

UNITED STATES MARINE CORPS
School of Infantry
Training Command
PSC Box 20161
Camp Lejeune, NC 28542-0161

MM1306
21 May 04

STUDENT OUTLINE

M224 60MM MORTAR SMALL DEFLECTION AND ELEVATION CHANGE

TERMINAL LEARNING OBJECTIVES:

1. Given a mounted SL-3 complete mortar and a fire command requiring a small deflection and/or elevation change, manipulate the mortar for a small deflection and/or elevation change, by preparing the mortar to fire the mission within 35 seconds. (41TR.03.02)

1. **FIRE COMMANDS**. Fire commands are the technical instructions issued to mortar crews. These instructions enable the gun crews to engage various targets. There are two types of fire commands. They have common factors but different functions.

a. Initial Fire Command. An initial fire command is used to start a fire mission; it contains all the technical information for the gun crew to lay the mortar on the target area. There are eight elements of a fire command, only pertinent information is issued in the fire command.

(1) Mortars to follow. This element has two functions; it alerts the crews to an incoming mission and tells the crews which squads will respond to the commands.

(2) Shell and fuze. This element indicates what ammunition and fuze setting to prepare.

(3) Mortars to fire. This element designates the specific mortar(s) to fire. If the "Mortars to fire" element is the same as the "Mortars to follow" this element is omitted.

(4) Method of fire. In this element, the mortar(s) designated to fire in the preceding element is told how many rounds to fire, how to engage the target, and any special control desired. Also included are the number and type of ammunition to be used in the fire-for-effect phase.

(a) Volley fire. A volley can be fired by one or more mortars. The command for volley fire is: "___ rounds" (the number of rounds).

(b) Interval fire. A volley may also be fired with an interval between each round. The command would be similar to this: "5 ROUNDS ___ SECOND INTERVAL" (THE TIME BETWEEN ROUNDS).

(c) At my command. This is considered a controlling element. "AT MY COMMAND" is issued when the Platoon Sergeant/Section Leader desires to

control the firing. The response to "AT MY COMMAND" is "at your command". In the absence of a controlling element it is generally understood that the squad may fire when the gun is up.

(d) Manipulation fires (Traversing or Searching). These types of commands are used to cover targets in width and depth. There will be a separate lesson on Manipulation fires.

(5) Deflection. This element gives the exact deflection setting to be placed on the mortar sight. It is always announced in four digits, the first two digits are applied to the course deflection scale and the second two digits are applied to the fine deflection scale. Deflection changes cause the sight telescope to move left or right, and result in the impact of the round moving left or right. The command is always preceded by the word deflection. For example, "DEFLECTION, 3250.

(6) Charge. This element gives the charge consistent with elevation and range as determined from the firing tables. This element indicates to the crew the number of propellant charges to remain on the round.

(7) Time. This element tells the ammunition bearer the exact time setting to set on the fuze. If the Shell and fuze element of the fire command does not call for a fuze, which requires a time setting, this element is omitted. The FDC may issue a fire command that requires the ammunition bearer to set a fuze accurately. For example, " TIME, TWO THREE." (23 SECONDS).

(8) Elevation. This element serves two purposes: first it gives the exact elevation setting that is to be placed on the sight; second it serves as the command to fire. In the absence of a control measure in the "Method of fire" element, the "Mortar to fire" crew may begin firing when their gun is level on the correct sight picture. Elevation is always given in four digits, the first two digits are applied to the course elevation scale and the second two digits are applied to the fine elevation scale. Elevation changes cause the sight to rotate up or down on the elevation mechanism. Elevation in conjunction with charge, cause the impact of the round on the target to fall farther or closer to the mortar position. The rule of thumb is, higher elevation equals shorter range. Elevation is always given in the fire command. And it is always given last.

b. Subsequent Fire Commands. Subsequent fire commands are issued to change firing data or cease firing. Subsequent fire commands only contain data that is changed from the initial fire command, with exception of the elevation, which is always issued in the command. This command should be issued brief and clear, and should contain only the necessary data to accomplish the mission.

