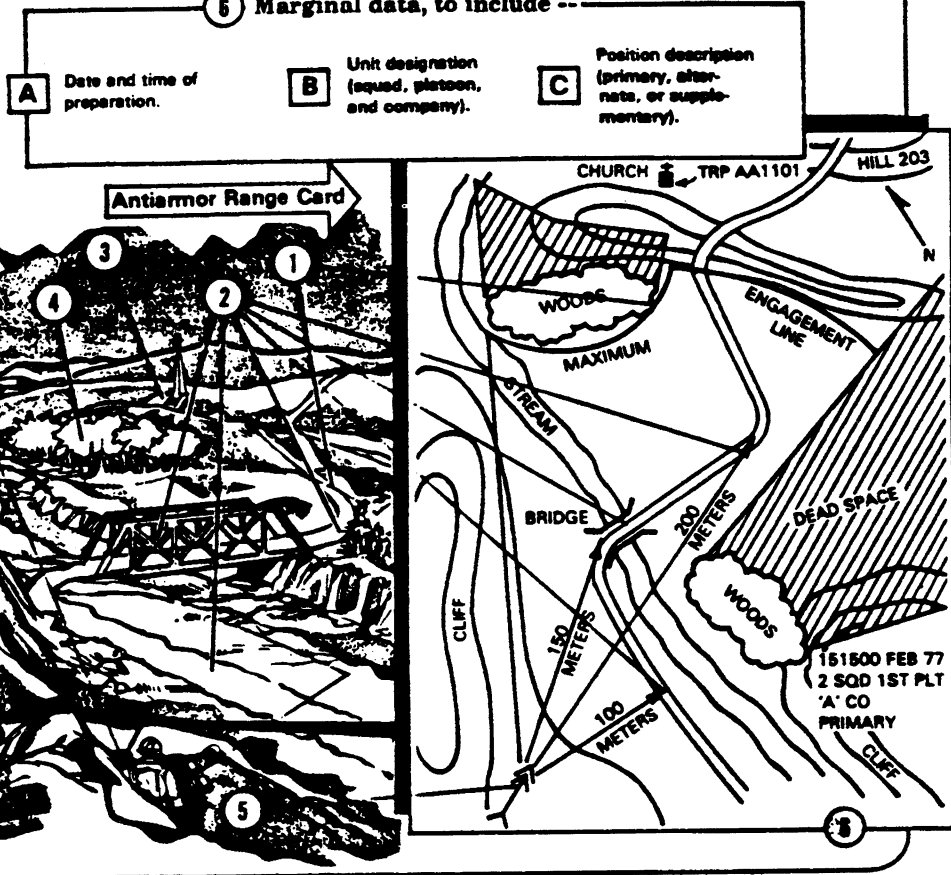


Fig 1-15. Antiarmor Range Card in order of priorities.

EXERCISE 1.5.1b: Answer the following items and check your responses against that listed at the end of this study unit.

1. State the mission of the assault section in the defense.

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2. Why should SHAW teams have several alternate positions and routes thereto selected to back up the primary firing position?

---

1.5.1c MISSION OF THE 60MM MORTAR SECTION IN THE DEFENSE

a. Mission. The mission of the 60mm mortar section in the defense is to provide close and continuous fire support for the rifle company during various stages of enemy attack.

b. Employment. In the defense, the mortars are normally employed as a section in general support, thereby simplifying control and resupply. Firing positions should be located between 150 and 300 meters to the rear of the FEBA. When mortars are located in the reserve area, the reserve platoon commander will provide security.

c. Defensive Fire Support. The 60mm mortar is capable of firing all four sequences of fire.

- (1) Long-range fires are intended to destroy the integrity of the enemy before he can attack.
- (2) Close defensive fires are intended to engage the enemy after he has formed for the attack, but before his assault.
- (3) Final protective fires are intended to build a "wall of fire" forward of our battle area and to destroy the enemy's assault. Because of ammunition restrictions, the emphasis for firing the 60mm mortar is during the final protective fire. Priority goes first to filling deadspace in the machinegun FPL's, then to covering dangerous avenues of approach. Final protective fires are planned to cover an area 50 meters wide and 50 meters deep for each 60mm mortar squad. One mortar firing four rounds will neutralize an area 50 by 50 meters. The FPF is fired at the maximum rate (30 rounds per minute) for the first minute, and is continued thereafter at the sustained rate (18 rounds per minute) until the FPF is ordered terminated.
- (4) Fires within the battle area are intended to limit enemy penetrations and to support counterattack.

EXERCISE 1.5.1c: Answer the following items and check your responses against those listed at the end of this study unit.

1. State the mission of the 60mm mortar section in the defense.

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2. List the four firing sequences that the 60mm mortar is capable of firing during defensive fire support.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

## Answers to Study Unit #1 Exercises

### Work Unit 1-1.

#### Exercise 1.1.1a

1. 1,100 meters
2. 100 rpm

#### Exercise 1.1.1b

1. a. Cover Raised  
b. Cover Closed
2. The barrel lock lever

#### Exercise 1.1.1c

1. a. Wait 5 seconds.  
b. Pull cocking handle to the rear.  
c. Place the weapon on SAFE.  
d. Keep the weapon pointed down range until the barrel is cool (15 minutes). Clear the weapon.

#### Exercise 1.1.1d

1. Hold the weapon on target until all rounds are fired.

#### Exercise 1.1.1e

1. Inspect the weapon for cleanliness and proper mechanical condition.
2. Maintain a light coat of CLP on moving parts. Change barrels after firing rapid rate for 2 minutes or sustained rate for 10 minutes.
3. Thoroughly clean the weapon for 3 consecutive work days.

### Work Unit 1-2.

#### Exercise 1.2.1a

1. a. 75-3,500 meters  
b. 75-1,800 meters
2. 75-1,000 meters
3. a. 30 rpm/4min  
b. 18 rpm/4min
4. a. 20 rpm  
b. 8 rpm

#### Exercise 1.2.1b

1. a. M720 HE  
b. M49A4 HE  
c. M302A1 SMOKE  
d. M83A3 ILLUM

#### Exercise 1.2.1c

1. a. Multioption Fuze  
b. Point Detonating Fuze  
c. Impact Fuze  
d. Fixed-time Fuze

**Work Unit 1-3.**

**Exercise 1.3.1a**

1. 29.01 lbs
2. 250 meters
3. a. 30 meters  
b. 60 meters

**Exercise 1.3.1b**

1. a. Keep the weapon pointed down range, on SAFE for 15 seconds.  
b. Eject the round and chamber a new round. Ensure that the bolt is fully forward.  
c. Place the weapon on FIRE, continue target engagement.
2. a. Hold the weapon on target for 15 seconds.  
b. Release the trigger and launch lever. Place the weapon on SAFE.  
c. Reset the charging lever to CHARGE position.  
d. Place the weapon on FIRE. Re-engage the target and attempt to fire again.

**Exercise 1.3.1c**

1. a. Clean the telescopic sight.  
b. Clean the exterior of the launcher.  
c. Clean the interior of the launcher.  
d. Clean the spotting rifle.

**Work Unit 1-4.**

**Exercise 1.4.1a**

1. a. General Support  
b. Direct Support  
c. Attachment

**Exercise 1.4.1b**

1. To support by fire the advance of the rifle company
2. a. Close support fires  
b. Long-range fires  
c. Flank protection fires  
d. Protection against counterattack
3. 35 meters

**Exercise 1.4.1c**

1. To provide close in anti-tank protection and assault support to the rifle company
2. teams
3. a. 90 meters by 30 meters wide

**Exercise 1.4.1d**

1. To provide supporting high-angle fires which are rapidly responsive to the company commander's requirements

**Work Unit 1-5.**

**Exercise 1.5.1a**

1. To provide close and continuous fire support for the front line platoons
2. A predetermined line of grazing machinegun fire designed to break up an enemy attack
3. Covers a dangerous avenue of approach

**Exercise 1.5.1b**

1. To provide close-in anti-tank protection for the rifle company and in the absence of an armored threat to provide close range fire support
2. Assault weapons have a tendency to disclose their position on firing (backblast).

**Exercise 1.5.1c**

1. To provide close and continuous fire support for the rifle company during various stages of the attack.
2.
  - a. Long-range fires
  - b. Close defensive fires
  - c. Final protective fires
  - d. Fires to limit enemy penetrations and to support counterattacks

STUDY UNIT 2

WEAPONS ORGANIC TO THE BATTALION

STUDY UNIT GOALS: TO RECOGNIZE AND TO GAIN AN UNDERSTANDING OF THE CHARACTERISTICS AND CAPABILITIES OF THE M2 AND MK 19 MACHINEGUNS, THE M29 MORTAR, AND THE M47 DRAGON.

Work Unit 2-1. CHARACTERISTICS AND CAPABILITIES OF THE M2, .50 CALIBER MACHINEGUN

TERMINAL LEARNING OBJECTIVE: Identify the characteristics and capabilities of the M2, .50 caliber machinegun.

ENABLING LEARNING OBJECTIVES:

2.1.1a State the key characteristics of the M2, .50 caliber machinegun.

2.1.1b List the capabilities of the M2, .50 caliber machinegun.

\* \* \* \* \*

DESCRIPTION

The M2, .50 caliber machinegun (fig 2-1) is a belt fed, recoil-operated, air-cooled, crew-served machinegun. The gun is capable of single-shot as well as automatic fire.

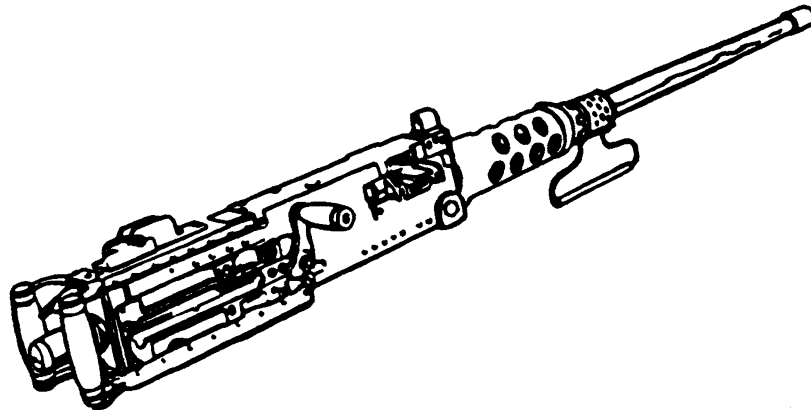


Fig 2-1. M2, .50 Caliber Machinegun.

2.1.1a CHARACTERISTICS

Weight of gun complete, on tripod mount, M3 . . . . . 128 lb

Ranges:

Maximum . . . . . 6,800 meters  
Maximum effective . . . . . 1,830 meters  
Grazing fire . . . . . 1,000 meters

Rates of fire:

Rapid . . . . . 40 rd or more per min  
Sustained . . . . . 40 rd or less per min



EXERCISE 2.1.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. What is the maximum effective range for the M2, .50 caliber machinegun?

\_\_\_\_\_

2. What is the sustained rate of fire for the M2, .50 caliber machinegun?

\_\_\_\_\_

2.1.1b CAPABILITIES

a. The machinegun supports the infantry in both the offense and defense. It provides the rifleman with the heavy volume of close, accurate, and continuous fire necessary to accomplish his mission in the attack. The long range, close defensive, and final protective fires delivered by this gun form an integral part of the unit's defensive fires. The M2, .50 caliber machinegun is also used to:

- b. Provide protection for motor movements, vehicle parks, and train bivouacs
- c. Defend against low-flying hostile aircraft
- d. Destroy lightly armored vehicles
- e. Conduct reconnaissance by fire on suspected enemy positions

EXERCISE 2.1.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the capabilities of the M2, .50 caliber machinegun.

a. \_\_\_\_\_

\_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

e. \_\_\_\_\_

Work Unit 2-2. CHARACTERISTICS AND CAPABILITIES OF THE MK 19, 40MM MACHINEGUN

TERMINAL LEARNING OBJECTIVE: Identify the characteristics and capabilities for the MK 19, 40mm machinegun.

ENABLING LEARNING OBJECTIVES:

2.2.1a State the key characteristics of the MK 19, 40mm machinegun.

2.2.1b List the capabilities of the MK 19, 40mm machinegun.

\* \* \* \* \*

DESCRIPTION

The MK 19, 40mm Machinegun (fig 2-2) is an air-cooled, blowback-operated, fully automatic weapon. The ammunition is fed into the gun by a disintegrating metallic link belt. The weapon features a barrel which prevents cook-off even after prolonged firing.

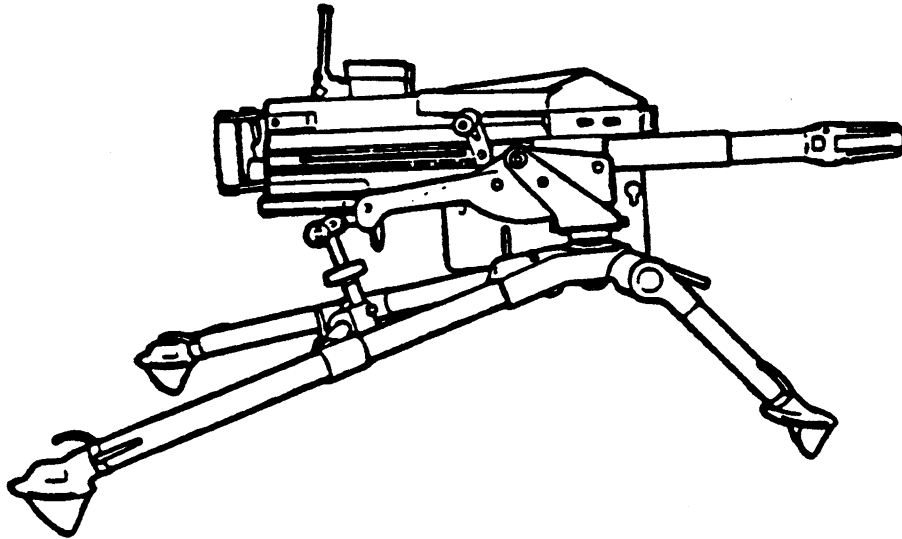


Fig 2-2. MK 19, 40mm machinegun.

2.2.1a CHARACTERISTICS

Weight of gun, complete, on tripod mount, M3 . . . . .	130.6 lb
Ranges:	
Maximum . . . . .	2,200 meters
Maximum effective . . . . .	1,500 meters
Rates of fire:	
Rapid . . . . .	60 rpm
Sustained . . . . .	40 rpm
Ammunition . . . . .	40mm HEDP, 40mm Target Practice
Armor Penetration . . . . .	.2 inches of steel at 0 degrees obliquity.
ECR (estimated casualty radius) . . . . .	5 meters

EXERCISE 2.2.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. What is the maximum effective range for the MK 19, 40mm machinegun?

---

2. What armor penetration capability does the 40mm round have?

---

3. What is the ECR for the 40mm round?

---

2.2.1b CAPABILITIES

a. The MK19 supports the infantry in both the attack and defense. It provides the supported unit with a heavy volume of close and continuous fire necessary to accomplish the mission. The long range fire of the gun forms an integral part of the battalion's defensive fires. The MK 19, 40mm machinegun is also used to:

- b. Provide defense against low-flying hostile aircraft,
- c. Destroy light armored vehicles, and
- d. Provide protective fires during motor movements.

EXERCISE 2.2.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the capabilities of the MK 19, 40mm machinegun.

- a. \_\_\_\_\_  
\_\_\_\_\_
- b. \_\_\_\_\_  
\_\_\_\_\_
- c. \_\_\_\_\_  
\_\_\_\_\_
- d. \_\_\_\_\_  
\_\_\_\_\_

Work Unit 2-3. CHARACTERISTICS AND CAPABILITIES OF THE M47 DRAGON

TERMINAL LEARNING OBJECTIVE: Identify the characteristics and capabilities of the M47 Dragon.

ENABLING LEARNING OBJECTIVES:

2.3.1a State the key characteristics of the M47 Dragon.

2.3.1b List the capabilities of the M47 Dragon.

\* \* \* \* \*

DESCRIPTION

The M47 Dragon (fig 2-3) is a man-portable, shoulder-fired, medium range anti-tank weapon (MAW). The command-to-line-of-sight guided missile is launched from a recoilless launcher with a smooth bore, fiberglass tube. Once launched, the missile is automatically guided to the target which the gunner holds in the sight. A sensor device tracks the missile's course and transmits signals through the fine wires trailed by the missile. The Dragon can be employed in all weather conditions and in any type of terrain so long as the gunner can obtain a clear line-of-sight to the target.

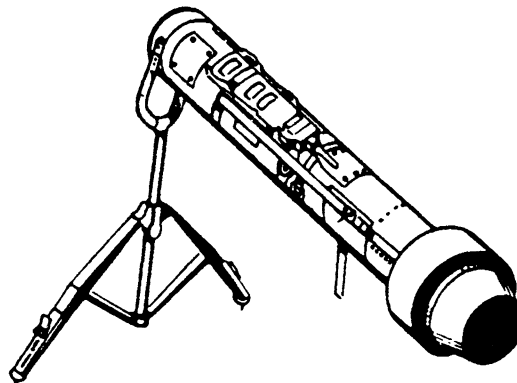


Fig 2-3. M47 Dragon.

2.3.1a CHARACTERISTICS

Ranges:	
Maximum . . . . .	1,000 meters
Minimum . . . . .	65 meters
Backblast area:	
Danger area . . . . .	30 meters by 60 meters.
Caution area . . . . .	20 meters by 70 meters.
Team . . . . .	Two Marines (Gunner and assistant gunner)

EXERCISE 2.3.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. What is the maximum range for the M47 Dragon?

\_\_\_\_\_

2. What is the minimum range for the M47 Dragon?

\_\_\_\_\_

3. How many Marines make up a Dragon team?

\_\_\_\_\_

2.3.1b CAPABILITIES

The primary mission of the M47 Dragon team is to provide medium range antiarmor support for the Marine infantry battalion. This mission will be accomplished by using the Dragon to engage and to destroy enemy tanks and other armored vehicles in both offensive and defensive combat. The Dragon team may be assigned a secondary mission of engaging other point targets such as:

- Nonarmored vehicles
- Crew-served weapons
- Bunkers

EXERCISE 2.3.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the capabilities of the M47 Dragon.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

Work Unit 2-4. CHARACTERISTICS AND CAPABILITIES OF THE M29, M29A1, 81MM MORTAR

TERMINAL LEARNING OBJECTIVE: Identify the characteristics and capabilities of the M29, and M29A1, 81mm Mortar.

ENABLING LEARNING OBJECTIVES:

2.4.1a State the key characteristics of the M29 and M29A1, 81mm mortar.

2.4.1b List the capabilities of the M29 and M29A1, 81mm mortar.

\* \* \* \* \*

The M29 series 81mm mortar is the heaviest indirect fire weapon in the infantry battalion. It is the battalion commander's "weapon of opportunity" and is sometimes called his "personal artillery." It is extremely versatile, and it normally uses the same procedures as larger indirect fire weapons in the artillery. However, it can be employed in the same manner as the 60mm mortar.

**DESCRIPTION**

The M29A1, 81mm mortar (fig 2-4), like the 60mm mortar, is a smooth bore, muzzle-loaded, high angle, indirect fire weapon. It also consists of a barrel, sight, bipod, and baseplate. Unlike the 60mm mortar, there is no provision or need for using the hand-held method. This is because of its greater range and circular baseplate, which allows firing in any direction.

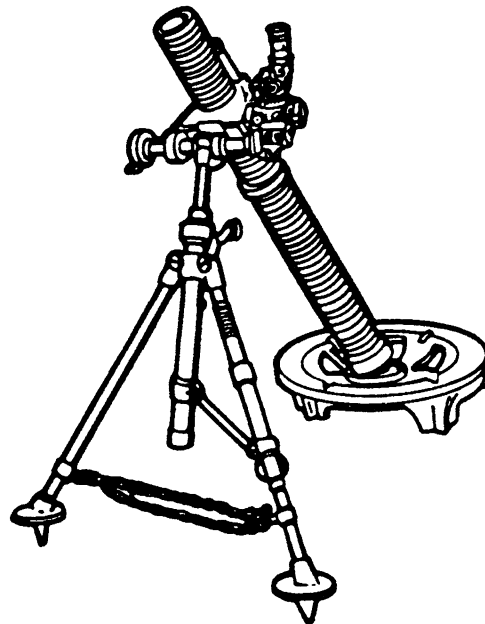


Fig 2-4. M29A1, 81mm mortar.

**2.4.1a CHARACTERISTICS**

**Ranges:**

HE, WP . . . . . 4,500 meters  
Illumination . . . . . 3,350 meters

**Rates of fire:**

Maximum . . . . . 25 rpm/2 min  
Sustained . . . . . 8 rpm

**EXERCISE 2.4.1a:** Answer the following items and check your responses against those listed at the end of this study unit.

1. What is the maximum range for HE and WP for the 81mm mortar?

\_\_\_\_\_

2. What is the maximum rate of fire for the 81mm mortar?

\_\_\_\_\_

**2.4.1b CAPABILITIES**

a. The mission of the 81mm Mortar Platoon is to provide close and continuous indirect fire support to the infantry battalion to which it is organic. The infantry battalion commander is ultimately responsible for the employment of the platoon. He has three options for using the platoon:

- (1) General Support. The mortar platoon fires in support of the whole battalion, receiving requests for support from each of the rifle companies.
- (2) Direct Support. The mortar platoon or one or more sections fires in support of a specific rifle company.
- (3) Attachment. One or more mortar sections are placed temporarily within a rifle company.

b. When employed in General Support, the 81mm Mortar platoon can engage multiple targets at the request of the company commanders and still mass highly destructive fires.

c. Each mortar is capable of firing an Final Protective Fire (FPF). The size of a single mortar FPF should not exceed an area 50 meters square. The size or shape of an FPF may be varied to fit the terrain; however, platoon or section FPF's normally will not exceed the following areas:

- (1) Squad - 50 meters x 50 meters
- (2) Section - 100 meters x 50 meters
- (3) Platoon - 400 meters x 100 meters

d. The ammunition available to the 81mm mortar allows the Battalion Commander to engage targets at ranges greater than with the companies' 60mm mortars, and when artillery is not available. Below are listed the maximum ranges and effects of the different rounds:

- (1) HE - maximum range of 4,500 meters with a burst area in excess of 30 x 20 meters
- (2) WP - maximum range of 4,500 meters with a burst area approximately 15 x 10 meters
- (3) ILLUM - maximum range of 3,350 meters. Will illuminate an area of about 1,000 meters square at 500,000 candlepower for 75 seconds.

EXERCISE 2.4.1b: Answer the following items and check your responses against those listed at the end of this study unit.

1. What are the three methods of employment for the 81mm mortar platoon?
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
2. What is the size or shape of the FPF fired by the 81mm mortar platoon?  
\_\_\_\_\_
3. How long will the illumination round illuminate an area?  
\_\_\_\_\_

Answers to Study Unit #2 Exercises.

Work Unit 2-1.

Exercise 2.1.1a

1. 6,800 meters
2. 40 rounds or less per minute

Exercise 2.1.1b

1.
  - a. Supports the infantry in both the offense and the defense
  - b. Provides protection for motor movement, vehicle parks, and train bivouacs
  - c. Defends against low-flying hostile aircraft
- d. Destroys lightly armored vehicles
- e. Conducts reconnaissance by fire on suspected enemy positions

Work Unit 2-2.

Exercise 2.2.1a

1. 1,500 meters
2. 2 inches of steel at 0 degrees obliquity
3. 5 meters

Exercise 2.2.1b

1.
  - a. Supports the infantry in both the offense and the defense
  - b. Provides defense against low-flying hostile aircraft
  - c. Destroys light armored vehicles
- d. Provides protective fires during motor movements

Work Unit 2-3.

Exercise 2.3.1a

1. 1,000 meters
2. 65 meters
3. 2 Marines

Exercise 2.3.1b

1.
  - a. Provides medium range antiarmor support for the infantry battalion
  - b. Engages nonarmored vehicles
  - c. Engages crew-served weapons
- d. Engages bunkers

**Work Unit 2-4.**

**Exercise 2.4.1a**

1. 4,500 meters
2. 25 rpm/2 minutes

**Exercise 2.4.1b**

1.
  - a. General Support
  - b. Direct Support
  - c. Attachment
2. 400 meters x 100 meters
3. 75 seconds





STUDY UNIT 3  
SUPPORTING ARMS

**STUDY UNIT GOALS:** TO RECOGNIZE AND TO GAIN AN UNDERSTANDING OF THE MISSION, CAPABILITIES, AND LIMITATIONS FOR FIELD ARTILLERY, NAVAL GUNFIRE, AND CLOSE AIR SUPPORT.

Work Unit 3-1. FIELD ARTILLERY

**TERMINAL LEARNING OBJECTIVE:** Identify the mission, capabilities, and limitations for field artillery.

**ENABLING LEARNING OBJECTIVES:**

- 3.1.1a State the general missions of field artillery.
- 3.1.1b List the capabilities of field artillery.
- 3.1.1c List the limitations of field artillery.

\* \* \* \* \*

3.1.1a MISSION

a. Marine Corps field artillery has the following general missions.

