
UNITED STATES MARINE CORPS
THE BASIC SCHOOL
MARINE CORPS TRAINING COMMAND
CAMP BARRETT, VIRGINIA 22134-5019

CALL FOR INDIRECT FIRE

B2C0299XQ

STUDENT HANDOUT

Call For Indirect Fire

Introduction

The reconnaissance team had discovered the base camp of a mixed Viet Cong/North Vietnamese battalion...HATEFUL, THIS IS PRIMNESS, FIRE MISSION. CONCENTRATION PAPA INDIA FIVE ZERO NINER. VOICES IN STREAM BED. ONE ROUND, WILLY PETER. WILL ADJUST...The artillery round hurtled in over the Marine's head. It sounded like someone ripping cloth. The explosion was sharp and close. A cloud of white smoke drifted up...HAVE THEM COME LEFT ONE HUNDRED AND FIRE FOR EFFECT... whispered Bisko...A few minutes later the rounds came tearing in. The grove shook with successive explosions. Fifteen North Vietnamese came out from the trees and walked rapidly to the stream crossing, and waded across...Twelve more rounds smashed into the trees, the sound of explosions mingling into one continuous roar. About forty enemy ran from the grove. They scampered to the stream and splashed across as fast as they could...KEEP THE FIRE COMING. CALL FOR AREA FIRE AND HIT THE OTHER BANK. I CAN SEE MORE THAN TWO HUNDRED. POUR IT ON...The artillery pounded them relentlessly. The enemy seemed to lose all sense of purpose and direction...Another volley. Three shells exploded in the stream. The enemy disappeared from the Marine's view in a shower of spray, mud, and stones...When the debris had settled, some were floating face down in the stream, others were lying in twisted shapes along the bank, a few were hanging from vines several yards in the air. The bamboo bridge sagged to water level under the weight of several collapsed enemy. Bodies clogged the stream and turned its color to rust.

In this Lesson

We will be learning how to generate and utilize the call for indirect fire format. We will also discuss the types of reports that must be sent to include: firing reports, end of mission reports, and adjusting rounds.

This lesson discusses the following topics:

Topic	Page
Learning Objectives	4
The Fire Support System	5
The Forward Observer and Target Location	5
The Call For Fire	10
Message to Observer	14
Reports Upon Firing	15
Adjustment of Fires	16
Ending a Fire Mission	22
Call for Suppressive Fires	23
Additional Information	24
Call For Fire Worksheets	25
Call For Fire Worksheet Answers	30
Call For Fire Problems	32
Call For Fire Problem Answers	42
References	44
Notes	44

Learning Objectives

TERMINAL LEARNING OBJECTIVES

TBS-FSPT-2003 Given a map, compass, protractor, target, and a radio with frequency, call for indirect fire using the polar method, to achieve effects on target within three corrections.

TBS-FSPT-2002 Given a map, compass, protractor, target, and a radio with frequency, call for indirect fire using the grid method, to achieve effects on target within three corrections.

ENABLING LEARNING OBJECTIVES

TBS-FSPT-1002b Given an evaluation, identify characteristics of immediate suppression, without omission.

TBS-FSPT-2002a Given a fire mission and a tactical radio, transmit the six elements of the call for fire, in sequence, without omission.

TBS-FSPT-2002b Given a fire mission and distance to target, employ an observer target (OT) factor, to calculate deviation corrections.

TBS-FSPT-2002c Given a map, compass, protractor, and target, determine the direction to the target from the observer's position, in mils, to transmit to the fire direction center.

TBS-FSPT-2002d Given an evaluation, define the components of a message to observer, in sequence, without omission.

TBS-FSPT-2002e Given a target and binoculars, spot a round's impact with binoculars, to determine range and deviation in relation to the target.

TBS-FSPT-2002f Given a fire mission, firing agency, rounds, and a target, apply bracketing, to achieve effects on target.

TBS-FSPT-2002g Given a fire mission, firing agency, rounds, and a target, fire for effect, to achieve effects on target.

TBS-FSPT-2002h Given a fire mission with effects on target, conduct RREMS (refine, record as target, end of mission, surveillance), for transmission to the fire direction center.

TBS-FSPT-2003a Given a fire mission, target, compass, map, protractor and tactical radio, determine target location using the direction and distance from the observer to the target, in order to send the second transmission of a polar mission.

The Fire Support System

The Fire Support System enables artillery and mortars to rapidly get rounds on target. Let's begin by looking at the three parts of the system.

Element	Role	Duties
Forward observer (FO)	Eyes	• Detects and locates suitable targets • Calls for fire • Adjusts fire • Relays the results of his fire missions
Fire direction center (FDC)	Brain	• Receives the CFF from the FO • Computes firing data • Then transmits that data in the form of weapon settings and fire commands to the firing unit
Firing unit	Muscle	Applies the weapon settings and fire commands transmitted by the FDC in order to deliver rounds when and where the observer has requested.