2. RESTATING OR CORRECTING FIRE COMMANDS

a. If any member of the crew does not understand any element of the fire command he may request that the element be restated by saying "Say again _____", followed by the element he didn't understand (deflection, elevation, time). If the command was an initial fire command the misunderstanding is corrected when the restated element is prefaced with "I SAY AGAIN DEFLECTION TWO NINE FOUR ZERO."

b. In a subsequent fire command any squad member may request clarification in the same fashion as above. The reply would be "THE COMMAND WAS _____." (deflection, charge, elevation)

c. If a subsequent command is issued incorrectly, the Marine issuing the command will correct it by saying "CORRECTION..." followed by the entire subsequent fire command. The term "Correction" cancels the entire command.

d. To limit errors in transmission all crewmen will echo each element back as it is received.

3. **SMALL DEFLECTION AND ELEVATION CHANGES.** With the mortar mounted and the sight installed, the sight is laid on the two aiming posts (the far post is placed out 100 meters or as far as terrain allows up to 100 meters and the near post is 50 meters, or half the distance to the far post) with a referred deflection of 2800 mils and an elevation of 1100 mils. The traverse is within two turns of center and both bubbles are level. The vertical hairline of the sight is on the left edge of the posts and they are aligned.

a. The gunner will receive a deflection change of less than 60 mils and places the new deflection on the sight. He then looks into the sight and begins to traverse half the distance to the posts and levels the cross level. He will continue this process until he receives the elevation.

b. When the gunner hears the command "elevation" he will stop traversing and place his right hand on the elevation control knob and look at the elevation scales (course and fine).

c. The gunner will receive an elevation change of less than 100 mils and place the new elevation on the sight. He then levels the elevation vial by turning the elevation hand crank and watching the elevation vial.

d. When the elevation bubble is level, the gunner will re-level the cross level, look into the sight and continue to traverse and cross level until the vertical hairline is within two mils of the left edge of the stake.

e. The gunner will then check both bubbles. If the bubbles are level and the sight picture is correct, He will report "GUN #____ UP."

4. **SIGHT PICTURES.** There are two types of sight pictures that are acceptable. Both sight pictures are correct and accurate.

a. Aligned sight picture. An aligned sight picture is attained when looking through the sight and the near aiming post covers the far aiming post. This occurs because the line of sight is on or near the original azimuth of lay. This is illustrated in diagram 1.

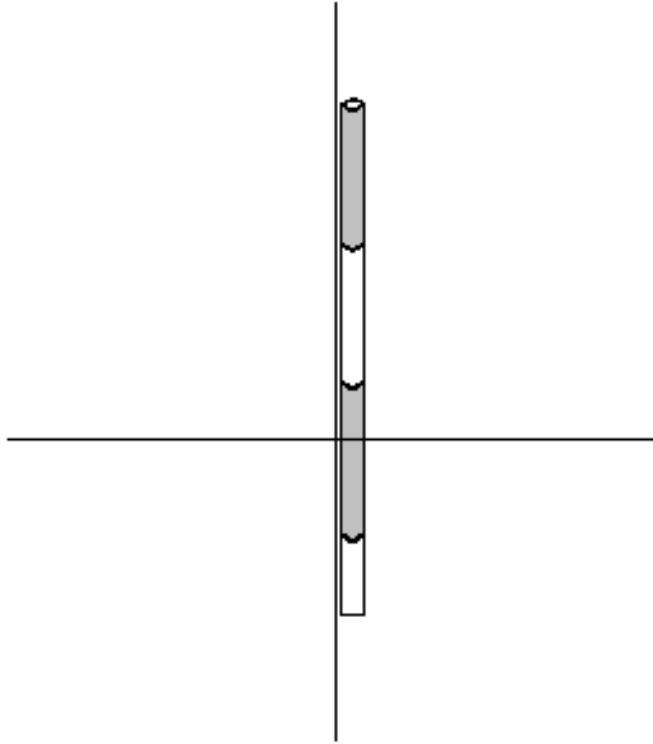


DIAGRAM 1 (aligned)

b. Compensated sight picture. A compensated sight picture is attained when looking through the sight and the near aiming post does not align with the far aiming post. This occurs because the line of sight has moved far enough away from the azimuth of lay to change the perspective that you are looking at the posts from. The method for laying in with a compensated sight picture is the same as for an aligned, however the sight picture is different. To correct for the separation between the posts the gunner would use the bottom left edge of the far aiming post as his reference point. If the far post is to the left of the near post, the vertical line is placed on the left also. The far post is centered between the near post and the vertical line of the reticle pattern.