- (1) To provide Close and Continuous Fire Support to Infantry Units. The key words are close and continuous. Fire support is provided day or night and in all conditions of weather. The primary job is the support of combat units.
- (2) To give Depth to Combat. Weapons with ranges of 20-plus miles give the ability to attack reserves and assembly areas, to interdict supply lines, to disrupt the enemy's command and control facilities, and so forth.
- (3) To attain Fire Superiority Over Enemy Delivery Means. Fire superiority over enemy's artillery, mortars, and rockets includes counterbattery (suppressing artillery), countermortar (suppressing mortars) and counterflak (suppressing anti-air fire).

b. Current Field Artillery Weapons

- (1) M101A1 105-MM Towed Light Howitzer (fig 3-1). The M101A1, 105-MM Towed Light Howitzer is a mobile, general-purpose artillery piece that can be used for direct or indirect fire in support of units within the Marine Corps divisions.

The M101A1 has a maximum range of 11,000 meters and can be towed by a vehicle or airlifted by the CH 46 or CH 53 helicopter.

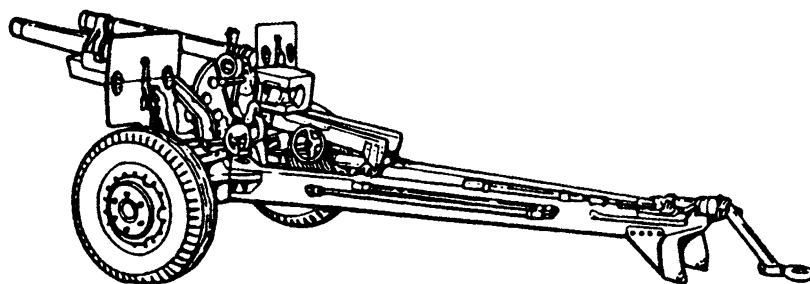


Fig 3-1. M101A1, 105-MM Towed Light Howitzer.

- (2) M114A1, 155-MM Towed Medium Howitzer (fig 3-2). The mission of the M114, 155-MM Towed Medium Howitzer is to provide direct and indirect fires in support of units of a Marine division.

The M114 has a maximum range of 14,600 meters with standard ammunition and 19,400 meters with rocket-assisted projectiles (RAP). It can be towed by vehicle or airlifted by a CH 46 or CH 53 helicopter.

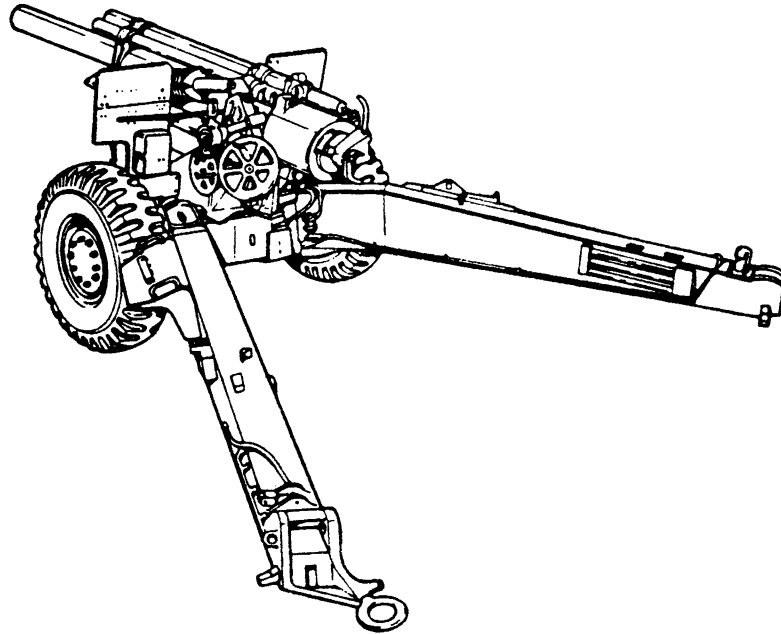


Fig 3-2. M114, 155-MM Towed Medium Howitzer.

- (3) M198, 155-MM Towed Medium Howitzer (fig 3-3). The purpose of the M198, 155-MM Towed Medium Howitzer is to provide general support field artillery firing for infantry units of a Marine division.

The M198 has an extended range of 30,000 meters and can be towed by a vehicle or airlifted by a CH 53 helicopter.

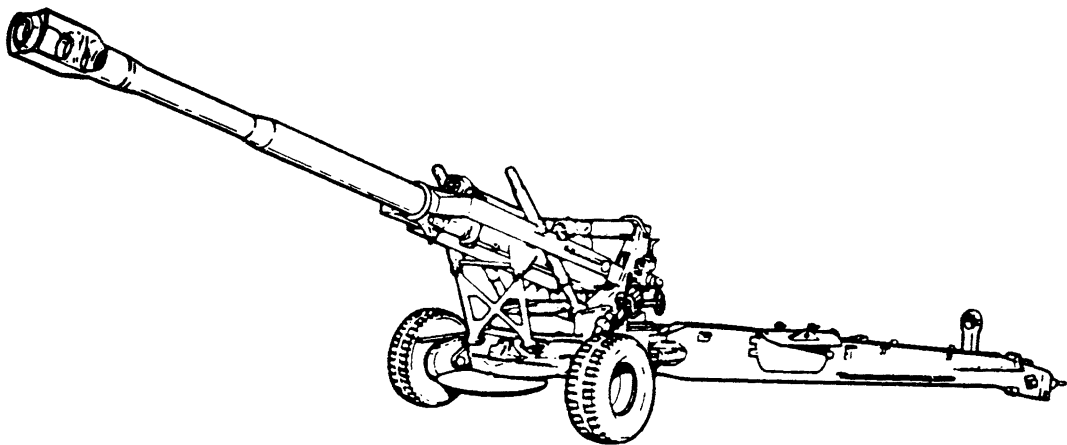


Fig 3-3. M198, 155-MM Towed Medium Howitzer.

- (4) M109, Self-Propelled 155-MM Howitzer (fig 3-4). The M109, 155-MM Self-Propelled Howitzer is a self-propelled, fully tracked, armor-plated, intermediate-range weapon. It is highly maneuverable and is of a medium caliber capable of firing either direct or indirect fire.

The M109's maximum speed is 35 mph with a cruising range of 217 miles. It has a maximum range of 18,100 meters.

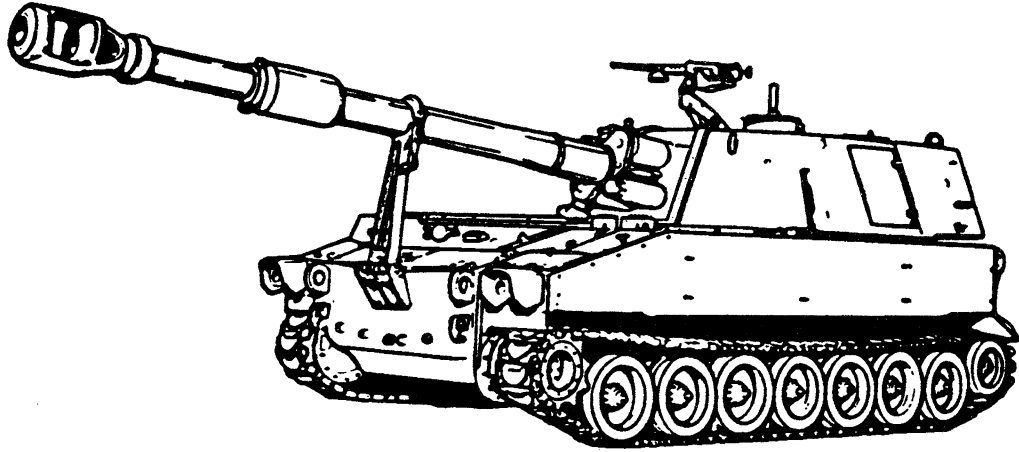


Fig 3-4. M109, Self-Propelled 155-MM Howitzer.

- (5) M110A2, Self-Propelled 8-Inch Howitzer (fig 3-5). The M110A2, Self-Propelled 8-Inch Howitzer is a low, track-laying, all-welded steel structure, with no superstructure, equipped with an independently operated turret and howitzer mounted toward the rear of the vehicle.

It has a maximum speed of 34 mph and a cruising range of 325 miles. The maximum range of the M110A2 is 20,800 meters.

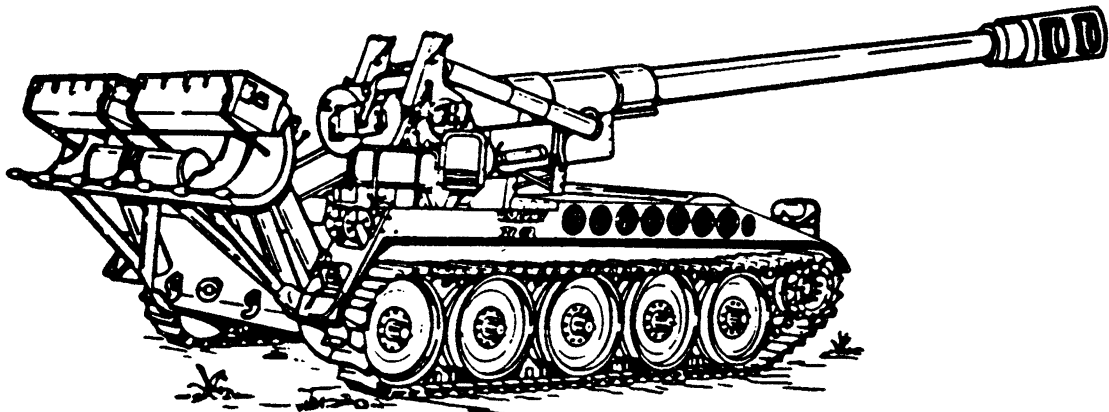


Fig 3-5. M110A2, Self-Propelled 8-Inch Howitzer.

EXERCISE 3.1.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. State the general missions of field artillery.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

3.1.1b CAPABILITIES OF FIELD ARTILLERY

Like any other weapon, Field Artillery has certain capabilities, which are:

- a. Shifting fires rapidly within a large area without displacing (maneuvering fires)
- b. Massing fires of dispersed units on one target or a series of targets
- c. Delivering fires from defilade without exposing the firing unit to direct enemy observation or counterfire
- d. Delivering accurate fires under all conditions of weather and visibility
- e. Delivering continuous support to the maneuver element
- f. Delivering surprise fires without adjustment

EXERCISE 3.1.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the capabilities of field artillery.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

3.1.1c LIMITATIONS OF FIELD ARTILLERY

Field Artillery also has certain limitations.

- a. The principal limitation of artillery is its inability to support the initial phase of the amphibious assault.
- b. Artillery units have reduced effectiveness during displacements and are particularly vulnerable at this time.
- c. Artillery is quite vulnerable to air attack as a result of no overhead cover and the necessity to fire from relatively fixed positions.
- d. The firing signature of an artillery weapon is distinct and can enable the enemy to determine the firing position.
- e. Logistics support may be limited as a result of handling and transportation difficulties encountered due to the weight and bulk of artillery ammunition.
- f. Artillery units are not designed to repulse ground attacks and delivery of artillery fires may be curtailed while engaged in close combat.

**EXERCISE 3.1.1c:** Answer the following item and check your responses against those listed at the end of this study unit.

1. List the limitations of field artillery.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

**Work Unit 3-2. NAVAL GUNFIRE**

**TERMINAL LEARNING OBJECTIVE:** Identify the mission, capabilities, and limitations or naval gunfire.

**ENABLING LEARNING OBJECTIVES:**

3.2.1a State the mission of naval gunfire.

3.2.1b List the capabilities of naval gunfire.

3.2.1c List the limitations of naval gunfire.

\* \* \* \* \*

**3.2.1a MISSION**

Naval gunfire plays a vital role in supporting amphibious operations. The general mission of naval gunfire is to support the assault of the objective by destroying or neutralizing:

- Shore installations that oppose the approach of ships and aircraft
- Defenses that may oppose the landing force
- Defenses that may oppose the post landing advance of the landing force

a. There are only two support missions that may be assigned naval gunfire support ships when in support of the landing force--direct support and general support.

- (1) **Direct Support.** In this relationship, the ship delivers prearranged and call fires for the supported unit. Call fires are normally requested and adjusted by a shore fire control party spotter of the supported unit or by an air spotter; however, simplified and standardized procedures are such that any trained observer can effectively adjust the fires of a ship. Each assault battalion is normally assigned one direct support ship.
- (2) **General Support.** The fires of a ship in general support are conducted as directed by the naval gunfire officer (naval gunfire liaison officer) of the unit being supported. The primary purpose of assigning the general support mission to a ship is to provide additional fire support to commanders at echelons (regiment, division) above the battalion without requesting it from higher echelons. Fire missions against targets of opportunity are conducted directly by fire support ships as provided for in the naval gunfire plans. Prearranged fires are delivered according to a schedule of fires which is a part of the naval gunfire plan. Units of regimental size or larger, in reserve, are assigned one or more general support ships.

b. The Navy presently has several different types of ships that can provide fire support to the landing force. They are:

- (1) Battleships (fig 3-6). Battleships are well-suited for gunfire support roles with main batteries of 16-inch/50 caliber guns which are capable of destructive type missions. The secondary batteries of 5-inch/54-caliber guns can also provide considerable fire support.

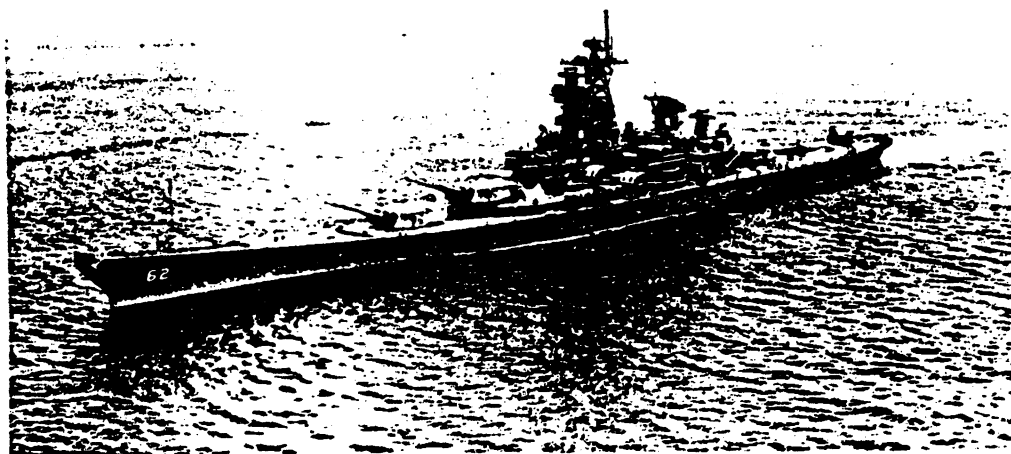


Fig 3-6. USS New Jersey (BB 62).

- (2) Guided Missile Cruiser. There are several different types of cruisers that can provide gunfire in support of the amphibious landing. They carry a single 5-inch/54-caliber rapid fire gun capable of firing 30 rounds per minute. The maximum effective range of these batteries is 23,000 meters.

- (3) Destroyers and Frigates (fig 3-7). The types of ships most frequently found in a gunfire support role are the destroyer and frigate. Their normal role is in the direct support of a battalion landing team (BLT) or Marine amphibious unit (MAU). Destroyers and frigates armed with the 5-inch/54-caliber rapid fire guns have a maximum effective range of 23,000 meters.

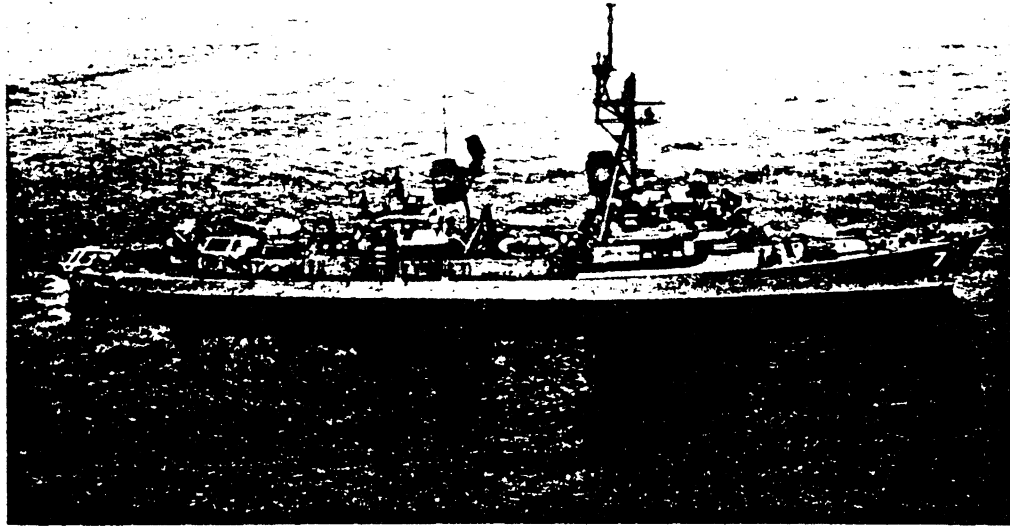


Fig 3-7. USS Henry B. Wilson (DD 7).

EXERCISE 3.2.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. State the mission of naval gunfire.

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### 3.2.1b CAPABILITIES OF NAVAL GUNFIRE

To use naval gunfire effectively, it is necessary to understand the capabilities. The most important capabilities are as follows:

a. Mobility. Within the limits imposed by hydrography and hostile action, the position of the firing ship must provide for the best support of the landing force and also for maneuverability to avoid shore battery fire. This ability to maneuver allows the selection of the most favorable gun-target line and is an important factor when planning for the support of widely separated beaches.

b. Fire Control Equipment. Automated fire control permits accurate fire whether at anchor or underway. Optical and electronic equipment aboard ship makes observation of targets possible under favorable conditions, thus permitting direct fire by the ship.

c. Weapons. The primary sources of naval gunfire support are the 16-inch/.50 caliber and the 5-inch/54 caliber gun.



d. Ammunition. The different types of projectiles, powder charges, and fuzes available permit selection of the optimum combination for the attack of most targets.

e. High Initial Velocity and Flat Trajectory. The high initial velocity and flat trajectory of naval gun projectile make it suitable in the direct fire role for the penetration and destruction of material targets, particularly those presenting an appreciable vertical face to the gun-target line.

f. Rate of Fire. The large volume of fire which can be delivered in a relatively short period of time is a distinct advantage when delivering neutralization fires.

g. Deflection Pattern. The dispersion pattern is very narrow in deflection and long in range. This is characteristic of any gun system as compared with the dispersion pattern of the howitzer or mortar. Because of this characteristic, close supporting fire can best be delivered when firing parallel to the frontlines.

EXERCISE 3.2.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the capabilities of naval gunfire.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_

### 3.2.1c LIMITATIONS OF NAVAL GUNFIRE

Naval gunfire has certain limitations.

a. Hydrography. Unfavorable hydrographic conditions such as shallow waters, reefs, shoals, etc., may force the firing ship to take an undesirable firing position with respect to the target area. The presence of mines can require that initial firing positions be farther from the target area than is desirable.

b. Fixing Ship's Position. The accuracy of naval gunfire depends upon the accuracy of the fixed position of the firing ship. In areas where navigational aids are lacking, there will be appreciable inaccuracies in unobserved fires and in the initial salvos of observed indirect fires. Using radar beacons and reference points indentifiable by both ship and spotter will reduce this problem.

c. Weather and Visibility. Bad weather and poor visibility make it difficult to determine the ship's position by visual means and reduce the observers' opportunities for locating targets and adjusting fires.

d. Changing Gun-Target Line. When the ship is firing while underway, the gun-target line may change relative to friendly positions. Under certain conditions this can cause cancellation of the fire mission because of the danger to friendly forces. Restricting the movement of the ship may partially offset this situation.

e. Range Pattern. The dispersion pattern of the naval gun is elliptical with the long axis of the pattern along the direction of fire. While this provides an advantage when the long axis of the target is parallel to the gun-target line, close supporting fires when firing over the heads of troops are not always possible.

f. Ammunition Capacity. Magazines of the support ships have a limited capacity. A relatively high percentage of total ammunition is available for gunfire support; the remainder is retained to protect ships from enemy air or surface attack. Replenishing ammunition in the objective area would diminish this limitation somewhat.

g. Communications. All communication between ship and shore is dependent upon radio. This single means of communication is susceptible to interruption by equipment limitations, enemy electronics warfare, and unfavorable atmospheric conditions. The constant movement of ships and shore fire control parties may further degrade communications.

EXERCISE 3.2.1c: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the limitations of naval gunfire.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_
- h. \_\_\_\_\_

Work Unit 3-3. CLOSE AIR SUPPORT

TERMINAL LEARNING OBJECTIVE: Identify the mission, capabilities, and limitations of close air support.

ENABLING LEARNING OBJECTIVES:

3.3.1a State the primary mission of marine aviation.

3.3.1b List the significant capabilities of close air support.

3.3.1c List the significant limitations of close air support.

\* \* \* \* \*

3.3.1a PRIMARY AND COLLATERAL MISSIONS OF MARINE AVIATION

a. Primary Mission. The primary mission of Marine aviation is to:

- (1) To participate as the supporting components of Fleet Marine Forces in the seizing and defending of advanced naval bases
- (2) To conduct such land operations as may be essential to execute a naval campaign

b. Collateral Mission

to participate as an integral component of naval aviation in the execution of such other Navy functions as Fleet Commanders so direct

The Marine Corps presently has several different types of aircraft that can provide close air support to the landing force. They are:

- (1) AH-1 Cobra (fig 3-8). The AH-1 Cobra provides close-in fire support to the landing force commander during aerial and ground escort operations, during ship-to-shore movement, and within the objective area. It has a chin-mounted 20mm nose turret and four stations on its stub wings that are capable of carrying either miniguns, rockets, or TOW's.

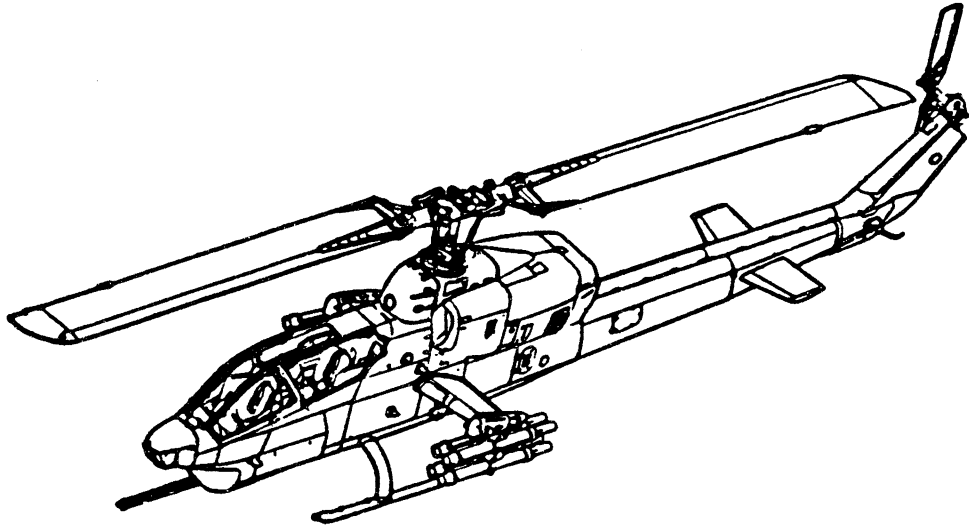


Fig 3-8. AH-1 Cobra.

- (2) UH-1 Huey (fig 3-9). The UH-1 Huey provides utility combat support to the landing force commander during ship-to-shore movement and in subsequent actions ashore. The Huey is capable of carrying eight combat-loaded Marines.

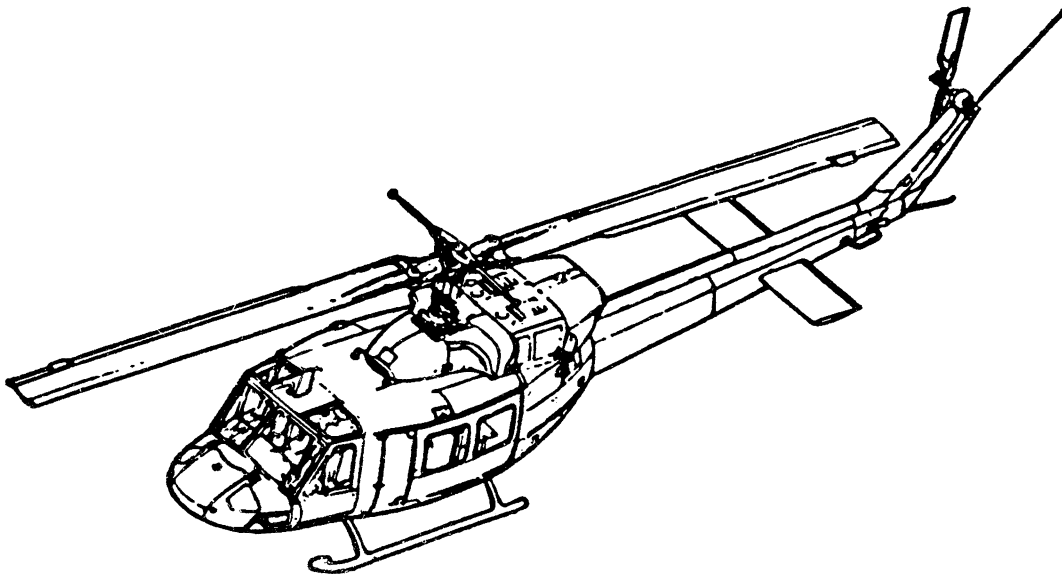


Fig 3-9. UH-1 Huey.

- (3) CH-46 Sea Knight (fig 3-10). The CH-46 Sea Knight transports supplies, equipment, and personnel for the landing force during ship-to-shore movement and within the objective area. The CH-46 Sea Knight can carry 17 combat-loaded Marines.

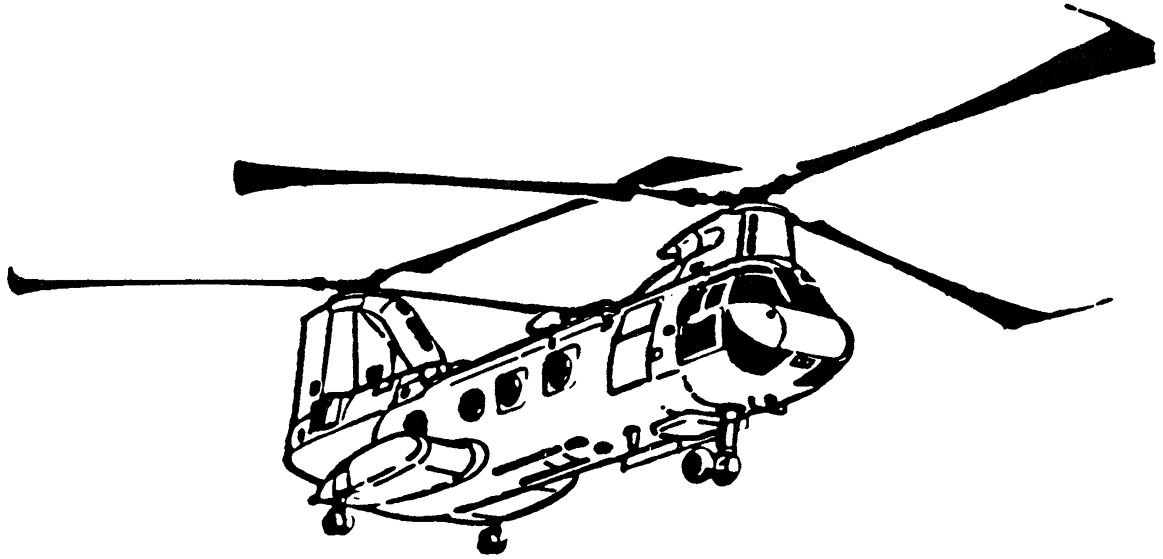


Fig 3-10. CH-46 Sea Knight.

- (4) CH-53E Sea Stallion (fig 3-11). The CH-53E Sea Stallion also transports supplies, equipment, and personnel for the landing force during ship-to-shore movement and within the objective area. The CH-53E Sea Stallion can carry 55 combat-loaded Marines.

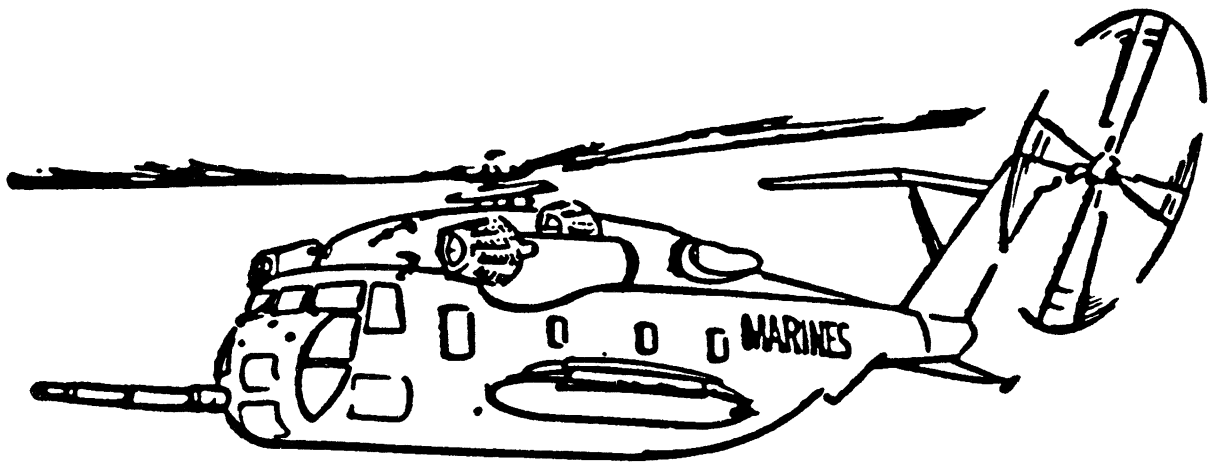


Fig 3-11. CH-53E Sea Stallion.

- (5) OV-10D Bronco (fig 3-12). The OV-10 Bronco conducts electronic aerial reconnaissance observation, and forward air control operations in support of the landing force commander during ship-to-shore movement and in subsequent operations ashore. The aerial observer is normally an O8 or O3 who has been specially trained to perform his mission. He provides the link between the ground commander and air assets.

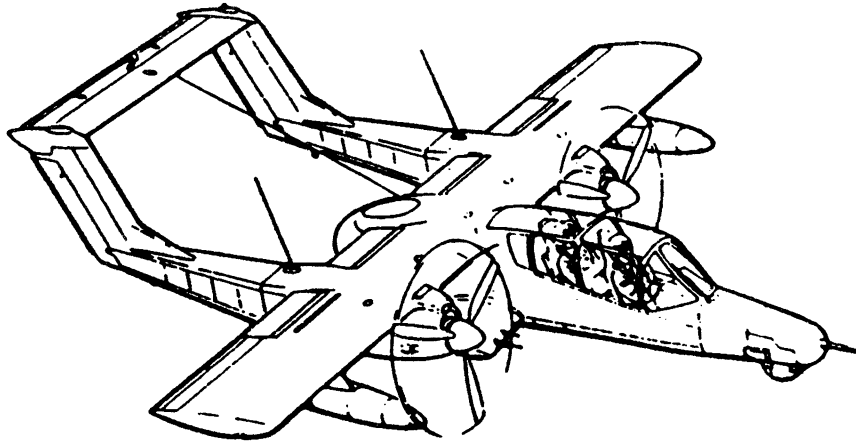


Fig 3-12. OV-10D Bronco.

- (6) A-4M Skyhawk (fig 3-13). The A-4M Skyhawk is capable of attacking and destroying surface targets in support of the landing force commander, escort helicopters, and conducts such other air operations as directed. The TA-4F is a two-seat model, used both as a trainer and for tactical air control airborne (TACA) missions.

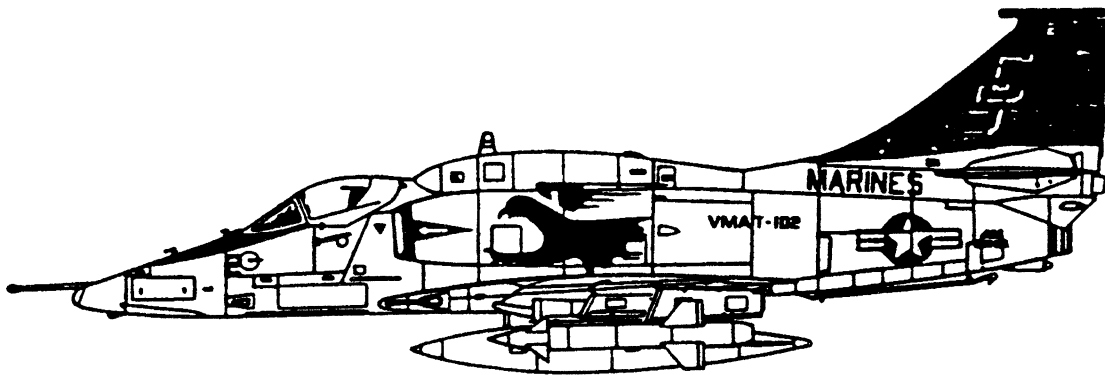


Fig 3-13. A-4M Skyhawk.

- (7) EA-6B Intruder (fig 3-14). The EA-6B Intruder conducts airborne electronic warfare (EW) in support of Fleet Marine Force operations. It employs a tactical jamming system consisting of on-board receivers and up to five externally mounted jamming pods to degrade enemy air defense. It is capable of aerial refueling and is deployable from either land bases or aircraft carriers.

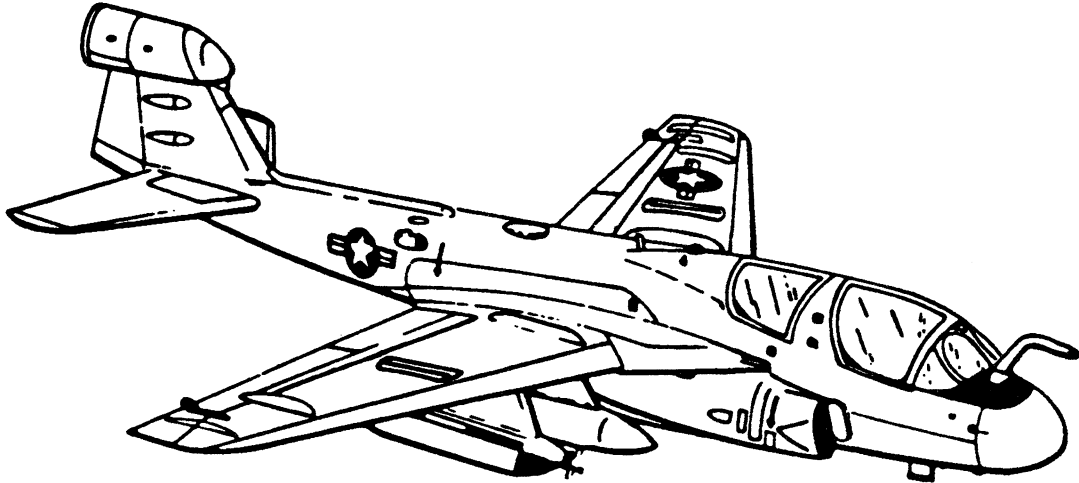


Fig 3-14. EA-6B Intruder.

- (8) A-6E Intruder (fig 3-15). The A-6E Intruder is capable of attacking and destroying surface targets under night and all weather conditions in support of the landing force commander; it also supports helicopter operations and conducts such other air operations as directed.

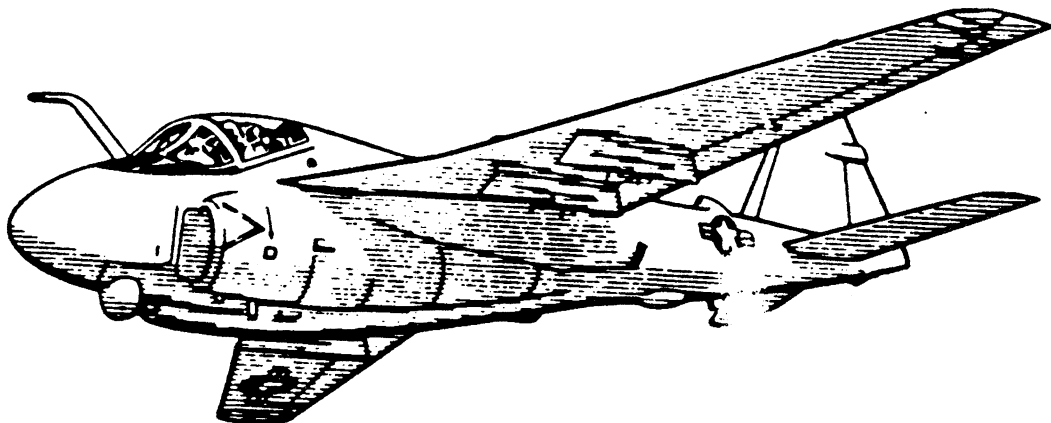


Fig 3-15. A-6E Intruder.

- (9) F-4S Phantom (fig 3-16). The F-4S Phantom is a supersonic, long-range, all-weather fighter. The aircraft carries and delivers an assortment of air-to-air missiles, air-to-ground missiles, rockets, bombs, land mines; and it dispenses leaflets. The aircraft also has gunnery capabilities with the addition of the MK-4 gun pod on the centerline station.

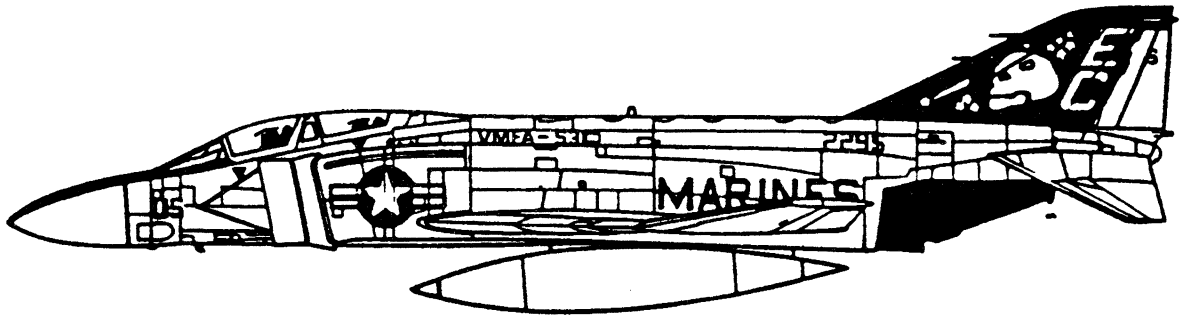


Fig 3-16. F-4S Phantom.

- (10) AV-8B Harrier (fig 3-17). The AV-8B Harrier is used to attack and destroy surface targets in support of the land force commander; it also escorts helicopters and conducts such other air operations as may be directed. It carries two 30mm guns and is capable of delivering an assortment of conventional weapons from five ordnance stations. The aircraft provides close and direct air support and is capable of an intermediate range fighter role. With its unique vertical/short takeoff and landing (V/STOL), capability it can operate from smaller ships or from unimproved forward sites.

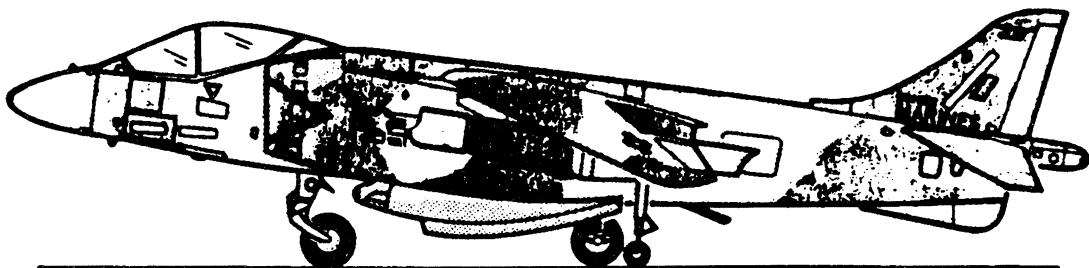


Fig 3-17. AV-8B Harrier.

- (11) F-18 Hornet (fig 3-18). The F-18 Hornet is a supersonic, long-range, all-weather fighter. The aircraft carries and delivers an assortment of air-to-air missiles, air-to-ground missiles, rockets, bombs, land mines; and it dispenses leaflets. The aircraft has gunnery capabilities with the addition of the MK-4 gun pod on the centerline station.

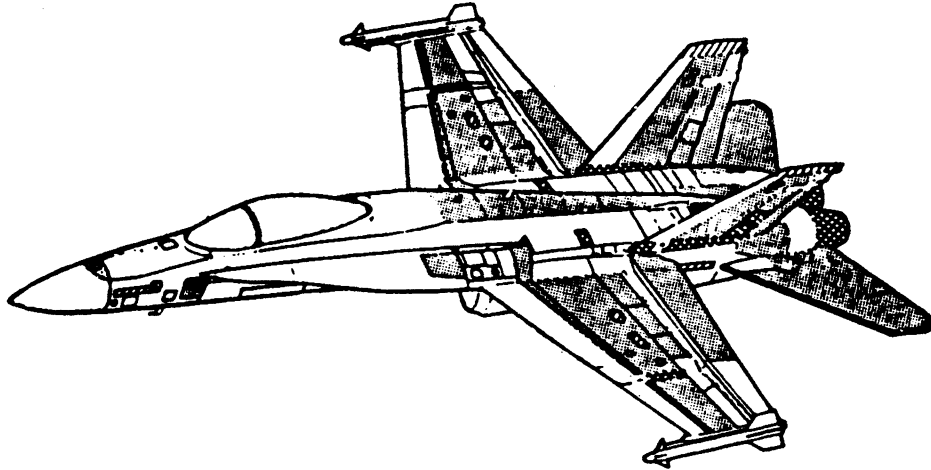


Fig 3-18. F-18 Hornet.

EXERCISE 3.3.1a: Answer the following items and check your responses against those listed at the end of this study unit.

1. State the primary mission of Marine aviation.

a. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### 3.3.1b CAPABILITIES OF CLOSE AIR SUPPORT

The principal advantages of aircraft weapons accrue from their ability to hit targets which other supporting arms cannot engage because of range or defilade, to deliver munitions including special weapons of great destructive power, and to destroy heavily fortified positions and point targets. Other significant aircraft capabilities include:

a. Variety of Attack. Subject to weather, terrain, and troop safety limitations, aircraft have the ability to carry out the type of attack best suited to the target.

b. Accuracy. The expected accuracy of air-to-surface weapons depends upon several factors, such as the degree of individual pilot proficiency and level of training, the visibility, and the pilot's ability to see the target or aim point. The type of delivery maneuver and the release height of the particular weapon affects the expected accuracy.



c. Observation. Aircraft, while performing close air support missions, can maintain continued observation over large areas, beyond the area of their close air support mission. This capability enables aviation units to be of great assistance to the supported ground unit commander. Support aircraft can relay information of immediate value to the ground commander regarding enemy activity on reverse slopes and in other areas beyond or shielded from ground observation. The capability to search for and attack targets gives air support a significant advantage over other fire support means.

d. Speed and Maneuverability. The speed of aircraft enables commanders to concentrate overwhelming air strength in the objective area from distant and dispersed bases and to deliver attacks with a great measure of surprise. Their speed and maneuverability also provide a measure of protection from enemy fires and detection by enemy radar.

e. Neutralization. The ability of aircraft to operate in flights of more than one aircraft with great speed and to carry ordnance in large amounts and varieties enables them to neutralize targets that threaten landing force operations.

f. Mobility and Flexibility. The mobility and flexibility of supporting air units permit the employment of a limited number of aircraft against individual targets or the concentration of large numbers of aircraft against targets of greater extent and more importance. The variety of armament selection of targets makes every type of enemy installation a potential target.

g. Availability. Primary dependence is normally on tactical aviation in land operations beyond the range of naval gunfire and during periods when the artillery is displacing or is inferior to that of the enemy. During the assault phase of an amphibious operation and before landing force artillery, air and naval gunfire are the primary supporting arms. Air support is planned so as to provide the maximum number of aircraft possible in close support of the ground forces during the assault phase.

h. Morale Effect. Closely allied to all of the above is the positive effect air support has upon the morale of the supported troops. The airplane is an outstanding morale builder to friendly forces and, conversely, serves as a symbol of defeat to the enemy. The presence of aircraft engaged in close support missions has a detrimental effect on an enemy's morale, since it is a positive indication that the enemy has lost control of the air--that one arm of his forces has been overcome or defeated.

EXERCISE 3.3.1b: Answer the following items and check your responses against that listed at the end of this study unit.

1. List the significant capabilities of close air support.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_
- h. \_\_\_\_\_

### 3.3.1c LIMITATIONS OF CLOSE AIR SUPPORT

The most significant limitation of aircraft weapons systems is the difficulty in providing support at night and in periods of limited visibility. Other significant aircraft limitations include:

a. Radius of Action. The fuel on board in relation to the amount of armament carried determines the radius of action of an aircraft.

b. Time on Station. The factors above also influence time on station. Other factors are distance from the air base to the forward edge of the battle area (FEBA), fuel consumption in relation to altitude flown, and fuel reserve requirements.

c. Communications. Radio communications are of great importance to air support strikes. Radio communications are the only means for transmitting detailed instructions to airborne aircraft.

d. Identification of Targets. Identification and location of prebriefed targets is done visually, usually by referring to grid maps or aerial photographs and by giving good target descriptions. The controller must communicate the description and location of the target to the pilot by radio. Further identification may relate to prominent terrain features and the use of smoke.

e. Weather. Weather, a limiting factor itself, can aggravate all other limitations. The bad or inclement weather at the target is the main limitation, rather than enroute and home base weather. Bad weather at the target area makes locating the target difficult and limits the types of attack made.

f. Enemy Antiaircraft Efforts. The proliferation of man-packed and vehicle-mounted antiaircraft missiles systems provides an opportunity to mass antiair fires with frontline units. Concentrations of fire by in-flight tracking weapons systems may force offensive air support aircraft into a defensive role and preclude the effective employment of weapons in support of ground troops.

EXERCISE 3.3.1c: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the significant limitations of close air support.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_

Answers to Study Unit #3 Exercises.

Work Unit 3-1.

Exercise 3.1.1a

- 1.
  - a. To provide close and continuous fire support to infantry units
  - b. To give depth to combat
  - c. To attain fire superiority over enemy delivery means

Exercise 3.1.1b

- 1.
  - a. Shifting fires rapidly
  - b. Massing fires
  - c. Delivering fires from defilade
  - d. Delivering accurate fires under all conditions
  - e. Delivering continuous support
  - f. Delivering surprise fires without adjustment

**Exercise 3.1.1c**

1. a. Inability to support the initial phase of the amphibious assault
- b. Reduced effectiveness during displacements
- c. Vulnerable to air attack
- d. Firing signature
- e. Logistics support may be limited
- f. Not designed to repulse ground attacks.

**Work Unit 3-2.**

**Exercise 3.2.1a**

1. To support assault of the objective by destroying or neutralizing shore installations that oppose the approach of ships and aircraft, defenses that may oppose the landing force, and defenses that may oppose the postlanding advance of the landing force

**Exercise 3.2.1b**

1. a. Mobility
- b. Fire control equipment
- c. Weapons
- d. Ammunition
- e. High initial velocity and flat trajectory
- f. Rate of fire
- g. Deflection pattern

**Exercise 3.2.1c**

1. a. Hydrography
- b. Fixing ship's position
- c. Weather and visibility
- d. Changing gun-target line
- e. Range pattern
- f. Ammunition capacity
- g. Communication

**Work Unit 3-3.**

**Exercise 3.3.1a**

1. a. To participate as the supporting components of Fleet Marine Forces in the seizure and defense of advanced naval bases
- b. Conduct such land operations as may be essential to the prosecution of a naval campaign

**Exercise 3.3.1b**

1. a. Variety of Attack
- b. Accuracy
- c. Observation
- d. Speed and Maneuverability
- e. Neutralization
- f. Mobility and Flexibility
- g. Availability
- h. Morale Effect

**Exercise 3.3.1c**

1. a. Radius of action
- b. Time on station
- c. Communications
- d. Identification of targets
- e. Weather
- f. Enemy anti-aircraft efforts

## STUDY UNIT 4

### CALLING FOR AND ADJUSTING MORTARS AND ARTILLERY

**STUDY UNIT GOALS:** TO RECOGNIZE AND TO GAIN AN UNDERSTANDING OF THE TOOLS AND EQUIPMENT USED TO CALL FOR AND TO ADJUST MORTARS AND ARTILLERY. THE PROCEDURES FOR LOCATING TARGETS, THE ELEMENTS FOR THE CALL FOR FIRE, AND SPOTTING AND ADJUSTING MORTARS AND ARTILLERY.

#### Work Unit 4-1. TOOLS AND EQUIPMENT

**TERMINAL LEARNING OBJECTIVE:** To identify the tools and equipment used by the small unit forward observer.

**ENABLING LEARNING OBJECTIVE:**

4.1.1a List the tools and equipment used by the small unit forward observer.

\* \* \* \* \*

#### 4.1.1a TOOLS AND EQUIPMENT

As a small unit leader, you must be proficient in the duties of a forward observer. To be proficient, you must familiarize yourself with the tools and equipment necessary to accomplish your mission. These necessary items are:

a. **Maps.** The primary purpose for the observer's use of the map is to locate targets. There are two types of maps used, each representing a picture of an area as though it were taken from different heights above the earth's surface. The one covering more area with less detail is at a scale of 1 to 50,000 (fig 4-1); the one covering less area but with more detail is at a scale of 1 to 25,000 (fig 4-2).