(1) Compensated right is the sight picture that occurs when the far aiming post is to the right of the near post. The distance between each post and the vertical hairline is equidistant (the same distance between the posts and the line). Compensated right is illustrated in diagram 2.

(2) Compensated left is the sight picture that occurs when the far aiming post is to the left of the near post. The distance between each post and the vertical hairline is equidistant (the same distance between the posts and the line). Compensated left is illustrated in diagram 3.

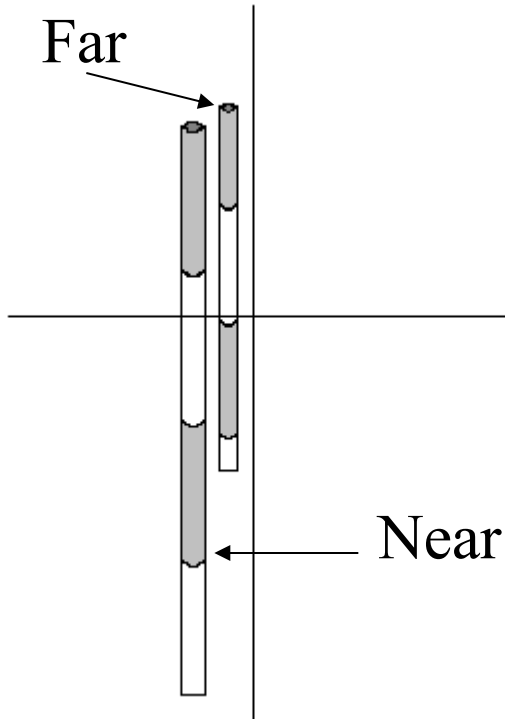


DIAGRAM 2 (COMPENSATED RIGHT)

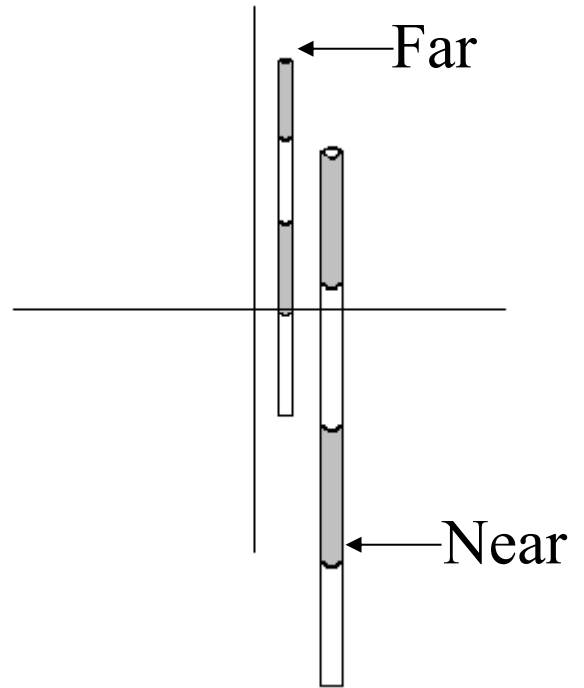


DIAGRAM 3 (COMPENSATED LEFT)

(c) If a compensated sight picture occurs while on the Azimuth of lay (Direction of Fire). The base plate has shifted or the posts were not placed in correctly. This may be corrected by performing refer and realignment of the posts. You will learn how to do this in a later lesson.

REFERENCES :

FM 23-90 Mortars, page 3-9.

EXAM ID: MM1306P

EXAM TITLE: M224 60mm Mortar Small Deflection and Elevation Change Performance Examination.

TLO/ELO: 41TR.03.02

STUDENT INSTRUCTIONS:

1. You are an infantry mortarman and must perform a small deflection and elevation change for a mortar.
2. The squad must perform the small deflection and elevation change within 35 seconds.
3. To achieve mastery, you must perform each of the performance steps correctly and within the allotted time.

PERFORMANCE STEPS AND/OR PERFORMANCE STANDARDS:

Performance Steps	Master	Non-Master	Remarks
1. Receive the fire command and echo the fire command.			
2. Place the deflection on the sight.			
3. Place the elevation on the sight.			
4. Level the elevation bubble.			
5. Level the cross level bubble.			
6. Traverse half way to the posts.			
7. Re-level the cross level bubble.			
8. Perform steps six and seven until the vertical hairline is within two mils of the correct sight picture.			
9. Check both bubbles and re-level.			
10. Announce "Gun up".			