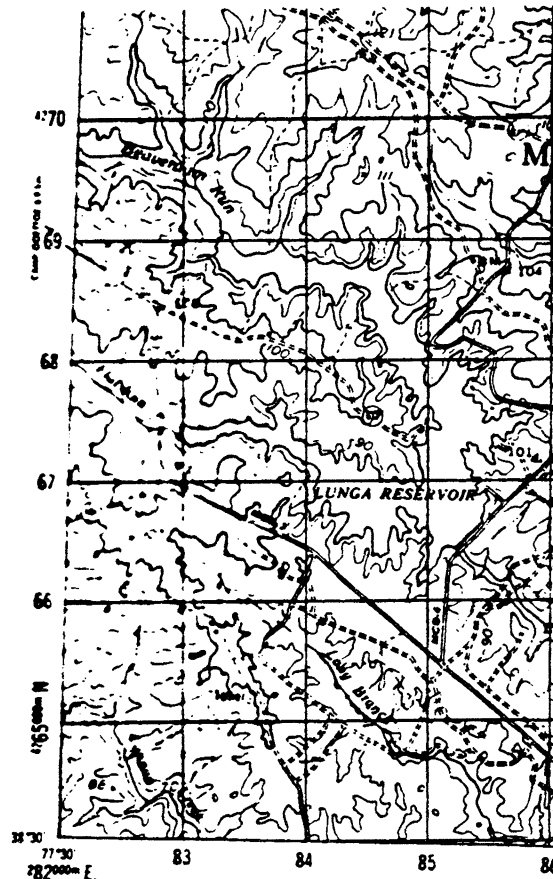


Fig 4-1. Map scale of 1:50,000.

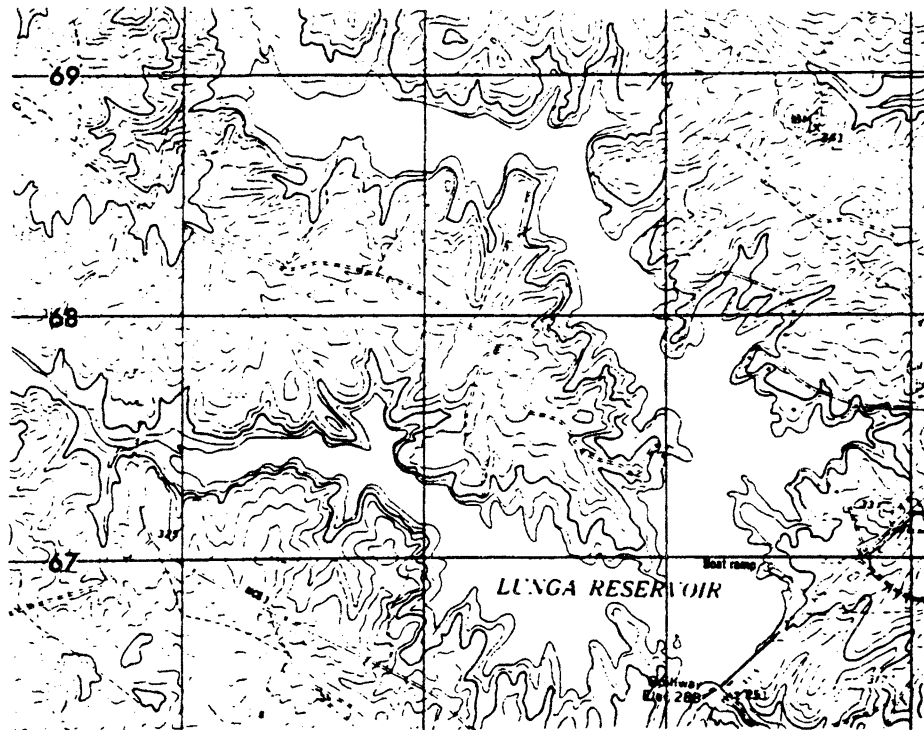


Fig 4-2. Map scale of 1:25,000.

b. Compass. The compass determines magnetic directions. Readings obtained from the compass are in mils. There are 6,400 mils in a circle. Each compass functions through the use of a north-seeking arrow which constantly points to the northern magnetic pull (not true north pole) of the earth's globe. It is from this reference point that one measures direction.

- (1) Lensatic compass (fig 4-3). The most commonly used compass by infantry units is the lensatic compass. The name lensatic refers to the lens which aids in reading the direction.

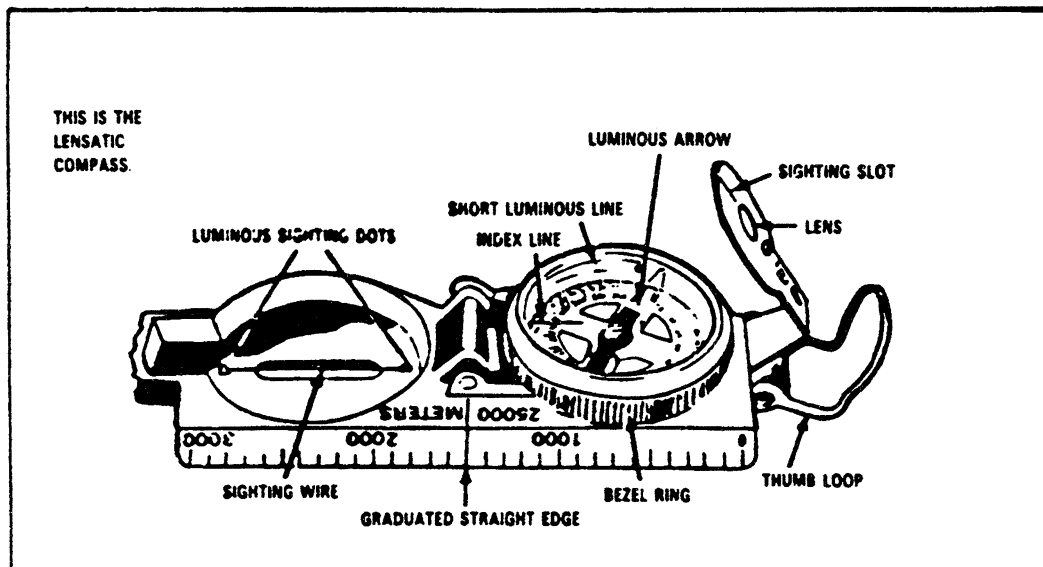


Fig 4-3. Lensatic compass.

c. Binoculars. Binoculars help the observer in his surveillance of the area and aid in adjusting fires on targets. The binoculars used are the M328 or similar binoculars. The major parts of the M328 binoculars and the purpose for each part are listed as follows:

- (1) Interpupillary scale (fig 4-4). This scale, located on the hinge of the binoculars, measures the distance between the two eyepieces. Because the distance between your eyes differs from others, you must adjust the binoculars to your personal preference. Once you adjust the binoculars, read the scale number for your eye distance. This reading can apply to any other pair of binoculars.
- (2) Focusing nut (fig 4-4). Focus each eyepiece independently until the image is clear.
- (3) Diopter scale (fig 4-4). Use the diopter scale, located at the base of the focusing nut to focus both telescopes. Once you focus one telescope, read the scale and set the same scale reading to the other focusing nut. This will automatically focus the two telescopes to the same distance.

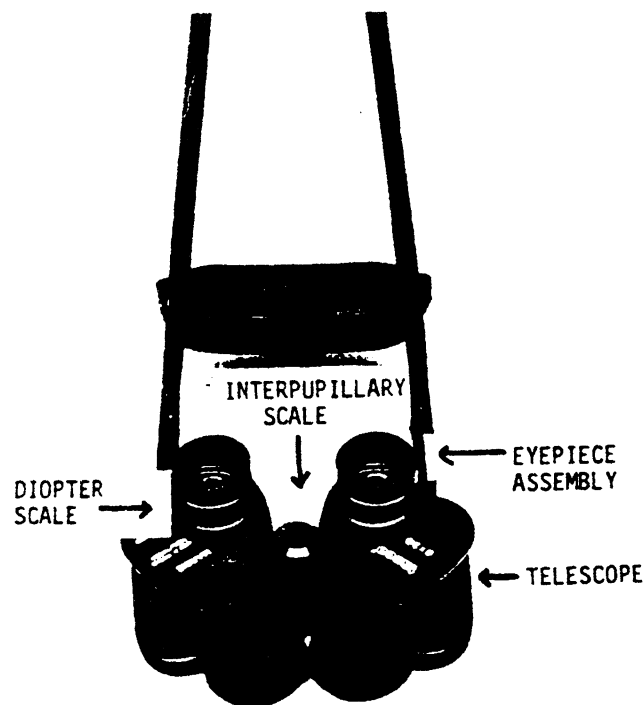


Fig 4-4. Major parts of the binoculars.

- (4) Binocular reticle scale (fig 4-5). Use the reticle scale, located inside the telescope, for adjusting rounds on target. The reticle pattern consists of a horizontal scale and a vertical scale.

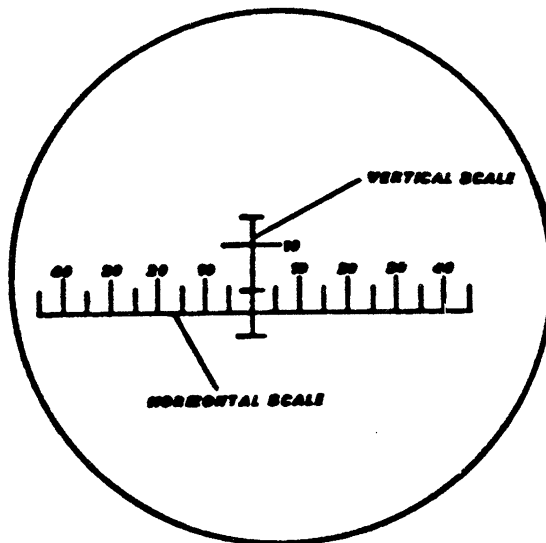


Fig 4-5. Reticle scale.

d. Communications equipment. The small unit forward observer uses this equipment to communicate with the FDC and higher headquarters. There are two means by which the small unit FO may communicate with the FDC: wireless radio and wire telephone.

- (1) Wireless radio (fig 4-6). The AN/PRC-77 is the radio used by the small unit FO. The AN/PRC-77 is a short-range, man-packed, portable receiver-transmitter which allows two-way radio voice conversation.



Fig 4-6. Wireless radio, AN/PRC-77.

- (2) Wire telephone (fig 4-7). The TA-1/PT and TA-312/PT telephones provide more positive security when communicating information which might be of interest to the enemy. It is a direct line to higher headquarters who will relay your request to the FDC. Unless the enemy has very special equipment or has tapped into the wires, the telephone system is the most secure.



Fig 4-7. Wire telephone TA-1/PT, TA-312/PT.

EXERCISE 4.1.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the tools and equipment used by the small unit forward observer.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_



Work Unit 4-2. LOCATING TARGETS

TERMINAL LEARNING OBJECTIVE: To identify the three methods of locating targets.

ENABLING LEARNING OBJECTIVE:

4.2.1a List the three methods of locating targets.

\* \* \* \* \*

There are three methods for locating targets. They are:

- grid coordinate method,
- polar plot method,
- and shift from a known point method.

a. The grid coordinate method (fig 4-8) is the most widely used method for locating targets and is the easiest of the three. This method involves simple map reading or dividing the grid square into tenths to obtain a six-digit coordinate number. You pinpoint the target on your map and use the protractor to determine the six-digit coordinates.

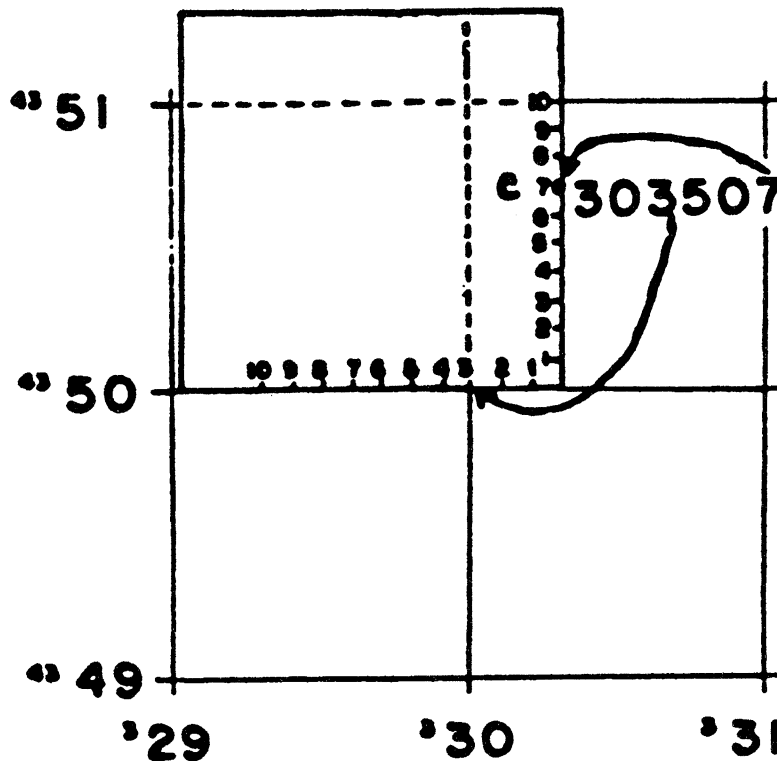


Fig 4-8. Locating targets by measuring grid coordinates.

b. The polar plot method is the second method used for target location. Follow the steps listed below when locating targets for the FDC.

Step 1. The FDC must already know your location.

Step 2. Using the compass, shoot an azimuth from your position to the target.

Step 3. Estimate the range from your position to the target.

From this point, the FDC will plot your position on the map, measure the same grid azimuth from your plotted position, and measure the range from your plotted position along the azimuth to the target (fig 4-9).

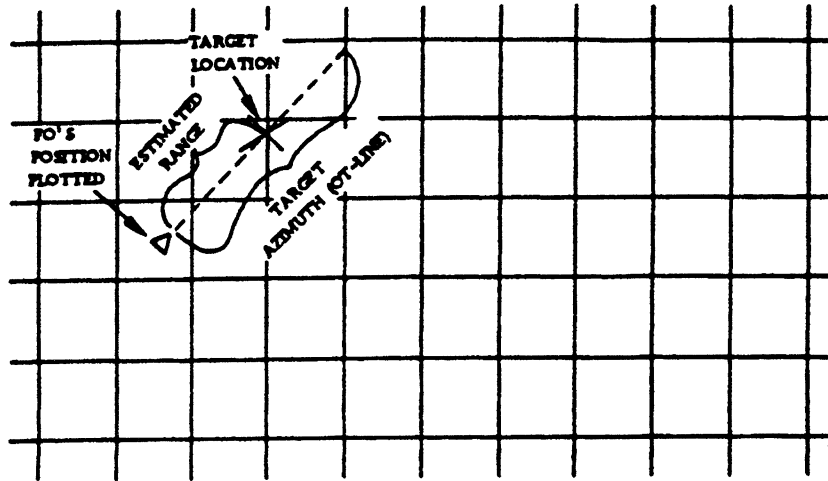


Fig 4-9. FDC locating target using polar plot method.

c. The shift from a known point method for locating targets is the most accurate of the three. This method, like the grid coordinate method, does not require the FDC to know the observer's position. The known points may be planned target locations or prominent terrain features whose locations are known by both the observer and the FDC. To employ this method, follow the steps listed below:

Step 1. The FDC must have a list of known points and their locations within your area of responsibility (fig 4-10).

TARGET	DESCRIPTION	LOCATION	REMARKS
AH 0101	CHURCH	453 671	Smoke on call
AH 0102	BRIDGE	457 683	Destroy on call
AH 0103	AUTO W/PN PSH	463 661	Neutralize H-5 to H+25
AH 0104	Suspect Assy Area	471 694	HE +WP

Fig 4-10. Sample list of known points.

Step 2. As the forward observer using the shift from a known point method of target location, first identify the known point from which you are shifting.

Step 3. Next, you must shoot an azimuth from your position to the target location. This direction is called the observer-target line (OT-line).

Step 4. Finally, you must estimate the distance right or left and/or over or how short the target is from the known point (fig 4-11).

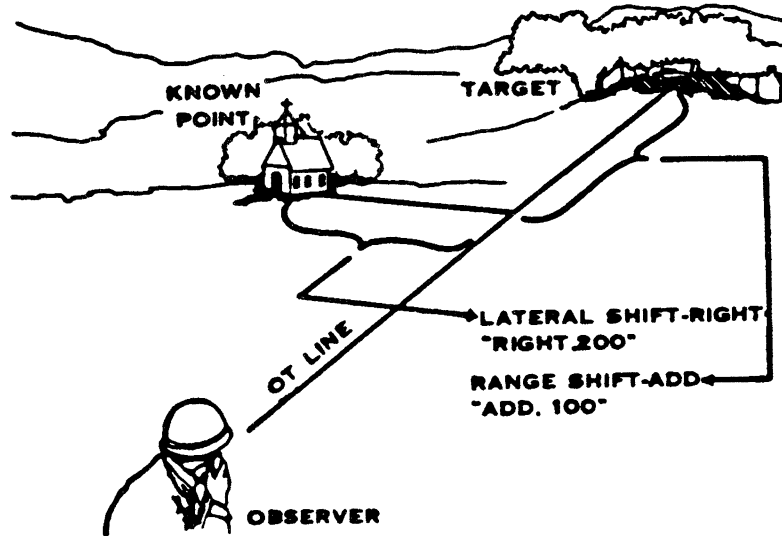


Fig 4-11. Lateral and range shifts from known point.

EXERCISE 4.2.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the three methods of locating targets.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_

Work Unit 4-3. THE CALL FOR FIRE

TERMINAL LEARNING OBJECTIVE: To define the call for fire and list the six elements of it.

ENABLING LEARNING OBJECTIVES:

4.3.1a Define the call for fire.

4.3.1b List, in sequence, the six elements of the call for fire.

\* \* \* \* \*

4.3.1a THE CALL FOR FIRE

a. A call for fire is a concise message prepared by the observer containing all information needed by the fire direction center (FDC) to determine the method of target attack. The observer must send the call for fire rapidly but with enough clarity that the FDC radio telephone operator (RTO) can understand, record, and read back the call without error. The observer should tell the RTO that he saw a target so the RTO can start the call for fire while he determines the target location. The observer sends this information as he determines it rather than waiting for a complete call for fire.

b. Regardless of the method of target location used, transmit the normal call for fire in a maximum of three parts, with a break and readback after each part. The three parts are the:

- (1) observer identification and warning order,
- (2) target location,
- (3) and the description of the target, method of engagement, and method of fire and control.

EXERCISE 4.3.1a: Answer the following item and check your response against that listed at the end of this study unit.

1. Define the call for fire.

---

---

#### 4.3.1b ELEMENTS OF THE CALL FOR FIRE

The order of the six elements of the call for fire are such that the FDC may easily receive and understand to process the fire mission. The six elements of the call for fire are as follows:

- (1) Observer identification (who you are).
- (2) Warning order (type of mission you want).
- (3) Target location (where the target is located).
- (4) Description of the target (what type of target).
- (5) Method of engagement (how the target should be attacked).
- (6) Method of fire and control (how and when you want the fire support delivered).

a. Observer identification. This element of the call for fire lets the FDC know who is calling for fire and clears the net for the fire mission.

b. Warning order. The warning order informs the FDC of the type mission and the type of target location. The warning order consists of the type of mission, the size of the element to fire, and the method of target location.

- (1) Type of mission. The type of fire mission informs the FDC as to the nature or the priority of the call for fire. There are four types of fire missions, and each type fits a different situation. The four types and their respective situations are as follows:
  - (a) Adjust fire missions. If you can see the target and you feel that you will have to conduct adjustments in order to get the desired effect on the target, you announce ADJUST FIRE.
  - (b) Fire for effect missions. If you are certain that the announced target location is accurate enough to have effect on the target, you announce FIRE FOR EFFECT. You should always strive for first round fire for effect.
  - (c) Suppress fire missions. To rapidly bring fire on an on call target (a planned target) that is not currently active (suspected position), you announce SUPPRESS and the target identification number.
  - (d) Immediate suppression fire missions. When engaging a planned target or a target of opportunity that has taken the maneuver elements under fire, announce IMMEDIATE SUPPRESSION.

The observer may request the size of the unit to fire for effect; however, this is a request and the FDC makes the final decision.

The purpose for announcing the method of target location is that the FDC may easily find the same target in the same manner the observer has used and prepares the FDC for the method to be used for adjustments. The grid method is not announced, if it is being used, because it is the standard method of target location.

Below are some examples for announcing the different types of warning orders.

(1) Adjust fire mission

Grid:  
ALFA 57, THIS IS ALFA 71, ADJUST FIRE, OVER.

(2) Fire for effect mission

Polar plot:  
ALFA 57, THIS IS ALFA 71, FIRE FOR EFFECT, BATTALION,  
POLAR, OVER.

Shift from a known point:  
ALFA 57, THIS IS ALFA 71, FIRE FOR EFFECT, SHIFT 176,  
OVER.

(3) Suppression mission

THIS IS FOX 72, SUPPRESS CHECKPOINT 10, OVER.

(4) Immediate suppression mission

THIS IS FOX 72, IMMEDIATE SUPPRESSION, 176, OVER.

c. Target location. Because there are three methods of locating the target, there are three methods of announcing the target location.

- Grid coordinate method. Send the six-digit coordinate number.
- Polar plot method. Send grid direction (in mils) and range to the target.
- Shift from known point. Send identification number of known point, grid direction reading to the target, and lateral and range shifts from known point to the target.

Below are some examples of what you would announce to the FDC to locate the target, using the different methods of target location.

- Grid coordinate method (six-digit number)  
874037
- Polar plot method (direction and range)  
DIRECTION 6380, MAGNETIC (the preferred method is to send grid direction but either is correct)  
RANGE 1230
- Shift from a known point method (identify known point, OT direction and shifts from known point)

FROM TARGET AH 0101,  
DIRECTION 6380, magnetic (or grid)  
ADD 100

d. **Target Description.** The observer must describe the target in sufficient detail so the FDC can determine the amount and type of ammunition to use. The FDC would use different ammunition for different type targets. The observer should be brief but accurate. The description should contain the following:

- (1) What the target is (troops, equipment, supply dump, trucks, etc.).
- (2) What the target is doing (digging in, in a assembly area, etc.).
- (3) The number of elements in the target (squad, platoon, three trucks, six tanks, etc.).
- (4) The degree of protection (in open, dug in, in bunkers with overhead protection, etc.).
- (5) Target size and shape (platoon in column, company in vee formation, "L" shaped ambush).

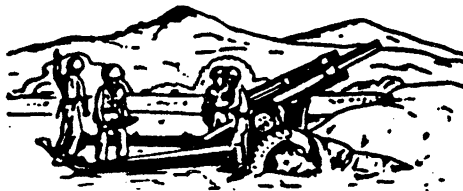
In the case where the target covers a large area, the observer will describe the target area or target shape by announcing two or more grid coordinates at the opposite ends of the target area. Below are some examples of targets observed by the observer, and how he would announce the description to the FDC (fig 4-12).



**SQUAD  
IN OPEN TRENCH  
LINE, AMBUSH**



**PLATOON  
SIZE MOTOR  
PATROL, MOVING  
EAST, IN THE  
OPEN.**



**ARTILLERY  
POSITION  
ENGAGED IN  
FIRING, NO  
OVERHEAD  
PROTECTION.**



**COMPANY  
BIVOUAC AREA IN TREELINE  
TARGET EXTENDS FROM GRIDS  
167194, TO 169198, TO 171194**

Fig 4-12. Targets and descriptions.

e. Method of Engagement. The observer must indicate how he wants to attack the target. This element consists of the type of adjustment, trajectory, ammunition, and distribution. These are discussed below.

- (1) Type of adjustment. There are two types of adjustment--precision or area. Unless the observer specifies precision fire, use area fire.
  - (a) Precision fire is conducted with one piece on a point target. It is used to either obtain registration corrections or destroy a target. When the mission is a registration, it is initiated with a message to observer. If the target is to be destroyed, the observer will announce DESTRUCTION.
  - (b) To attack a dispersed target use area fire. Since many area targets are capable of movement, the adjustment should be as rapid as possible, consistent with accuracy, to prevent the target from escaping. Select a well-defined point at or near the center of the area to be attacked and use it as an aiming point. This point is called the adjusting point. To achieve surprise, adjust fire on an auxiliary adjusting point, and, then, shift fire to the actual target area. Normally, adjustment on an area target is conducted with one adjusting piece. Two pieces fire when the height of burst for fuze time is being adjusted.
  - (c) Include the term DANGER CLOSE in the method of engagement when the target is within 400 meters of any friendly troops with mortars, and 600 meters for artillery.
- (2) Trajectory. If desired, request high angle fire immediately after the type of adjustment. If high angle is not specified, low angle will be used.
- (3) Ammunition. If the type of ammunition is not specified in the call for fire, shell HE with fuze quick will be fired during the adjustment and fire for effect phases. If a different type of ammunition or fuze action is desired during either the adjustment or the fire for effect phase, the observer requests it.
  - (a) Projectile. Examples of requests for other than HE projectile are ILLUMINATION, ICM, and SMOKE.
  - (b) Fuze. Most missions are fired with fuze quick during the adjustment phase. When requesting a projectile that has only one fuze, the fuze is not indicated. Illumination, ICM, and smoke projectiles have time fuzes; therefore, when the observer requests ILLUMINATION, ICM, or SMOKE, he does not announce TIME.
  - (c) Volume of fire. The observer may request the number of rounds to be fired by the weapons firing in effect; e.g., 3 ROUNDS indicate a battery, 3 volleys.
- (4) Distribution. The observer may control the pattern of bursts, a sheaf, in the target area. Unless otherwise requested, the battery will fire a parallel sheaf, all guns will fire the same data; and the pattern of bursts will resemble the position of the guns in the battery area. A converged sheaf places all rounds on a specific point (and is used) for small, hard targets. Special sheafs of any length may be requested; e.g., SHEAF 150 METERS.

f. Method of Fire and Control. The method of fire and control element indicates the desired manner of attacking the target, whether or not the observer desires to control the time of delivery of fire, and whether or not he can observe the target. The observer announces methods of fire and control by using the terms below.

- (1) Method of fire. In area fire, the adjustment normally is conducted with one of the center platoon howitzers or center section mortars. If, for any reason, the observer determines that PLATOON RIGHT (LEFT) will be more appropriate, he may request it. The normal interval of time between rounds fired by a platoon or battery right (left) is 5 seconds. If the observer wants some other interval, he may so specify.

(2) Method of control.

- (a) At my command. If the observer wishes to control the time of delivery of fire, he includes AT MY COMMAND in the method of control. When the pieces are ready to fire, the FDC announces:

BATTERY (BATTALION) IS READY, OVER.

The observer announces FIRE when he is ready for the pieces to fire. AT MY COMMAND remains in effect throughout the mission until the observer announces:

CANCEL AT MY COMMAND, OVER.

- (b) Cannot observe. CANNOT OBSERVE indicates that the observer cannot see the target (because of vegetation, terrain, weather, or smoke); however, he has reason to believe that a target exists at the given location and that it is of sufficient importance to justify firing on it without adjustment.

- (c) Time on target. The observer may tell the FDC when he wants the rounds to impact around the target by requesting:

TIME ON TARGET \_\_\_\_\_ MINUTES FROM ...NOW, OVER.

or

TIME ON TARGET 0859, OVER.

- (d) Fire when ready. If the observer does not specify regarding method of control, each cannon section will FIRE WHEN READY.

There are three additional steps in the call for fire of which the small unit forward observer must be aware. These are:

- Corrections for errors
- Message to observer
- Authentication

a. Corrections for errors. Errors in transmitting data or in reading back the data requires the observer to announce CORRECTION and to transmit corrected data. Either the observer or the FDC personnel could be responsible for errors.

EXAMPLE:

The observer transmits:

SHIFT REGISTRATION POINT 2, DIRECTION 4680, OVER.

He immediately realizes that he should have sent DIRECTION 5680. He announces:

CORRECTION, DIRECTION 5680, OVER.

After receiving the correct readback, he may continue to send the remainder of the call for fire.

When an error occurs in a sub-element and the correction of that sub-element will affect other transmitted data, announce CORRECTION and then transmit the corrected sub-element and all affected data in the proper sequence.



**EXAMPLE:**

The observer transmits:

LEFT 200, ADD 400, UP 40, OVER.

He then realizes that he should have sent DROP 400. To correct his element, he sends:

CORRECTION, LEFT 200, DROP 400, UP 40, OVER.

Because the LEFT 200 and UP 40 may be canceled if they are not included in the corrected transmission, transmit the entire message again.

b. Message to observer. After the FDC receives the call for fire, they will determine how to attack the target. The FDC announces that decision to the observer in the form of a MESSAGE TO OBSERVER. The message to observer consists of three items:

- (1) Unit(s) to fire--the battery or batteries that will fire the mission. If the battalion is firing in effect with one battery adjusting, the FDC will designate the fire for effect unit (battalion) and the adjusting unit (bravo).

**EXAMPLE:**

"ALPHA . . . ." or "BATTALION . . . .".

- (2) Changes to the call for fire--any changes to what the observer requested in the call for fire.

**EXAMPLE:**

"ALPHA, VT IN EFFECT . . . "

- (3) Number of rounds--the number or rounds per tube in fire for effect.

**EXAMPLE:**

Continuing the above example, the FDC will fire a battery of 4 rounds:

"ALPHA, VT IN EFFECT, 4 ROUNDS, OVER.

c. Authentication. Challenge and authentication are normal elements of initial requests for artillery and mortar fire. The FDC inserts the challenge in the last readback of the fire request (see sample missions). The observer transmits the correct authentication reply to the FDC immediately following the challenge. Authentication replies exceeding 15-20 seconds are automatically suspect and a basis for rechallenge. Subsequent adjustment of fire or immediate engagement of additional targets by the observer originating the initial fire request normally would not require continued challenge by the FDC. The observer would not use authentication during artillery and mortar support for suppressive type fire missions or with a dedicated battery.

**SAMPLE MISSIONS:**

The following are sample calls for fire and FDC responses for various type missions. These samples do not contain complete transmissions.



a. FIRE MISSION (GRID).

INITIAL FIRE REQUEST

BRAVO 57, THIS IS BRAVO 71, ADJUST FIRE, OVER.

BRAVO 71, THIS IS BRAVO 57, ADJUST FIRE, OVER.

GRID 180513, OVER

GRID 180513, OVER.

INFANTRY PLATOON IN THE OPEN, VT IN EFFECT, OVER.

INFANTRY PLATOON IN THE OPEN, VT IN EFFECT, AUTHENTICATE PAPA BRAVO, OVER.

I AUTHENTICATE CHARLIE, OUT.

MESSAGE TO OBSERVER

BRAVO 57, 2 ROUNDS, OUT.

BRAVO 71, 2 ROUNDS, OVER.

Direction (must be sent before or with first correction).

DIRECTION 1650, OVER.

DIRECTION 1650, OUT.

b. FIRE MISSION (POLAR PLOT).

INITIAL FIRE REQUEST

ZULU 56, THIS IS ZULU 31, FIRE FOR EFFECT,  
POLAR, OVER.

DIRECTION 4520, DISTANCE 2300 , DOWN 35,  
OVER.

INFANTRY COMPANY IN OPEN, ICM, OVER.

I AUTHENTICATE ECHO, OVER.

ZULU 31, THIS IS ZULU 56, FIRE FOR  
EFFECT, POLAR, OVER.

DIRECTION 4520, DISTANCE 2300, DOWN  
35, OVER.

INFANTRY COMPANY IN OPEN, ICM,  
AUTHENTICATE TANGO FOXTROT, OVER.

MESSAGE TO OBSERVER

BATTALION, VT, 3 ROUNDS, OUT

BATTALION\*, VT\*\*, 3 ROUNDS, OVER.

\*Battalion FDC directed a battalion mass mission.  
\*\*FDC changed shell to HE/VT.

c. FIRE MISSION (SHIFT FROM A KNOWN POINT).

INITIAL FIRE REQUEST

DELTA 66, THIS IS DELTA 44, ADJUST FIRE, SHIFT  
732, OVER.

DIRECTION 5210, LEFT 380, ADD 400, DOWN 25,  
OVER.

COMBAT OP IN OPEN, ICM, OVER.

I AUTHENTICATE PAPA, OUT.

THIS IS DELTA 66, ADJUST FIRE, SHIFT  
732, OVER.

DIRECTION 5210, LEFT 380, ADD 400,  
DOWN 25, OVER.

COMBAT OP IN OPEN, ICM, AUTHENTICATE  
LIHA FOXTROT, OVER.

MESSAGE TO OBSERVER

DELTA 66, 1 ROUND, OUT.

DELTA 44, 1 ROUND, OVER.

d. FIRE MISSION (SUPPRESSION).

INITIAL FIRE REQUEST

BRAVO 57, THIS IS BRAVO 71, SUPPRESS 31, OVER.

THIS IS BRAVO 57, SUPPRESS 31, OUT.

NOTE: No authentication is required.

e. FIRE MISSION (IMMEDIATE SUPPRESSION).

INITIAL FIRE REQUEST

THIS IS HOTEL 24, IMMEDIATE SUPPRESSION,  
GRID 211432, OVER.

THIS IS HOTEL 69, IMMEDIATE  
SUPPRESSION, GRID 211432, OUT.

NOTE: No authentication required.

EXERCISE 4.3.1b: Answer the following item and check your responses against those listed at the end of this study unit.

1. List, in sequence, the six elements for the call for fire.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

Work Unit 4-4. SPOTTING, ADJUSTING, AND FIRE FOR EFFECT

**TERMINAL LEARNING OBJECTIVE:** To define spotting and adjusting; identify the types of adjustments, the procedures for using the "WERM" rule, the methods used to adjust range, and the situations that warrant the request for fires for effect.

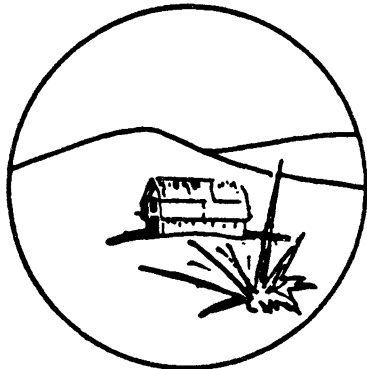
**ENABLING LEARNING OBJECTIVES:**

- 4.4.1a Define spotting as it pertains to the initial rounds fired in the fire mission.
- 4.4.1b Define adjusting as it pertains to the initial rounds fired in the fire mission.
- 4.4.1c List the two types of adjustment.
- 4.4.1d Identify the words that make up the acronym "WERM."
- 4.4.1e State the two methods used to adjust range.
- 4.4.1f List the five situations that warrant the request for fires for effect.
- 4.4.1g State what must be announced to terminate a fire mission.

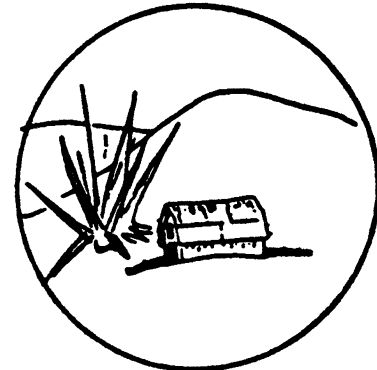
\* \* \* \* \*

4.4.1a SPOTTING

Spotting is the visual process by which you determine where the bursting rounds land in relation to the target location. You (the observer) determine(s) that the rounds land to the left or right of the target, and whether the rounds are short of or beyond the target as you see it (fig 4-13).



SPOTTING: SHORT AND RIGHT



SPOTTING: OVER AND LEFT

Fig 4-13. Spotting.

**EXERCISE 4.4.1a:** Answer the following item and check your response against that listed at the end of this study unit.

1. Define spotting as it pertains to the initial rounds fired in the fire mission.

---

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#### 4.4.1b ADJUSTING

Adjusting is the actual process in which you move the impacting rounds (or the aim on the weapon(s)) onto the target. Once you have completed your spotting, you must measure how far the rounds are landing from the target. These measurements along with the OT direction are given to the FDC. The FDC will compute each measurement as you see it to how the firing weapon(s) would "see" it and issue new fire commands. This will move the adjusting rounds onto or near the target.

EXERCISE 4.4.1b: Answer the following item and check your response against that listed at the end of this study unit.

1. Define adjusting as it pertains to the initial rounds fired in the fire mission.

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#### 4.4.1c TYPES OF ADJUSTMENT

There are two factors to consider in adjusting rounds on target:

- Adjustments for deviation (left or right adjustments)
- Adjustments for range (beyond or short of the target)

a. Adjustments for deviation. The standard rule in adjusting rounds on targets is that you must always compute adjustments for deviation before adjusting for range. That is to say, that you must adjust the bursting rounds onto the observer target line (OT line) before computing any adjustments in range (fig 4-14).

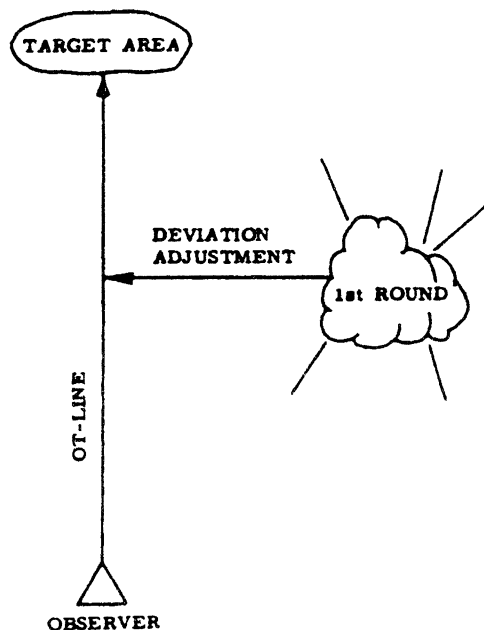


Fig 4-14. Deviation adjustment.

b. Adjustment for range. Once you have adjusted the bursting rounds onto the OT line, you must then adjust for range by adding or dropping distances from the last burst to the target (fig 4-15).

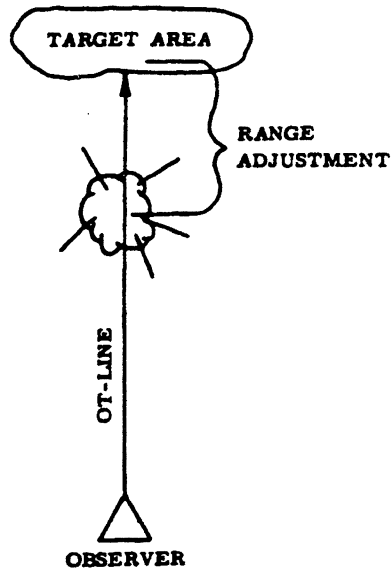


Fig 4-15. Range adjustment.

EXERCISE 4.4.1c: Answer the following item and check your responses against those listed at the end of this study unit.

1. List the two types of adjustment when adjusting rounds onto the target.

a. \_\_\_\_\_

b. \_\_\_\_\_

#### 4.4.1d ADJUSTING FOR DEVIATION

To determine deviation width, the observer uses the "WERM" formula. "WERM" is the acronym that represents the formula, Width Equals Range times Mils (deviation angle). By using this formula, the observer can tell how far to the left or right the rounds are landing from the target. To apply this formula, you must first gather information concerning the range to the target, and the mil angle between the OT line and the bursting rounds (fig 4-16).

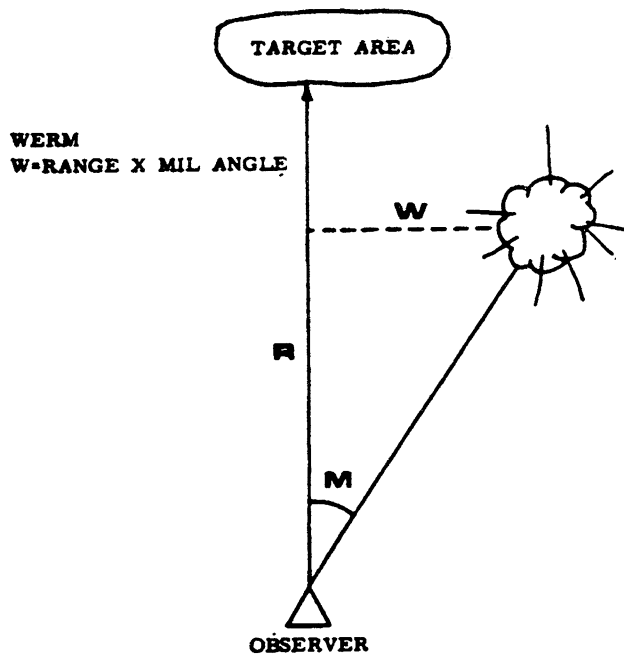


Fig 4-16. WERM rule formula.

a. Range. Estimate or measure the range to the target from your position to the target, but before you can substitute or place the range into the formula, you must convert the range into an OT factor. Use the OT factor to multiply the mil deviation. To convert the range to an OT factor, divide the range by 1,000 and round this number off to the nearest whole number.

EXAMPLE:

<u>RANGE TO THE TARGET</u>	<u>RANGE/1,000</u>	<u>OT FACTOR (nearest whole number)</u>
3,000 meters	3.0	3
4,200 meters	4.2	4
1,800 meters	1.8	2
600 meters	.6	1

NOTE: Express ranges less than 1,000 meters are expressed as OT factor 1 and never as zero.

b. Mil deviation angle. Use the binoculars to measure small deviation angles. A feature called the reticle pattern is inside the binoculars. This reticle pattern contains vertical and horizontal scales that specifically measure mil angles (fig 4-17). The horizontal scale measures deviation angles. This scale has the capability of measuring 40 mils from center, or 80 mils from one end to the other. Each number on the scale represents 10 mils.



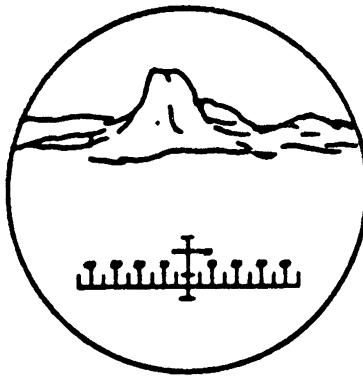
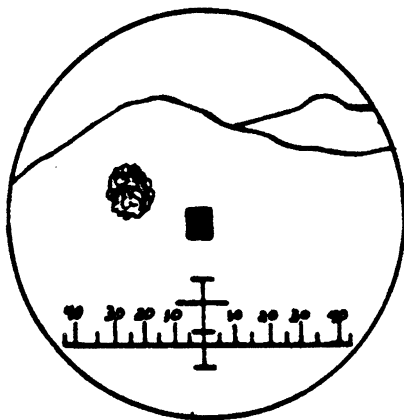
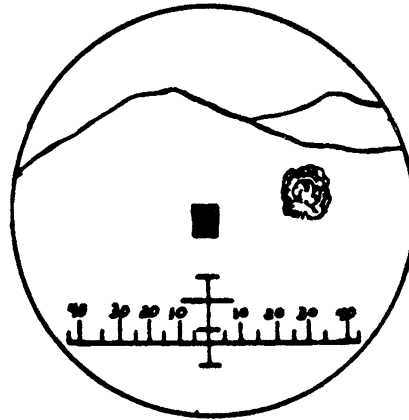


Fig 4-17. Binocular reticle pattern.

To measure the mil deviation angle between the bursting round and the OT line, look through the left scope and observe the target and the burst. If you place the center of the reticle scale directly below the target, and the center of the burst lies just above one of the numbers (10 through 40) on the left or right, you will obtain the number of mils in the deviation angle (fig 4-18).



The burst is 25 MILS LEFT

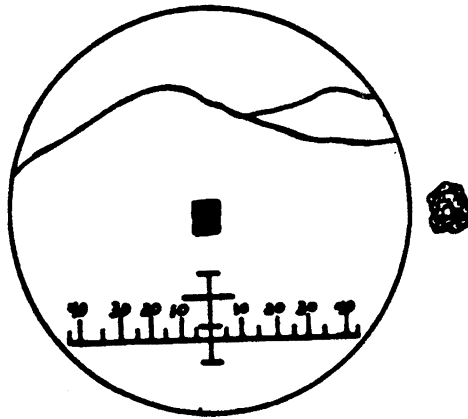


The burst is 30 MILS RIGHT

Fig 4-18. Measuring deviation angles less than 50 mils.

If the angle between the OT line and the burst exceeds 40 mils, position the target over either end of the scale and count the number of increments between the target and burst (fig 4-19).

If it looks like this:



Change it to this:

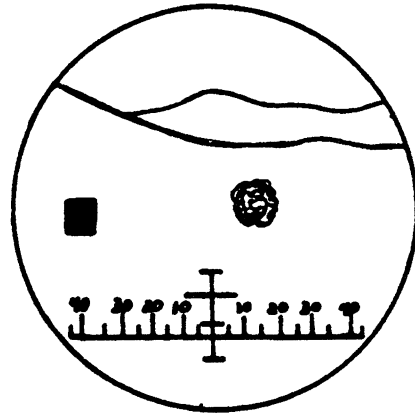
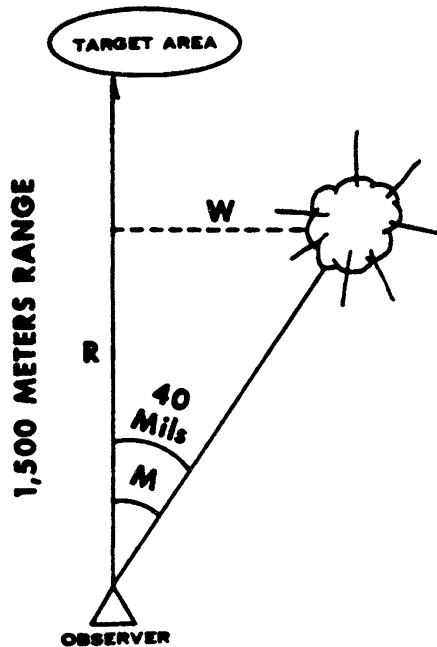


Fig 4-19. Measuring deviation angles that exceed 40 mils.

Now you can estimate the range to the UT line and convert this range into an OT factor. You can also measure mil deviation angles using the binocular reticle pattern. Below is an example of how to compute deviation width using the WERM rule formula (fig 4-20).



WERM RULE

$$W = R \times M$$

$$W = 1500 \times 40$$

$$W = 2(\text{OT FACTOR}) \times 40 (\text{MIL DEVIATION ANGLE})$$

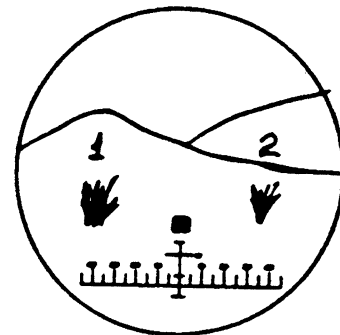
$$W = 80 \text{ METERS}$$

Fig 4-20. Application of the WERM rule formula for deviation width.

**EXERCISE 4.4.1d:** Answer the following items and check your responses against those listed at the end of this study unit.

1. Deviation is the distance the round bursts to the right or left of the \_\_\_\_\_.
2. Determine deviation width using the \_\_\_\_\_ formula.
3. Write in the parts of the formula represented by the letters below.
  - a. W \_\_\_\_\_
  - b. E \_\_\_\_\_
  - c. R \_\_\_\_\_
  - d. M \_\_\_\_\_
4. Which response in item 3 must you divide by 1,000 and then round off to the nearest whole number (to the OT factor)?  
\_\_\_\_\_
5. Convert the following to the OT factors.
  - a. 3200 meters \_\_\_\_\_
  - b. 4000 meters \_\_\_\_\_
  - c. 2100 meters \_\_\_\_\_
  - d. 800 meters \_\_\_\_\_

6. By using the binocular reticle, what are the mil deviation angles for rounds number 1 and 2 below?



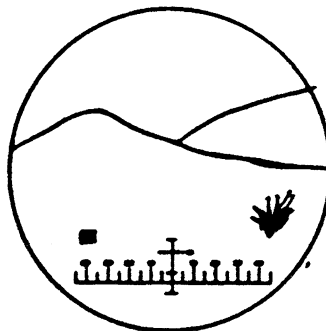
- a. Round #1 \_\_\_\_\_ mils.
- b. Round #2 \_\_\_\_\_ mils.

7. If the range is 1800 and the deviation angle is 40 mils, what is the deviation width?

\_\_\_\_\_

8. What is the deviation angle in the figure shown below?

\_\_\_\_\_

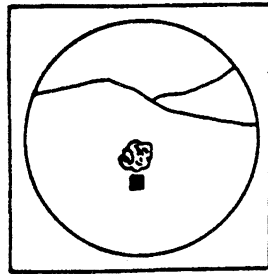


#### 4.4.1e ADJUSTING FOR RANGE

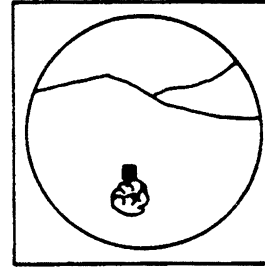
The observer uses two methods to adjust for range. The two methods are:

- Bracketing
- Creeping

a. Bracketing. This is the easiest way to adjust for range. This simply requires that you tell the FDC to ADD or DROP enough range to bring the next round on the opposite side of the target. For example, if the round lands beyond the target, you must DROP enough meters for the next round to land short of the target (fig 4-21). This creates the bracket.



FIRST ROUND



SECOND ROUND

Fig 4-21. Bracketing.

(1) Minimum Bracket Guide (fig 4-22). To use the bracket method correctly, the observer must add (drop) enough so that the second round comes out over (short). Since there is no accurate method of determining how much to add (drop), the observer must make an estimate. To aid him in making this estimate, he uses the minimum bracket guide, as illustrated. Following this guide, the observer will make a range correction large enough to ensure that the second round establishes a bracket. For example, if the target was between 1000 and 2000 meters away from the observer and the first round was spotted as over, his minimum range correction would be drop 200. If it was obvious that the drop 200 would not make the second round short, he would make a larger correction, but the minimum correction he would make would be drop 200. Once he has established the bracket, he would then proceed to successively split the bracket until he either hit the target, had effect on the target, or split a 100-meter bracket, at which time he would fire for effect.

#### Observer-target Range

Less than 1000 meters  
1000 to 2000 meters  
Greater than 2000 meters

#### Minimum Correction

100 meters  
200 meters  
400 meters

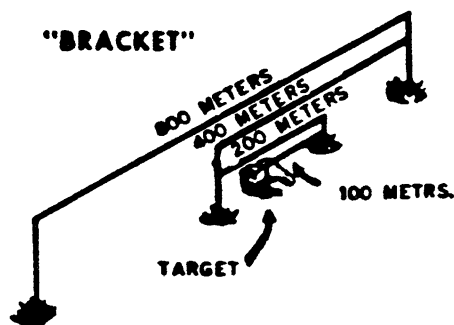


Fig 4-22. Bracketing to a 100-meter adjustment.

b. Creeping (fig 4-23). Use the creeping method of adjustment for range when the target is within 400 meters of friendly troops. Using this method requires more rounds and more time than bracketing, but it ensures the safety of friendly troops. When the observer intends to use the creeping method, he will announce DANGER CLOSE in the method of engagement of his call for fire.

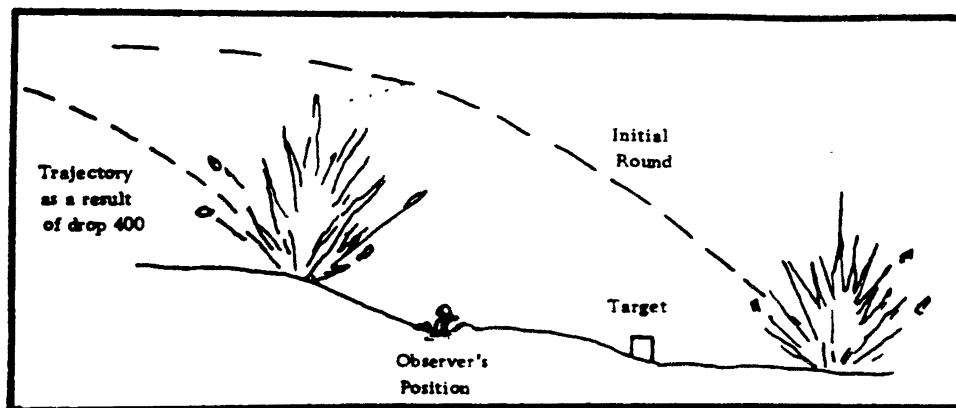


Fig 4-23. Friendly units too close to target for bracketing method.

The procedure for conducting adjustments in range using the creeping method (fig 4-24) is shown below.

- (1) The observer first determines the location of the target on the ground (grid coordinates or shift from a known point). The target location he uses in his call for fire is a point 200 meters beyond the target on the observer-target line. The 200 meters is a safety measure that the observer uses to ensure that the first round is on the far side of the target and away from friendly troops.
- (2) Once the first round impacts, the observer estimates the distance from it to the target. His range correction is then ONE-HALF of this estimated distance. The observer then estimates the distance from the impact of the second round to the target and sends a range correction of ONE-HALF this estimated distance. The observer will continue or will use half of the estimated distance to the target until he reaches drop 25. He then continues to drop 25 meters until he hits the target or obtains a round that is spotted as short.
- (3) The observer will enter fire for effect when the round hits the target or has an effect on it. If at any time during the course of the mission the observer spots a round as short, he will switch to the bracketing method of adjustment. He does not make range corrections of less than 25 meters. If the observer makes a correction of drop 25 meters and obtains a short, he will enter fire for effect since he is having an effect on the target.

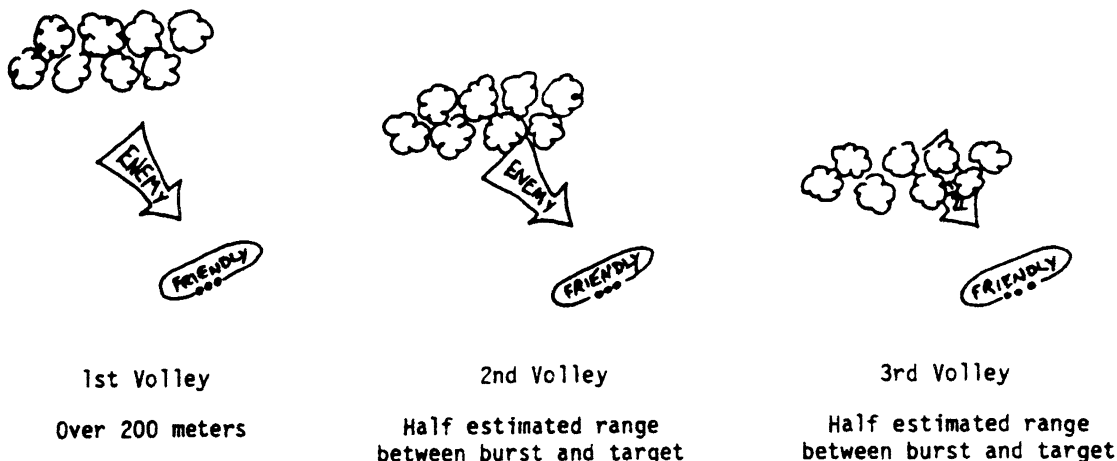


Fig 4-24. Conducting adjustments in range (creeping method).

EXERCISE 4.4.1e: Answer the following items and check your responses against those listed at the end of this study unit.

1. Two methods of adjusting for range are:

- a. \_\_\_\_\_
- b. \_\_\_\_\_

2. Which method requires you to tell the FDC to ADD or DKOP enough range to bring the next round to the opposite side of the target?

\_\_\_\_\_

3. How many meters of change should you give a bracket if the target is between 1,000 and 2,000 meters?

\_\_\_\_\_

4. Once you establish a bracket, you continue by \_\_\_\_\_ the bracket.

5. The method you use when friendly troops are within 400 meters of the target is \_\_\_\_\_

\_\_\_\_\_

6. Using the creeping method requires you first to fire at a point \_\_\_\_\_ meters beyond the target.

#### 4.4.1f REQUIREMENTS FOR THE REQUEST OF FIRES FOR EFFECT

There are certain situations that warrant the request for fires for effect on targets. These situations are as follows:

- Initial rounds on target
- Initial target location accurate
- After bold shifts in adjustments on fleeting targets
- Last adjustments sent will have effect on target
- Repeating last fire for effect

a. Initial rounds on target. When you are unsure of the target location but the initial rounds fired are on target, request FIRE FOR EFFECT. All of the supporting weapons will use the same data as the adjustment piece and will fire the prescribed number of rounds on target.

b. Initial target location accurate. When you are sure of the target's exact location, you may request FIRE FOR EFFECT, and all weapons will fire on the exact target location.

c. After bold shifts in adjustments on fleeting targets. When engaging a moving target or a target capable of mobility, it may be necessary to make bold adjustments to maintain fire on the target. For example, an enemy unit in the open will have to maneuver toward cover once the initial rounds impact on target. You, as the observer, must observe, anticipate their movements, and be ready to change the target location for the fire for effect.

d. Last adjustment sent for bracketing or creeping. Using the bracketing or creeping methods for adjustment does not require that you adjust on target before you request fire for effect. If you feel that the next adjustment will be on target, request for FIRE FOR EFFECT.

e. Repeating the last fire for effect. When the fire for effect on target has been fired and these fires did not accomplish the desired effect, you can request a REPEAT of the fire for effect. The same volume of fire will be placed on the same target unless you send adjustments and REPEAT.

**EXERCISE 4.4.1f:** Answer the following item and check your responses against those listed at the end of this study unit.

1. List the five situations that warrant the request for FIRES FOR EFFECT.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_

**4.4.1g TERMINATING THE MISSION**

You have just performed a primary function of the forward observer, but it's not over yet. The supporting weapons and the FDC are still standing by waiting to hear what's going on. Remember they can't see the target, and they don't know what's happened. How do you finish the fire mission? To relieve the FDC and the supporting units for other possible missions, you must announce END OF MISSION to the FDC and follow it by giving an estimated assessment of the casualties and damages to the target.

Termination of the fire mission is conducted in one transmission. The information contained in the casualty and damage report is brief but clear; this frees the supporting units from the fire mission as quickly as possible so that they may be able to provide support elsewhere.

**EXERCISE 4.4.1g:** Answer the following items and check your responses against those listed at the end of this study unit.

1. To free the FDC and the supporting units for other possible fire missions, you must announce \_\_\_\_\_ to the FDC.
2. Next, you give a report of \_\_\_\_\_ and \_\_\_\_\_.

**Answers to Study Unit #4 Exercises.**

Work Unit 4-1.

Exercise 4.1.1a

1.
  - a. Maps
  - b. Compass
  - c. Binoculars
  - d. Communications equipment

Work Unit 4-2.

Exercise 4.2.1a

1.
  - a. Grid coordinate method
  - b. Polar plot method
  - c. Shift from a known point method

work Unit 4-3.

Exercise 4.3.1a

1. A call for fire is a concise message prepared by the observer containing all information needed by the fire direction center (FDC) to determine the method of target attack.

Exercise 4.3.1b

1. a. Observer identification
- b. Warning order
- c. Target location
- d. Description of target
- e. Method of engagement
- f. Method of fire and control

Work Unit 4-4.

Exercise 4.4.1a

1. Spotting is the visual process by which you determine where the bursting rounds land in relation to the target location.

Exercise 4.4.1b

1. Adjusting is the actual process in which you move the impacting rounds (or the aim on the weapon(s)) onto the target.

Exercise 4.4.1c

1. a. Adjustments for deviation
- b. Adjustments for range

Exercise 4.4.1d

1. target
2. WERM
3. a. Width
- b. Equals
- c. Range
- d. Mils
4. The OT range
5. a. 3
- b. 4
- c. 2
- d. 1
6. a. 40 mils left
- b. 30 mils right
7. 80 meters deviation width
8. 70 mils

Exercise 4.4.1e

1. a. Bracketing
- b. Creeping
2. Bracketing
3. 400 meters
4. Splitting
5. creeping.
6. 200



Exercise 4.4.1f

1. a. Initial rounds on target
- b. Initial target location accurate
- c. After bold shift in adjustments on fleeting targets
- d. Last adjustment sent will have effect on targets
- e. Repeating last fire for effect

Exercise 4.4.1g

1. END OF MISSION
2. a. casualty and damage

STUDY UNIT 5

NAVAL GUNFIRE AND CLOSE AIR SUPPORT

STUDY UNIT GOALS: TO RECOGNIZE AND TO GAIN AN UNDERSTANDING OF THE ELEMENTS OF THE CALL FOR FIRE FOR NAVAL GUNFIRE AND THE PROCEDURES TO CALL FOR AND DIRECT CLOSE AIR SUPPORT.

Work Unit 5-1. THE CALL FOR FIRE (NAVAL GUNFIRE)

TERMINAL LEARNING OBJECTIVE: To identify the six elements of the call for fire for naval gunfire.

ENABLING LEARNING OBJECTIVE:

5.1.1a List, in sequence, the six elements of the call for fire for naval gunfire.

\* \* \* \* \*

A naval gunfire spotter, to request and adjust naval gunfire, must be able to communicate effectively with the fire support ship. However, as a small unit leader in combat without the aid of a trained naval gunfire spotter who is equipped with radio to contact the ship, you must rely on a relay system if you are going to receive naval gunfire support. Your message would go from you to the infantry battalion headquarters (FSCC) where a naval gunfire liaison officer would relay your request to a naval gunfire support ship. You can relay through your company artillery forward observer or anyone else with whom you have radio contact. Your message, or CALL FOR FIRE, should consist of SIX ELEMENTS. These elements are:

- Spotter Identification
- Warning Order
- Target Location
- Target Description
- Method of Engagement
- Method of Fire and Control

a. Spotter Identification. IDENTIFICATION is the establishment of communications between the observer and the person to whom you are transmitting on the radio. If your call sign was BRAVO ONE SIERRA, and the infantry battalion call sign was TANGO SIX ZULU, you would establish communications with the battalion by saying:

TANGO SIX ZULU, THIS IS BRAVO ONE SIERRA, OVER.

b. Warning Order. The WARNING ORDER alerts the naval gunfire liaison officer or the fire support ship that an immediate CALL FOR FIRE follows. The warning order consists of the words FIRE MISSION (and the target number if you have been assigned a block of target numbers).

EXAMPLE: FIRE MISSION, TARGET NUMBER ALFA HOTEL ONE ZERO ONE FOUR FOUR, OVER.

If you have not been assigned target numbers to use for naval gunfire missions, you may call your first target number one; or as in most cases, the Naval Gunfire Liaison Officer will add the target number to your CALL FOR FIRE and will tell you what the target number is.

c. Target Location. The complete target location includes three items:

- (1) GRID COORDINATES of the target, using six digits.
- (2) The ALTITUDE of the target in feet, yards, or meters.
- (3) The DIRECTION OF THE OBSERVER-TARGET (OT) line in mils or degrees, magnetic or grid.

EXAMPLE: GRID, ONE FIVE SEVEN ONE EIGHT SIX, ALTITUDE, ONE FIVE ZERO, DIRECTION, ONE TWO FIVE ZERO MILS MAGNETIC, OVER.

**NOTE:** The altitude of the target is an important part of the naval gunfire call for fire due to the flat trajectory of naval guns. Hence, a reference for determining altitude is as follows:

- (1) If the desired point is on a contour line, its elevation is that of the contour line.
- (2) For a point between contour lines to satisfy most military needs, estimate the elevation to an accuracy of one half the contour interval. Interplot more precise determination to the accuracy desired.
- (3) To estimate the elevation of the top of an unmarked hill, add half the contour interval to the elevation of the highest contour line around the hill.
- (4) Unit of Measurement. The ship will assume all distances and altitudes reported to be METERS unless otherwise specified.

d. Target Description is information about a target that enables gunnery personnel on the naval gunfire support ship to determine the best shell and fuze combination to use to attack a target.

- EXAMPLE: (1) COMPANY SIZE UNIT DIGGING IN ON HILLTOP, OVER.  
(2) MACHINEGUNS AND LIGHT ANTITANK WEAPONS IN BUNKERS AND TRENCHES, OVER.

e. Method of Engagement. DANGER CLOSE is the type of adjustment to help protect friendly troops from being hit by friendly fire. When using the warning DANGER CLOSE in your CALL FOR FIRE, the gunfire support ship takes special precautions when firing the first rounds.

(1) DANGER CLOSE

- (a) For ships armed with 6-inch or larger caliber guns, report "DANGER CLOSE" when friendly troops are within 1000 meters of the target (fig 5-1).



Fig 5-1. "DANGER CLOSE" with 6-inch guns or larger.

- (b) For ships armed with guns smaller than 6-inch, report "DANGER CLOSE" when friendly troops are within 750 meters of the target (fig 5-2).

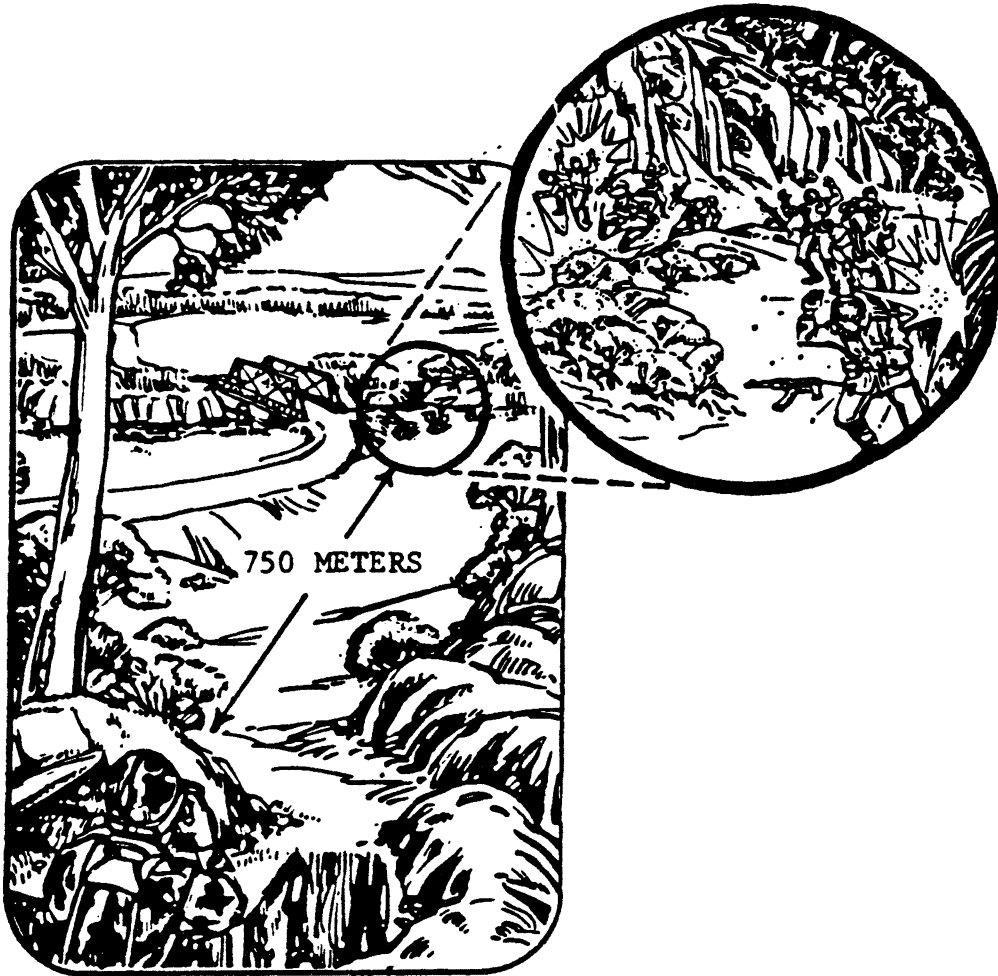


Fig 5-2. "DANGER CLOSE" with guns smaller than 6-inch.

- (c) If the target is at a range greater than the safe distances for the weapon used, omit "DANGER CLOSE" from the call for fire.

(2) DIRECTION

- (a) Along with the words DANGER CLOSE, you must also give the direction FROM the target to the nearest friendly troops and the distance. The ship will assume the distance you give is in meters unless you specify otherwise.

EXAMPLE: (Fig 5-3). DANGER CLOSE, SOUTHWEST, SEVEN FIVE ZERO, OVER.  
Notice that the azimuth circles are labeled in mils.

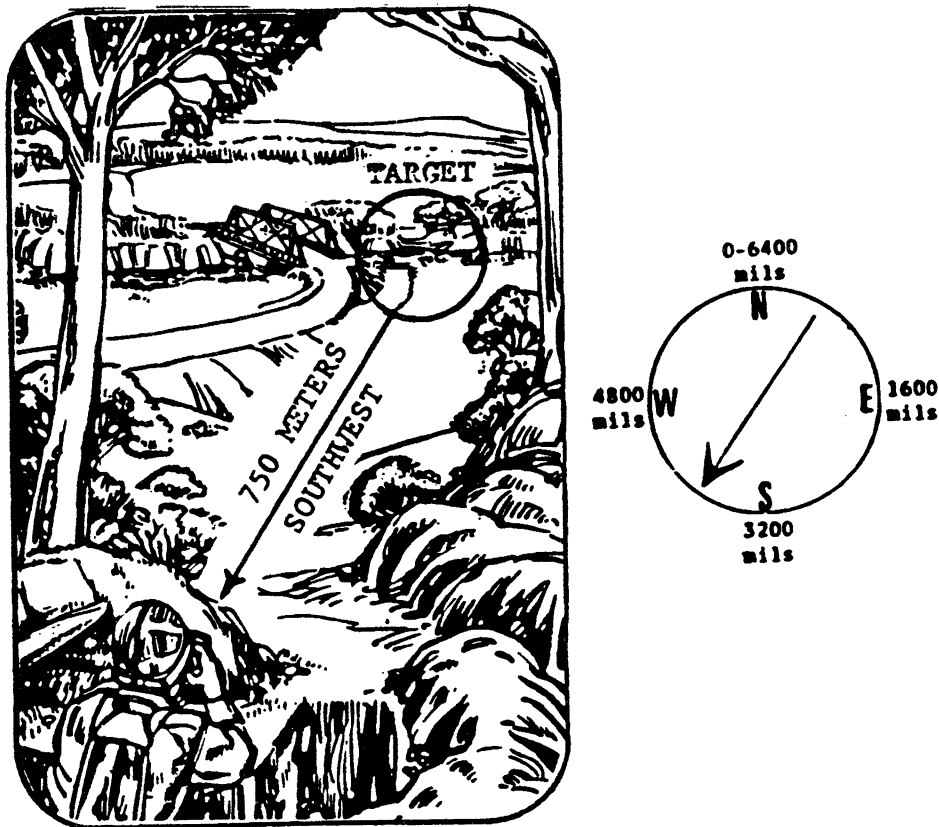


Fig 5-3. Distance and Direction from target to observer.

f. Method of Fire and Control

- (1) Method of Fire. An experienced gunfire spotter may give the portions of the naval gunfire CALL FOR FIRE such as AMMUNITION, FUZE, and NUMBER OF GUNS DESIRED. If the spotter does not transmit this information, gunnery personnel aboard the fire support ship will decide how best to engage the target. Shell HE, fuze quick is the standard ammunition/fuze combination.
- (2) Method of Control
  - (a) In most cases, the first round(s) fired will not land right on the target. You will have to adjust the fire to get it on target. To tell the gunfire support ship or the naval gunfire liaison officer that you can see the target and that you can adjust the fire, you say: "SPOTTER ADJUST."
  - (b) Sometimes you might not want to open fire on a target immediately; therefore, you would say "AT MY COMMAND," followed by "SPOTTER ADJUST." The ship will READY when it is prepared to fire. The next transmission from you would be FIRE. For example; you are on the side of a hill and observe an enemy patrol making its way through the jungle. They are headed for a clearing. If you wait for them to reach the clearing you will have a better chance to adjust your fire accurately. You would send your Naval Gunfire CALL FOR FIRE and use the control command of AT MY COMMAND, SPOTTER ADJUST. The ship will report READY. When you desire to begin firing, you would transmit your call sign and the command FIRE.

Complete the following naval gunfire CALL FOR FIRE problems using the information provided. The correct responses will be given after each problem.

PROBLEM #1.

You observe 75 enemy troops digging trenches approximately 850 yards west of your present position. The target coordinates are 496328, altitude 680 feet. The compass reading to the enemy is 4760 mils. Your infantry company, which will relay the fire mission, is ALFA TWO ZULU and you are ALFA ONE BRAVO. You see the target and will adjust the fire. You have not been allocated any target numbers.

- (a) Spotter Identification: \_\_\_\_\_
- (b) Warning Order \_\_\_\_\_
- (c) Target Location \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- (d) Target Description \_\_\_\_\_
- (e) Method of Engagement \_\_\_\_\_
- (f) Method of Fire and Control \_\_\_\_\_

PROBLEM #2.

You observe a 50-man unit digging in, 230 degrees magnetic. You estimate their position to be 550 meters southwest from friendly troops. You locate the enemy position on your map at 493785, altitude 170 meters. You have not been allocated any target numbers. You are BRAVO ONE SIERRA, and your infantry battalion is QUEBEC FOUR INDIA.

- (a) \_\_\_\_\_
- (b) \_\_\_\_\_
- (c) \_\_\_\_\_  
\_\_\_\_\_
- (d) \_\_\_\_\_
- (e) \_\_\_\_\_
- (f) \_\_\_\_\_

RESPONSES TO PROBLEM #1.

- (a) ALFA TWO ZULU, THIS IS ALFA ONE BRAVO,
  - (b) FIRE MISSION, OVER.
  - (c) GRID FOUR NINER SIX THREE TWO EIGHT,  
ALTITUDE SIX EIGHT ZERO FEET,  
DIRECTION FOUR SEVEN SIX ZERO MILS MAGNETIC, OVER.
  - (d) SEVEN FIVE TROOPS DIGGING IN,
  - (e) DANGER CLOSE, EAST EIGHT FIVE ZERO YARDS,
  - (f) SPOTTER ADJUST, OVER.
- 

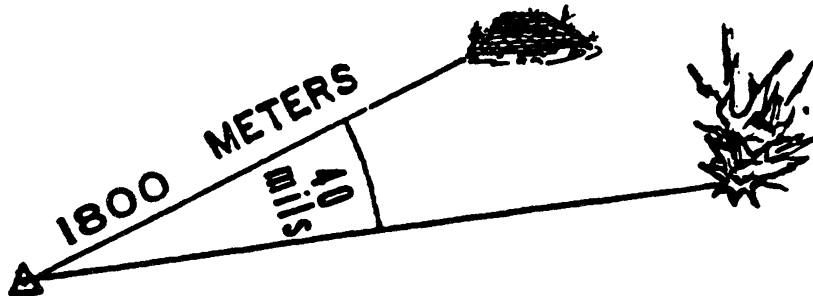
RESPONSES TO PROBLEM #2.

- (a) QUEBEC FOUR INDIA, THIS IS BRAVO ONE SIERRA,
  - (b) FIRE MISSION, OVER.
  - (c) GRID FOUR NINER THREE SEVEN EIGHT FIVE,  
ALTITUDE ONE SEVEN ZERO  
DIRECTION TWO THREE ZERO DEGREES MAGNETIC, OVER.
  - (d) FIVE ZERO TROOPS DIGGING IN,
  - (e) DANGER CLOSE, NORTHEAST FIVE FIVE ZERO,
  - (f) SPOTTER ADJUST, OVER.
- 

PROBLEM #3.

After the initial round(s) is fired, the spotter makes the correction necessary to move the round(s) onto the target. Adjustments of naval gunfire are similar to the adjustments of artillery. If the spotting round(s) does not fall on the observer-target (OT) line, a correction is necessary to bring the next round(s) on to the OT line.

EXAMPLE:



Give the deviation correction for the above example.

---

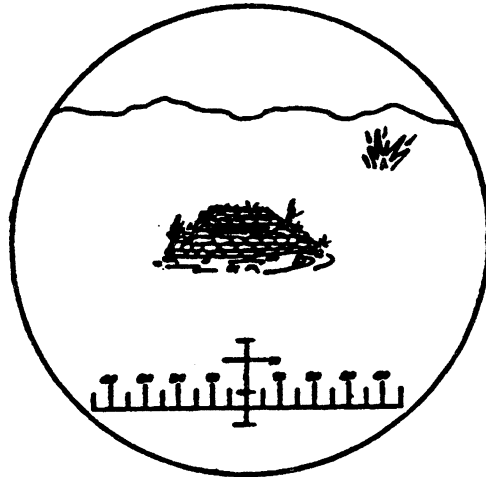
RESPONSE TO PROBLEM #3.

LEFT EIGHT ZERO (2 times 40 equals 80)

NOTE: Corrections are made in meters. No units such as meters or yards need be transmitted.

---

PROBLEM #4.



**RANGE 1800 METERS**

This is the way the previous round would look through your binoculars. Since you have positive spottings for both range and deviation, what corrections would you make?

---



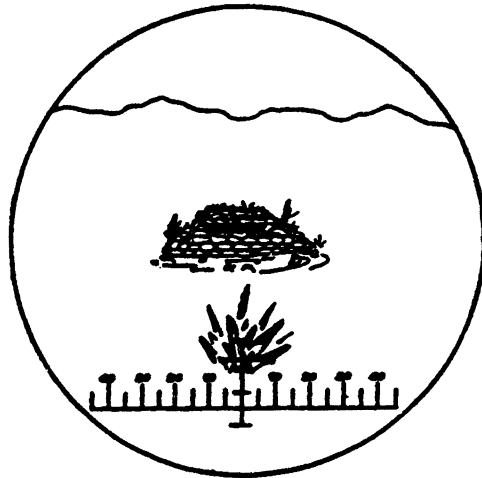
RESPONSE TO PROBLEM #4.

LEFT EIGHT ZERO, DROP FOUR HUNDRED, OVER.

---

PROBLEM #5.

On the next round you see:



What is your next correction?

---

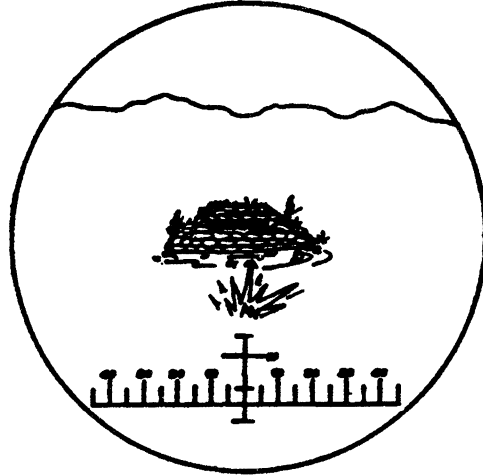
RESPONSE TO PROBLEM #5.

ADD TWO HUNDRED, OVER.

---

PROBLEM #6.

After sending the ADD TWO HUNDRED, you see:



What is your correction?

---

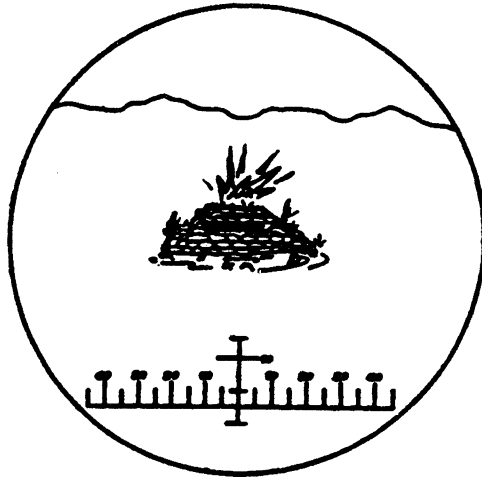
RESPONSE TO PROBLEM #6.

ADD ONE HUNDRED, OVER.

---

PROBLEM #7.

On the next round you see:



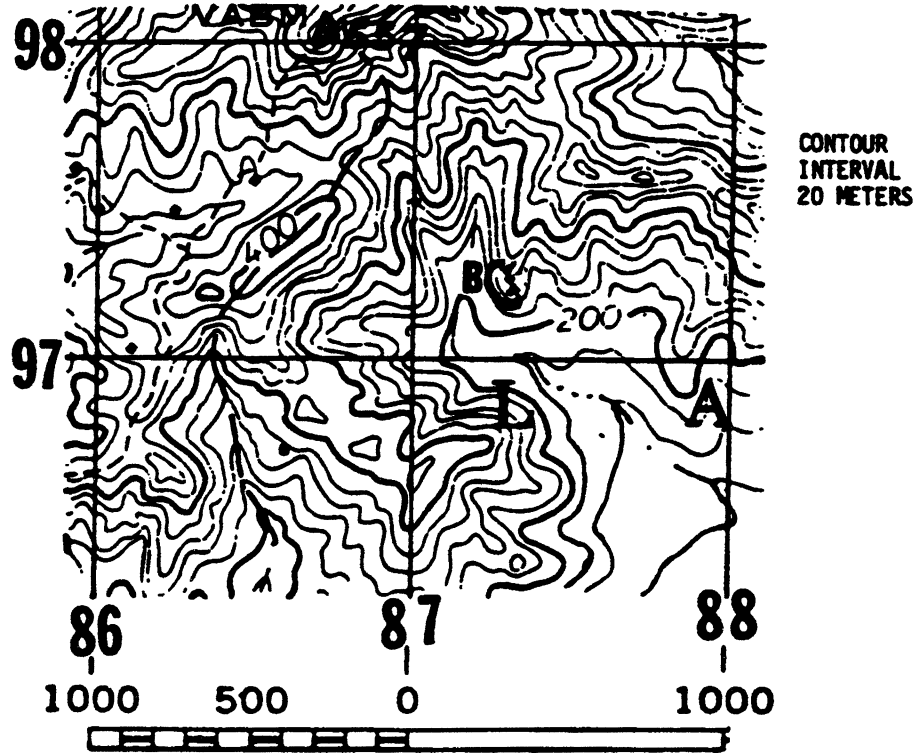
What is your correction?

---

RESPONSE TO PROBLEM #7.

DROP FIVE ZERO, FIRE FOR EFFECT, OVER.

-----



Map for problem on page 5-12.

PROBLEM #8.

You arrive at Hill 557 (coordinates 867981) and observe about 30 troops digging in at "B." Your call sign is BRAVO ONE TWO; the infantry battalion is QUEBEC FOUR INDIA. The direction to the target is 2380 mils magnetic. This is target number AB3205 and naval gunfire is available.

NOTE: The naval gunfire support ship is armed with 6-inch caliber guns.

What is your CALL FOR FIRE?

- (a) \_\_\_\_\_
- (b) \_\_\_\_\_
- (c) \_\_\_\_\_
- (d) \_\_\_\_\_
- (e) \_\_\_\_\_
- (f) \_\_\_\_\_

-----  
PROBLEM #9.

The first round(s) is spotted short and 40 mils to the right of the target. What are your deviation and range corrections?

\_\_\_\_\_

-----  
PROBLEM #10.

The next round(s) is over and on line. What correction will you make?

\_\_\_\_\_

-----  
PROBLEM #11.

The next round(s) is short and on line. What correction will you make?

\_\_\_\_\_

-----  
PROBLEM #12.

The next round(s) is on target. What is your next transmission?

\_\_\_\_\_

RESPONSE TO PROBLEM #8.

- (a) QUEBEC FOUR INDIA, THIS IS BRAVO ONE SIERRA,
  - (b) FIRE MISSION, TARGET NUMBER ALFA BRAVO THREE TWO ZERO FIVE, OVER.
  - (c) GRID EIGHT SEVEN THREE NINER SEVEN THREE,  
ALTITUDE TWO FOUR ZERO,  
DIRECTION TWO THREE EIGHT ZERO MILS MAGNETIC, OVER.
  - (d) THREE ZERO TROOPS DIGGING IN,
  - (e) DANGER CLOSE, NORTHWEST NINER FIVE ZERO,
  - (f) SPOTTER ADJUST, OVER.
- 

RESPONSE TO PROBLEM #9.

LEFT FOUR ZERO, ADD FOUR HUNDRED, OVER.

---

RESPONSE TO PROBLEM #10.

DROP TWO HUNDRED, OVER.

---

RESPONSE TO PROBLEM #11.

ADD ONE HUNDRED, OVER.

---

RESPONSE TO PROBLEM #12.

FIRE FOR EFFECT, OVER.

---

NOTE: If the target is not damaged to the degree you desire, you would want to refire the FIRE FOR EFFECT. You do this by sending "REPEAT".

PROBLEM #13.

The target at which you were just firing was neither neutralized nor destroyed (as appropriate) after the ship fired for effect; what request would you transmit?

---

PROBLEM #14.

The enemy is dispersing to the southeast, and you observe 15 WIA's. What is your transmission?

---

RESPONSE TO PROBLEM #13.

REPEAT, OVER.

-----  
RESPONSE TO PROBLEM #14.

END OF MISSION, ENEMY TROOPS DISPERSING TO SOUTHEAST, ONE FIVE WIA's, OUT.  
-----

EXERCISE 5.1.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. List, in sequence, the six elements of the CALL FOR FIRE for naval gunfire.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_
- e. \_\_\_\_\_
- f. \_\_\_\_\_

Work Unit 5-2. CALL FOR CLOSE AIR SUPPORT

TERMINAL LEARNING OBJECTIVE: Identify the 10 elements of the CALL FOR CLOSE AIR SUPPORT.

ENABLING LEARNING OBJECTIVE:

5.2.1a List, in sequence, the 10 elements of the CALL FOR CLOSE AIR SUPPORT.

\* \* \* \* \*

In this work unit you will learn how to CALL FOR CLOSE AIR SUPPORT aircraft when there is not a forward air controller around to help you. Since occasionally there is no way for you to talk directly with the attack aircraft (your radio and theirs may operate on different frequencies), what you really need to know is what to have relayed to the air officer (AO), back at the infantry battalion headquarters through your company commander. As you will see, there are 10 basic elements in a request for close air support and they are somewhat different from the information you give when requesting artillery or naval gunfire support. Below are listed the 10 elements are for the request for CLOSE AIR SUPPORT, and on the following pages are descriptions of each element.

- a. Unit identification
- b. Tactical situation
- c. Target description
- d. Target location
- e. Target time
- f. Type ordnance recommended
- g. Your (Friendly) position
- h. Your (Friendly) position marking
- i. Attack heading
- j. Target marking

a. Unit Identification. You begin your request for Air Support by giving your identification (or Call Sign).

KILO ONE JULIET (COMPANY COMMANDER), THIS IS ALFA ONE FOXTROT (YOU), OVER.

b. Tactical Situation. Your tactical situation should be described by giving the volume or type of fire you are receiving if any. Keep it simple.

"UNDER LIGHT SMALL ARMS FIRE"

"RECEIVING HEAVY AUTOMATIC WEAPONS FIRE"

OR

"NO CONTACT WITH THE ENEMY"

c. Target Description. Information about the target which assists the A.O. in determining the aircraft and ordnance needed to attack the target.

"COMPANY SIZED UNIT WITH AUTOMATIC WEAPONS"

d. Target Location. The complete target location includes:

GRID COORDINATES--of the target, using six-digit grid coordinates

ALTITUDE--of the target using feet, yards, meters

DIRECTION--of the observer-target (OT) line in mils or degrees, magnetic or grid

GRID SIX FIVE FIVE THREE NINER SEVEN,

ALTITUDE TWO FIVE ZERO,

DIRECTION ONE NINER FIVE ZERO MILS MAGNETIC, OVER.

e. Target Time. The 5th element of you close air request tells the A.O. WHEN you want the air strike to begin, for example:

"AS SOON AS POSSIBLE" (ASAP)

Sometimes you may want to specify a delay if you need time to pull back to a safe position, such as:

"IN THREE ZERO MINUTES FROM NOW"

You may also specify a particular time, when you know you will be in position to observe the strike, such as:

"AT ONE EIGHT ZERO ZERO HOURS"

Complete the following work unit problems before moving on. The correct responses will be found on the next page. If you have any difficulties, restudy the material before moving on.

PROBLEM #1.

Arrange the following in the proper order for a request for close air support:

- a. WHERE the target is
- b. WHAT the target is
- c. WHAT the situation is
- d. WHEN the attack should start
- e. WHO you are

(1) \_\_\_\_\_

(2) \_\_\_\_\_

(3) \_\_\_\_\_

(4) \_\_\_\_\_

(5) \_\_\_\_\_

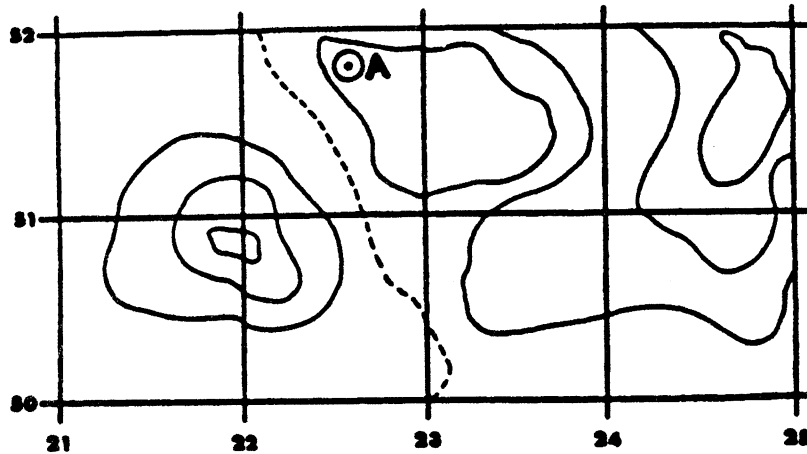


RESPONSE TO PROBLEM #1.

- (a) e. WHO are you
  - (b) c. WHAT the situation is
  - (c) b. WHAT the target is
  - (d) a. WHERE the target is
  - (e) d. WHEN the attack should start
- 

PROBLEM #2.

You are a patrol leader (ALFA ONE FOXTROT) and have been pinned down by small arms fire from about 50 enemy troops at point A in open trenches. Their position is about 400 meters from your front as shown on the sketched map below.



The A O (KILO ONE JULIET) is on the net. Write the first five elements of your request for close air support.

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_
- (4) \_\_\_\_\_
- (5) \_\_\_\_\_

RESPONSE TO PROBLEM #2.

- (1) KILO ONE JULIET, THIS IS ALFA ONE FOXTROT, OVER.
  - (2) UNDER HEAVY SMALL ARMS FIRE,
  - (3) FIVE ZERO TROOPS IN OPEN TRENCHES,
  - (4) AT GRID COORDINATES TWO TWO SIX FIVE ONE NINER,
  - (5) REQUEST AIR STRIKE AS SOON AS POSSIBLE (ASAP), OVER.
- 

Okay--your halfway through; that is you've learned the first five things the A.O. will need to know to give you close air support. Now take a look at the last five.

- f. Type Ordnance Recommended
- g. Your (Friendly) Position
- h. Your (Friendly) Position Marking
- i. Attack Heading
- j. Target Marking

f. Type Ordnance Recommended. Notice that you are only RECOMMENDING the type of ordnance. The A.O. will make the decision as to the best type of ordnance to use, depending on what the target is and what ordnance is available.

The general, soft targets such as infantry, non-armored vehicles and trucks can be attacked effectively by strafing or napalm. Hard type targets such as tanks are best attacked with rockets or rokeye, while bunkered positions can be effectively attacked with delayed fuzed bombs, rockets, or napalm.

The best way to be sure you get the proper fire on a target is to give a clear, specific description of the target.

EXAMPLE: DESCRIPTION--ABOUT 25-30 ENEMY IN A DITCH SPREAD OVER 200 METERS,  
TYPE ORDNANCE RECOMMENDED--RECOMMEND NAPALM.

g. Your (Friendly) Position. Never pass your grid coordinates over an unsecured net (use crypto gear or schakel). You can use a check point, O.P., L.P. or any other terrain feature known to both yourself and your platoon/company commander, who is relaying your air request to the A.O..

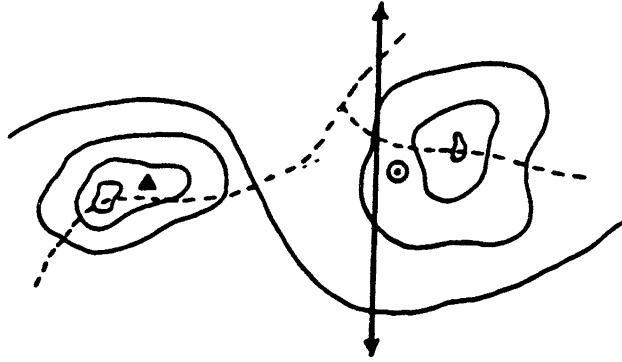
EXAMPLE: FIVE ZERO ZERO METERS EAST OF CHECK POINT TWO.

h. Your (Friendly) Position Marking. Before they are sent out, infantry patrols may be provided with brightly colored fluorescent rectangle of cloth, used as MARKING PANELS. When placed in front of a patrol's position, the attack pilot can quickly and accurately tell where you are. Sometimes colored smoke grenades are used for the same purpose. If the weather is clear and the sun is shining, you may choose to use a signalling mirror.

EXAMPLE: YELLOW MARKING PANELS.

i. Attack Heading. This is the DIRECTION along which the aircraft should fly in making the ATTACK, so as to avoid endangering your patrol. You should give an attack heading which is parallel to your front which will not cause the aircraft to fly over your position. If the ordnance is released too soon or too late, your patrol would not be endangered. This may not always be possible, however, due to enemy fire. So be flexible on attack headings, but remember, all things being equal you should give an attack heading parallel to your lines.

Suppose you are located at  $\triangle$  and the target is  $\odot$ . Notice in the sketch provided that the arrow points BOTH ways. The attack heading can be from either direction, along the line.



Now to actually GIVE an attack heading you must determine the AZIMUTH, that is the compass DIRECTION of the line. Place your compass on your orientated map and estimate the direction, or azimuth of the attack heading. As long as you are within 10 degrees, that's close enough.

EXAMPLE: ATTACK HEADING ONE NINER FIVE DEGREES.

j. Target Marking. The final piece of information you should pass to the AO is what you can MARK the target with.

Since target identification from the air is sometimes difficult due to terrain or visibility conditions, you can help pilots greatly if you mark the target for them. To mark the target; you may use mortars, or artillery, smoke grenades, or you may simply talk the pilot onto the target.

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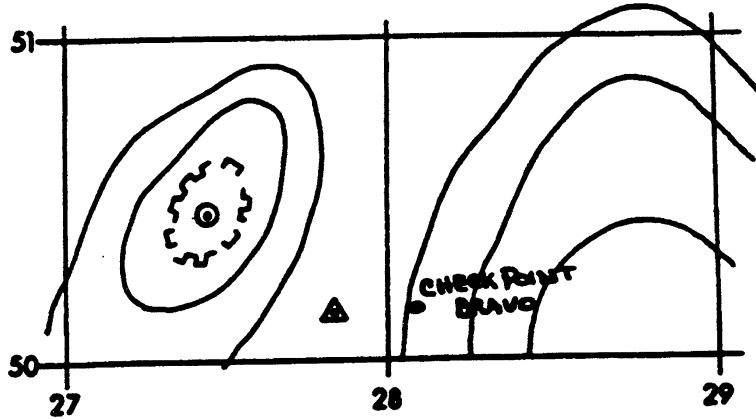
Here, then, are all 10 elements of your close air request:

- IDENTIFICATION--Who you are
- TACTICAL SITUATION--What's going on
- TARGET DESCRIPTION--What the target is
- TARGET LOCATION--Where the target is
- TARGET TIME--When to strike
- RECOMMENDED ORDNANCE--What to use
- FRIENDLY LOCATION-ENCRYPTED--Where you are
- FRIENDLY MARKINGS--How you are marked
- ATTACK HEADING--Which way to come
- TARGET MARKING--How target is marked

Study this for a few minutes, then write out a request for air support from the situation described on the next page.

**PROBLEM #3.**

You are leading a patrol (call sign ALPHA ONE FOXTROT) and have encountered heavy enemy fire from the location marked ⊙ on the map below. Your position is marked ▲ and you have just passed through check point BRAVO marked ●. The enemy is in trenches and bunkers and you estimate their strength to be about 75 men. You have a PRC-77 radio, smoke grenades, red air panels, and mortars with white phosphorus rounds available. You have requested fire support from your company and they tell you that close air support is the only means available and that the infantry battalion A O (call sign INDIA ONE JULIET) will contact you on the Company Tac Net.



Make up your request for close air support on the lines provided below.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

Check your answers with the correct responses on the next page.

RESPONSE TO PROBLEM #3.

- (1) INDIA ONE JULIET THIS IS ALPHA ONE FOXTROT, OVER.
  - (2) I AM UNDER HEAVY FIRE,
  - (3) TARGET IS SEVEN FIVE TROOPS IN BUNKERS AND TRENCHES,
  - (4) TARGET LOCATED AT GRID COORDINATES TWO SEVEN FIVE FIVE ZERO FIVE, OVER,
  - (5) TARGET TIME AS SOON AS POSSIBLE,
  - (6) RECOMMEND BOMBS AND NAPALM,
  - (7) ALPHA ONE FOXTROT THREE ZERO ZERO METERS EAST OF CHECK POINT BRAVO,
  - (8) ALPHA ONE FOXTROT MARKED WITH RED PANELS,
  - (9) ATTACK HEADING ZERO FOUR ZERO DEGREES,
  - (10) I CAN MARK TARGET WITH WHITE PHOSPHORUS (WP), OVER
- 

EXERCISE 5.2.1a: Answer the following item and check your responses against those listed at the end of this study unit.

1. List, in sequence, the 10 elements of the request for Close Air Support.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
  - f. \_\_\_\_\_
  - g. \_\_\_\_\_
  - h. \_\_\_\_\_
  - i. \_\_\_\_\_
  - j. \_\_\_\_\_

Work Unit 5-3. ADJUSTING CLOSE AIR SUPPORT

TERMINAL LEARNING OBJECTIVE: Identify the two methods used to adjust close air support.

ENABLING LEARNING OBJECTIVE:

5.3.1a Define the compass and clock methods for adjusting close air support.

\* \* \* \* \*

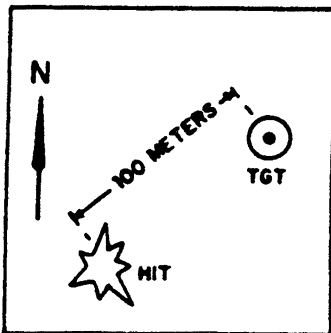
Before discussing how to adjust a close air strike, you should remember that often a forward air controller (FAC) would be with your unit. He would normally prepare the tactical air request. If a FAC is not available, the AO can take your request and assign it to a Marine air observer (MAO) or airborne FAC (FAC(A)) if there is station. Normally the FAC, the FAC(A), or the MAO would control the strike. The FAC should have radio contact with the attack aircraft. You and an MAO can communicate directly after the initial request has gone to the AO. Many times, however, you will not have an FAC or an MAO to submit the air request and control the close air support attack aircraft. In that event, you will have to make the subsequent corrections. Now pay close attention so you can relay the right correction to the attack pilot through the AO or directly to the pilot.

There are TWO ways of ADJUSTING hits onto the target:

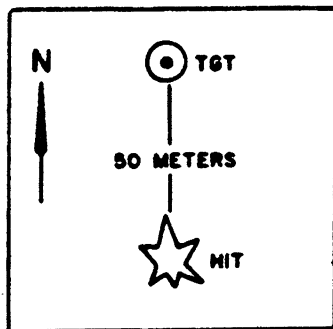
- (1) Compass Direction Method
- (2) Clock Code Method

a. Compass Direction Method. When you use a compass direction to adjust close air support, you must orientate your map, observe the last hit, and make your adjustment. Give one of the eight basic directions--NORTH, NORTHEAST, SOUTH, SOUTHWEST, etc. Below are some examples:

EXAMPLE #1

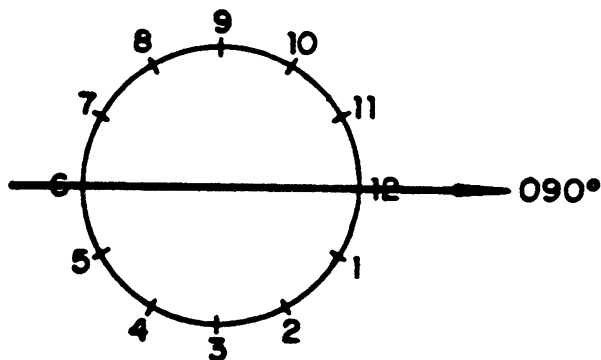


You would say: "FROM THE LAST HIT  
MOVE NORTHEAST ONE ZERO ZERO METERS,  
OVER."

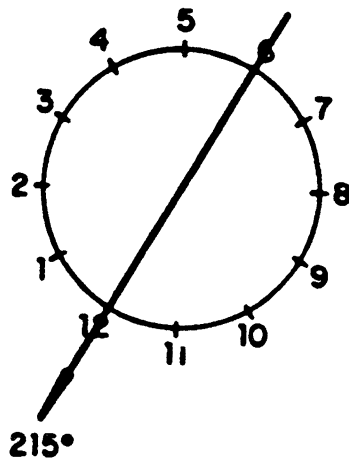


You would say: "FROM LAST HIT  
MOVE NORTH FIVE ZERO METERS,  
OVER."

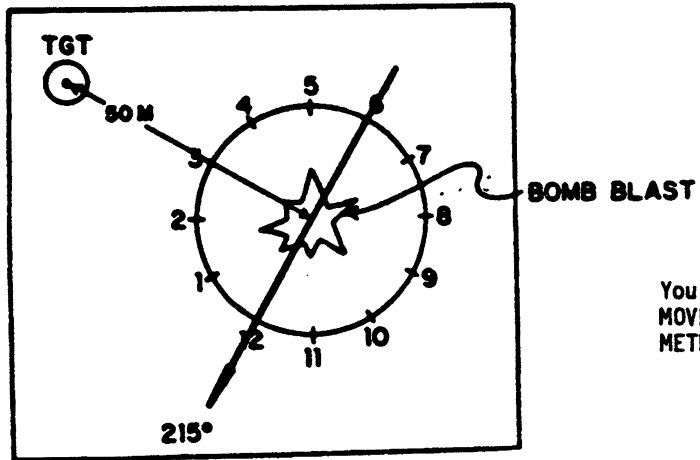
b. Clock Code Method. To use the clock code method of adjustment from the last hit, line up the 12 o'clock position with the AIRCRAFT ATTACK HEADING. For example, if the attack heading is 90 degrees, orientate the clock like this:



If the aircraft heading is 215 degrees the clock would be orientated like this:



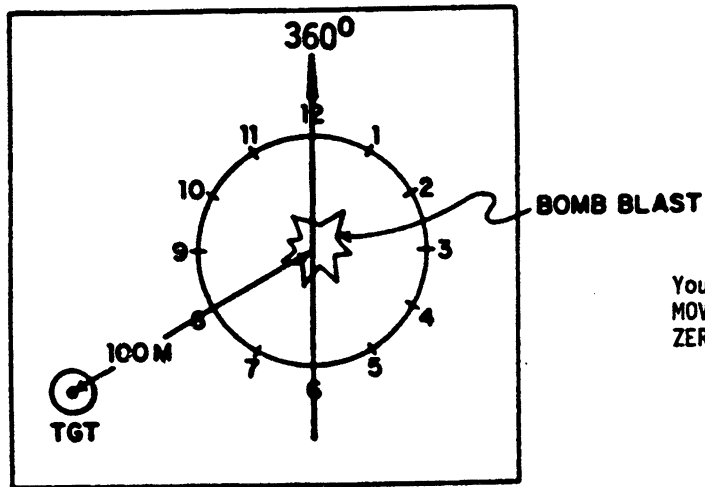
Here are some examples of clock code corrections.



You would say: "FROM LAST HIT  
MOVE THREE O'CLOCK FIVE ZERO  
METERS, OVER".

ATTACK HEADING 215

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You would say: "FROM LAST HIT  
MOVE EIGHT O'CLOCK ONE ZERO  
ZERO METERS, OVER".

ATTACK HEADING 360

---



c. Terminating the Air Strike. When neutralizing or destroying the target, you will want to continue your mission or move into the enemy position. At this time, you will have to end the close air strike by telling the AO or pilot to:

1. TERMINATE THE STRIKE  
and
2. GIVE AN ESTIMATE OF THE DAMAGE.

Naturally, you can end an air strike at any time during the attack if you feel that the pilots don't have the right target or that the ordnance is falling too close to your position. Just call the AO or pilot IMMEDIATELY and tell him to STOP THE ATTACK!! If you feel that there is not enough time to inform the pilot why you want to terminate the mission or to give a correction, simply say "ABORT, ABORT, ABORT." The pilot will drop no more ordnance until the situation is corrected.

EXERCISE 5.3.1a: Answer the following items and check you responses against those listed at the end of this study unit.

1. Define the compass direction method for adjusting close air support.

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2. Define the clock code method for adjusting close air support.

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**Answers to Study Unit #5 Exercises.**

**Work Unit 5-1.**

**Exercise 5.1.1a**

1.
  - a. Spotter Identification
  - b. Warning Order
  - c. Target Location
  - d. Target Description
  - e. Method of Engagement
  - f. Method of Fire and Control

**Work Unit 5-2.**

**Exercise 5.2.1a**

1.
  - a. Unit Identification
  - b. Tactical Situation
  - c. Target Description
  - d. Target Location
  - e. Target Time
  - f. Type Ordnance Recommended
  - g. Your (Friendly) Position
  - h. Your (Friendly) Position Marking
  - i. Attack Heading
  - j. Target Marking

**Work Unit 5-3.**

**Exercise 5.3.1a**

1. You must orientate your map, observe the last hit, and make you adjustment by giving one of eight basic directions.
2. Align the 12 o'clock position with the aircraft attack heading.



INFANTRY SQUAD LEADER: WEAPONS AND FIRE SUPPORT

Review Lesson

Instructions: This review lesson is designed to aid you in preparing for your final examination. You should try to complete this lesson without the aid of reference materials, but if you do not know an answer, look it up and remember what it is. The enclosed answer sheet must be filled out according to the instructions on its reverse side and mailed to MCI using the envelope provided. The questions you miss will be listed with references on a feedback sheet (MCI-R69) which will be mailed to your commanding officer with your final examination. You should study the reference material for the questions you missed before taking the final examination.

Multiple Choice: Select the ONE answer which BEST completes the statement or answers the question. After the corresponding number on the answer sheet, blacken the appropriate circle.

1. The maximum effective range of the M60E3 machinegun is \_\_\_\_\_ meters.
  - a. 1,000
  - b. 1,100
  - c. 1,500
  - d. 3,625
2. The sustained rate of fire for the M60E3 machinegun is \_\_\_\_\_ rounds per minute.
  - a. 250-300
  - b. 550-600
  - c. 100
  - d. 200
3. The two methods for loading the M60E3 machinegun are cover raised and
  - a. with the bolt forward.
  - b. with the bolt to the rear.
  - c. cover closed.
  - d. by magazine.
4. To change barrels on the M60E3 machinegun, the gunner must first raise the
  - a. feed cover.
  - b. barrel lock lever.
  - c. rear sight.
  - d. forward assist.
5. How many minutes must you allow the barrel to cool on the M60E3 machinegun, while performing immediate action (hot barrel, round not ejected)?
  - a. 5
  - b. 10
  - c. 15
  - d. 30
6. If, while firing the M60E3 machinegun in an assault fire position, a runaway gun occurs, the gunner should
  - a. place the weapon on safe.
  - b. attempt to break the ammunition belt.
  - c. pull the bolt to the rear and hold it there.
  - d. hold the gun on target until all rounds are expended.
7. Inspecting the M60E3 machinegun for cleanliness and proper mechanical condition, running a dry patch through the bore, and placing a light coat of CLP on the bolt and receiver rails describes \_\_\_\_\_ maintenance.
  - a. after firing
  - b. during firing
  - c. before firing
  - d. preinspection
8. You must change the barrel of the M60E3 machinegun after two minutes of fire at the rapid rate and \_\_\_\_\_ rate.
  - a. 10 min. at the cyclic
  - b. 10 min. at the sustained
  - c. 15 min. at the sustained
  - d. 20 min. at the sustained

9. How many consecutive work days must you clean the M60E3 machinegun after firing?
- a. 1  
b. 2  
c. 3  
d. 4
10. The maximum range for the M720 and M49A4 HE mortar rounds are
- a. 3,500 m/1,800 m.  
b. 2,500 m/1,000 m.  
c. 4,750 m/2,800 m.  
d. 3,000 m/1,000 m.
11. The minimum and maximum ranges of the M83A3 ILLUM round for the M224 mortar are
- a. 100-1,500 m.  
b. 125-1,750 m.  
c. 50-2,000 m.  
d. 75-1,000 m.
12. The rapid rate of fire for the M720 HE mortar round is
- a. 30 rpm/ 6 min.  
b. 35 rpm/ 6 min.  
c. 30 rpm/ 4 min.  
d. 35 rpm/ 4 min.
13. The sustained rate of fire for the M720 HE mortar round is \_\_\_\_\_ rpm.
- a. 10  
b. 15  
c. 20  
d. 30
14. The four types of service ammunition for the M224, 60-MM mortar are the M720 HE, M49A4 HE, M302A1 SMOKE, and the \_\_\_\_\_ rounds.
- a. M493B3 C.S.  
b. target practice  
c. training  
d. M83A3 ILLUM
15. The four types of fuzes for 60-MM mortar ammunition are the M734 Multioption, M935 Point Detonating, M52 Impact, and the
- a. M1A1 Air Burst.  
b. M3A3 Surface Burst.  
c. M343 Super Quick.  
d. M65A1 Fixed-Time.
16. The ready-to-fire weight of the MK153 SMAW is \_\_\_\_\_ lbs.
- a. 29.01  
b. 35.01  
c. 33  
d. 19.5
17. The optimum firing range of the MK153 SMAW is \_\_\_\_\_ meters.
- a. 150  
b. 500  
c. 250  
d. 350
18. The danger and caution areas while firing the MK153 SMAW are \_\_\_\_\_ meters.
- a. 75/125  
b. 50/100  
c. 25/50  
d. 30/60
19. If a misfire occurs while firing the spotting rifle on the MK153 SMAW, you must place the safety on SAFE and wait \_\_\_\_\_ seconds before chambering a new round.
- a. 10  
b. 15  
c. 30  
d. 60
20. The four maintenance areas to clean on the MK153 SMAW are the exterior of the launcher, the interior of the launcher, the spotting rifle, and the
- a. firing mechanism.  
b. night vision sight.  
c. magazine.  
d. telescopic sight.

21. The three methods of employment of the Weapons Platoon are General Support, Direct Support, and
- a. as a Reserve.
  - b. in Reserve Support.
  - c. Attachment.
  - d. Indirect Support.
22. "To support by fire the advance of the rifle platoons" is the offensive mission of the
- a. Assault Section.
  - b. Machinegun Section.
  - c. Mortar Section.
  - d. Weapons Platoon.
23. The normal distance for adequate dispersion between machineguns is \_\_\_\_\_ meters.
- a. 20
  - b. 100
  - c. 65
  - d. 35
24. "To provide close in anti-tank protection and assault support" is the offensive mission of the \_\_\_\_\_ Section.
- a. Assault
  - b. Machinegun
  - c. Mortar
  - d. Weapons
25. The basic unit of employment for MK153 SMAW assault weapons is by
- a. team.
  - b. individual.
  - c. section.
  - d. platoon.
26. The safety clearance for the backblast on the MK153 SMAW is \_\_\_\_\_ meters deep by \_\_\_\_\_ meters wide.
- a. 25/40
  - b. 40/25
  - c. 60/50
  - d. 90/30
27. "To provide supporting high-angle fires which are rapidly responsive to the company commander's requirements" is the offensive mission of the \_\_\_\_\_ Section.
- a. Assault
  - b. Machinegun
  - c. Mortar
  - d. Weapons
28. "To provide close and continuous fire support for the frontline platoons" is the defensive mission of the \_\_\_\_\_ Section.
- a. Assault
  - b. Machinegun
  - c. Mortar
  - d. Weapons
29. A predetermined line of grazing machinegun fire designed to break up an enemy assault is called a (an)
- a. PDF.
  - b. Sector of Fire.
  - c. EFL.
  - d. FPL.
30. A machinegun covering a dangerous avenue of approach is laid on a (an)
- a. PDF.
  - b. Sector of Fire.
  - c. EFL.
  - d. FPL.
31. "To provide close-in anti-tank protection for the rifle company, and in the absence of an armored threat, provide close range fire support" is the defensive mission of the \_\_\_\_\_ Section.
- a. Assault
  - b. Machinegun
  - c. Mortar
  - d. Weapons

32. "To provide close and continuous fire support for the rifle company during various stages of an enemy attack" is the defensive mission of the
- Assault Section.
  - Machinegun Section.
  - Mortar Section.
  - Weapons Platoon.
33. The four firing sequences that the 60-MM Mortar is capable of firing during defensive fire support are Close Defensive Fires, Final Protective Fires, Enemy Penetration Fires, Counterattack Fires, and \_\_\_\_\_ Fires.
- Dual-mode
  - Bracketing
  - Long-range
  - Counter-mortar
34. The maximum effective range for the M2 .50 caliber machinegun is \_\_\_\_\_ meters.
- 2,000
  - 1,830
  - 2,500
  - 2,850
35. The sustained rate of fire for the M2 .50 caliber machinegun is \_\_\_\_\_ per min.
- 30 rounds or less
  - 60 rounds or less
  - 35 rounds
  - 40 rounds or less
36. To "Provide protection for motor movements, vehicle parks, and train bivouacs; defend against low-flying hostile aircraft; destroy lightly armored vehicles; and reconnaissance by fire on suspected enemy positions describes the capabilities of the
- M28, 81mm Mortar.
  - M2, .50 caliber Machinegun.
  - M47 Dragon.
  - MK26, .30-mm Machinegun.
37. The maximum effective range for the MK19, 40mm Machinegun is \_\_\_\_\_ meters.
- 750
  - 900
  - 1,000
  - 1,500
38. The armor penetration capability of the MK19, 40mm round is \_\_\_\_\_ inch(es) of steel.
- 1
  - 2
  - 3
  - 4
39. To "Support the infantry in both the offense and defense; provide defense against low-flying hostile aircraft; destroy light armored vehicles; and provide protective fires during motor movements are the capabilities of the
- M29, 81mm Mortar.
  - MK19, 40mm Machinegun.
  - M47 Dragon.
  - MK26, .30 caliber Machinegun.
40. The maximum range of the M47 Dragon is \_\_\_\_\_ meters.
- 900
  - 975
  - 1,000
  - 1,500
41. The minimum range of the M47 Dragon is \_\_\_\_\_ meters.
- 50
  - 55
  - 60
  - 65
42. How many Marines are in a Dragon team?
- 1
  - 2
  - 3
  - 4
43. "To provide medium range antiarmor support for the Marine infantry battalion; and to engage nonarmored vehicles, crew-served weapons and bunkers" describes the capabilities of the
- M29, 81mm Mortar.
  - M2, .50 caliber Machinegun
  - M47 Dragon.
  - MK19, 40mm Machinegun.

44. The maximum range for the 81mm mortar HE and WP ammunition is \_\_\_\_\_ meters.
- a. 3,500
  - b. 4,000
  - c. 4,250
  - d. 4,500
45. The maximum rate of fire for the 81mm mortar is
- a. 20 rpm/ 2 min.
  - b. 25 rpm/ 2 min.
  - c. 20 rpm/ 4 min.
  - d. 25 rpm/ 4 min.
46. The three methods of employment of the 81mm mortar platoon is general support, direct support and
- a. reserve.
  - b. attachment.
  - c. reserve support.
  - d. indirect support.
47. The size or shape of an FPF fired by the 81mm mortar platoon is \_\_\_\_\_ meters by \_\_\_\_\_ meters.
- a. 200/50
  - b. 250/75
  - c. 400/100
  - d. 450/125
48. The illumination round fired from the 81mm mortar will burn for \_\_\_\_\_ seconds.
- a. 60
  - b. 75
  - c. 90
  - d. 120
49. The general missions of field artillery are to provide close and continuous fire support, to give depth to combat, and to
- a. have an amphibious capability.
  - b. be easily transportable for combat use.
  - c. attain fire superiority over enemy delivery means.
  - d. to be of sufficient size and caliber to inflict substantial damage on the enemy.
50. One of the capabilities of field artillery is to
- a. be air transportable.
  - b. carry sufficient ammunition.
  - c. cover defilade areas of the FEBA.
  - d. shifting fires rapidly without displacing.
51. The principal limitation of field artillery is
- a. its firing signature.
  - b. its vulnerability to air attack.
  - c. its not designed to repulse ground attacks.
  - d. its inability to support the initial phase of the amphibious assault.
52. The general missions of naval gunfire are to support: the assault of the objective by destroying or neutralizing shore installations that oppose the approach of ships and aircraft, to support defenses that may oppose the landing force, and
- a. to shift fires rapidly.
  - b. to give depth to combat.
  - c. to support defenses that may oppose the post landing advance of the landing force.
  - d. to participate as the supporting components of Fleet Marine Forces in the seizure and defense of advanced naval bases.
53. The capabilities of naval gunfire are mobility, fire control equipment, weapons, ammunition, high initial velocity and flat trajectory, rate of fire, and
- a. range.
  - b. deflection pattern.
  - c. range pattern.
  - d. ammunition capacity.



54. The limitations of naval gunfire are hydrography, fixing ships position, weather and visibility, changing gun-target line, range pattern, ammunition capacity, and
- rate of fire.
  - communications.
  - mobility.
  - deflection pattern.
55. The primary mission of Marine aviation is to participate as the supporting components of Fleet Marine Forces in the seizure and defense of advanced naval bases and
- to achieve air superiority over enemy aircraft.
  - to provide a variety of attack forces for the Landing Force Commander.
  - to conduct such land operations as may be essential to the prosecution of a naval campaign.
  - to participate as an integral component of naval aviation in the execution of such other Navy functions as Fleet Commanders so direct.
56. Significant aircraft capabilities include variety of attack, accuracy, observation, speed and maneuverability, neutralization, mobility and flexibility, availability, and
- morale effect.
  - radius of action.
  - massing fires.
  - identification of targets.
57. The most significant limitation of aircraft weapons systems is the
- range pattern.
  - lack of mobility and flexibility.
  - inability to support the initial phase of the amphibious assault.
  - difficulty in providing support at night and in periods of limited visibility.
58. The tools and equipment used by the small unit forward observer are maps, compass, binoculars, and
- protractor.
  - interpupillary scale.
  - reticle scale.
  - communication equipment.
59. The easiest and most widely used method of locating targets for the Call for Fire is the \_\_\_\_\_ method.
- polar plot
  - grid coordinate
  - creeping and bracketing
  - shift from a known point
60. The FDC must already know where your position is located when using the \_\_\_\_\_ method.
- polar plot
  - grid coordinate
  - creeping and bracketing
  - shift from a known point
61. The most accurate method for locating a target is the \_\_\_\_\_ method.
- polar plot
  - grid coordinate
  - creeping and bracketing
  - shift from a known point
62. A concise message prepared by the observer containing all information needed by the fire direction center (FDC) to determine the method of target attack is called
- SMEAC.
  - the call for fire.
  - SHELREP.
  - the warning order.
63. What element of the call for fire (for mortars and artillery) lets the FDC know who is calling for fire?
- Warning Order
  - Method of Fire and Control
  - Method of Engagement
  - Observer Identification

64. What information must be given, in sufficient detail, to the FDC so that they can determine the amount and type of ammunition to use?
- a. Warning Order
  - b. Target Description
  - c. Method of Engagement
  - d. Method of Fire and Control
65. The visual process by which you determine where the bursting rounds land in relation to the target is called
- a. Spotting.
  - b. Adjusting.
  - c. Laying.
  - d. Observing.
66. The actual process in which you move the impacting rounds (or the aim on the weapon(s)) onto the target is called
- a. Spotting.
  - b. Adjusting.
  - c. Laying.
  - d. Observing.
67. The two types of adjustments for adjusting rounds on target are adjustments for deviation and adjustments for
- a. altitude.
  - b. deflection.
  - c. range.
  - d. elevation.
68. "WERM" is the key word that represents the formula, Width Equals Range times
- a. Mils.
  - b. Meters
  - c. Mass.
  - d. Minutes.
69. The two methods used by the observer in adjusting for range are
- a. bracketing and creeping.
  - b. bracketing and searching.
  - c. searching and grid.
  - d. creeping and searching.
70. The situations that warrant the request for Fires For Effect on targets are initial rounds on target, initial target location accurate, after bold shifts in adjustments on fleeting targets, last adjustments sent will have effect on the target, and
- a. repeating last fire for effect.
  - b. when the grid method has no effect on the target.
  - c. when the creeping method has no effect on the target.
  - d. when the bracketing method has no effect on the target.
71. What radio message must the small unit forward observer announce to the FDC to terminate the fire mission?
- a. END OF MISSION
  - b. REQUEST CLOSE OF MISSION
  - c. TERMINATE FIRE MISSION
  - d. REQUEST FIRES IN EFFECT
72. The correct sequence for the six elements of the Call For Naval Gunfire Support is:
- a. Warning Order  
Target Description  
Target Location  
Method of Fire and Control  
Method of Engagement  
Spotter Identification
  - b. Warning Order  
Spotter Identification  
Target Description  
Target Location  
Method of Fire and Control  
Method of Engagement
  - c. Spotter Identification  
Target Location  
Target Description  
Method of Engagement  
Method of Fire and Control  
Warning Order
  - d. Spotter Identification  
Warning Order  
Target Location  
Target Description  
Method of Engagement  
Method of Fire and Control

73. The correct sequence for the ten elements of the Call For Close Air Support is:

- |   |   |
|---|---|
| a. Unit Location<br>Tactical Situation<br>Target Description<br>Target Location<br>Target Time<br>Type Ordnance Recommended<br>Your Position<br>Your Position Marking<br>Attack Heading<br>Target Marking       | c. Target Description<br>Tactical Situation<br>Target Location<br>Type Ordnance Recommended<br>Target Time<br>Your Position Marking<br>Your Position<br>Target Marking<br>Attack Heading<br>Unit Identification |
| b. Unit Identification<br>Attack Heading<br>Target Marking<br>Your Position<br>Your Position Marking<br>Target Time<br>Target Location<br>Target Description<br>Tactical Situation<br>Type Ordnance Recommended | d. Unit Identification<br>Target Location<br>Type Ordnance Recommended<br>Your Position<br>Tactical Situation<br>Target Time<br>Target Description<br>Target Marking<br>Your Position Marking<br>Attack Heading |

74. When you adjust close air support, if you orient your map, observe the last hit, and make your adjustments by giving one of eight basic directions; you are using the \_\_\_\_\_ method.

- |                      |                          |
|----------------------|--------------------------|
| a. clock code        | c. resection location    |
| b. compass direction | d. intersection location |

75. When you line up the aircraft attack heading with the 12 o'clock position while adjusting Close Air Support, you are using the \_\_\_\_\_ method.

- |                      |                          |
|----------------------|--------------------------|
| a. clock code        | c. resection location    |
| b. compass direction | d. intersection location |

\*This ends the review lesson.\*

## Review Lesson Solutions

## Reference

		Work Unit
1.	b.	1-1a
2.	c.	1-1a
3.	c.	1-1b
4.	b.	1-1b
5.	c.	1-1c
6.	d.	1-1d
7.	c.	1-1e
8.	b.	1-1e
9.	c.	1-1e
10.	a.	1-2a
11.	d.	1-2a
12.	c.	1-2a
13.	c.	1-2a
14.	d.	1-2b
15.	d.	1-2c
16.	a.	1-3a
17.	c.	1-3a
18.	d.	1-3a
19.	b.	1-3b
20.	d.	1-3c
21.	c.	1-4a
22.	b.	1-4b
23.	d.	1-4b
24.	a.	1-4c
25.	a.	1-4c
26.	d.	1-4c
27.	c.	1-4d
28.	b.	1-5a
29.	d.	1-5a
30.	a.	1-5a
31.	a.	1-5b
32.	c.	1-5c
33.	c.	1-5c
34.	b.	2-1a
35.	d.	2-1a
36.	b.	2-1b
37.	d.	2-2a
38.	b.	2-2a
39.	b.	2-2b
40.	c.	2-3a
41.	d.	2-3a

## Review Lesson Solutions--cont'd

## Reference

42.	b.	2-3a
43.	c.	2-3b
44.	d.	2-4a
45.	b.	2-4a
46.	b.	2-4b
47.	c.	2-4b
48.	b.	2-4b
49.	c.	3-1a
50.	d.	3-1b
51.	d.	3-1c
52.	c.	3-2a
53.	b.	3-2b
54.	b.	3-2c
55.	c.	3-3a
56.	a.	3-3b
57.	d.	3-3c
58.	d.	4-1a
59.	b.	4-2a
60.	a.	4-2a
61.	d.	4-2a
62.	b.	4-3a
63.	d.	4-3b
64.	b.	4-3b
65.	a.	4-4a
66.	b.	4-4b
67.	c.	4-4c
68.	a.	4-4d
69.	a.	4-4e
70.	a.	4-4f
71.	a.	4-4g
72.	d.	5-1a
73.	a.	5-2a
74.	b.	5-3a
75.	a.	5-3a