The Forward Observer and Target Location

The FO's capability to provide effective fire support depends upon his ability to locate targets quickly and accurately. Understanding and applying the skills of map reading are essential to an FO's success. The FO's map is second in importance only to his radio. The FO continually scans the map and terrain in order to associate features he sees on the ground with those on his map. The FO uses the map to:

- Determine the location of:
- Targets
- Friendly positions
- His own position
- Keep oriented during movement

The first step any FO must do is know his POSITION. Then, using his map and other tools, the FO determines the two critical elements of target location:

- Direction
- Distance

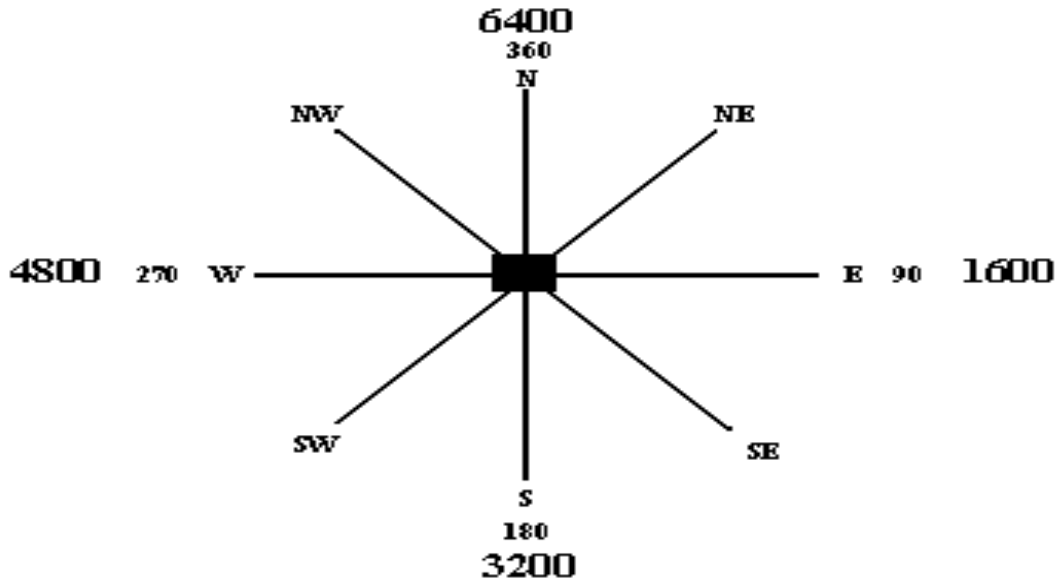
Key Concepts of Direction

- Direction. Direction is the most important element of target location and an integral part of terrain/map association and adjustment of fire. Direction can be measured in degrees or mils. While you are familiar with degrees (angular measurement 1/360 of a circle), you probably have not been introduced to mils.

The Forward Observer and Target Location (Continued)

- Mils. A mil is a unit of angular measurement that is equal to 1/6400 of a circle (see diagram below). Artillery and mortars use the mil because of its accuracy and the mil relation formula's ability to easily convert angular deviation into lateral distance. Mils may be measured:
 - From a map (mils grid)
 - By using a compass (mils magnetic)

CARDINAL DIRECTION, DEGREES, AND MILS



The standard unit of measure for direction in CFF is mils grid; this is what you will be expected to use at The Basic School.

- Conversion of Degrees to Mils. Degrees may be converted to mils by multiplying the number of degrees by 17.8.

Example.

$$90 \text{ degrees} \times 17.8 = 1602 \text{ mils}$$

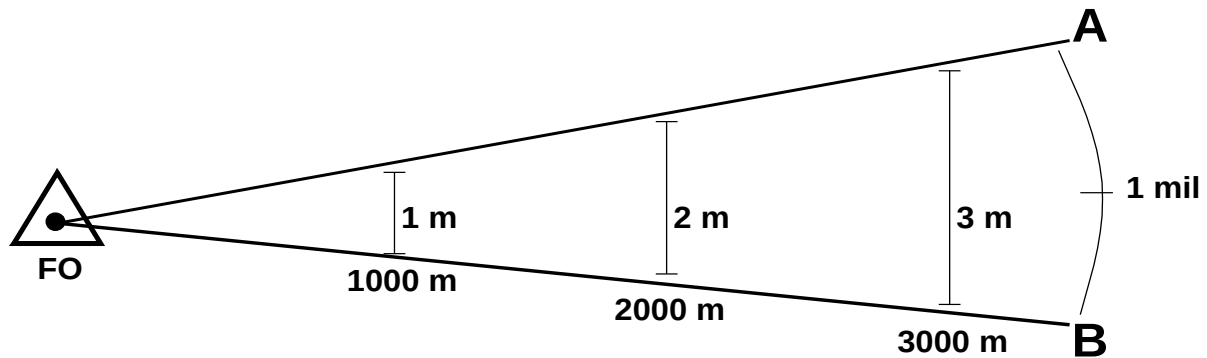
Expressed to 1600 mils

- Mil Relation Formula. The mil relation formula states that an angle of one mil equates to one meter of lateral distance for every 1000 meters of range. Thus if R equals range in meters, W equals lateral distance in meters, and M equals angular deviation in mils, then the following is true:

$$W = (R/1000) (M)$$

The Forward Observer and Target Location (Continued)

Example. Look at the diagram below.



From the FO's perspective, an angle of 1 mil ($M = 1$) separates points A and B. Thus, at a range of 2000 meters ($R = 2000$), the lateral distance is 2 meters:

$$\begin{aligned} W &= (R/1000) (M) \\ W &= (2000/1000) (1) \\ W &= 2 \text{ meters} \end{aligned}$$

Similarly, if from the FO's perspective, an angle of 300 mils ($M = 300$) separates point A and B, then at a range of 2000 meters ($R = 2000$), the lateral distance is 600 meters:

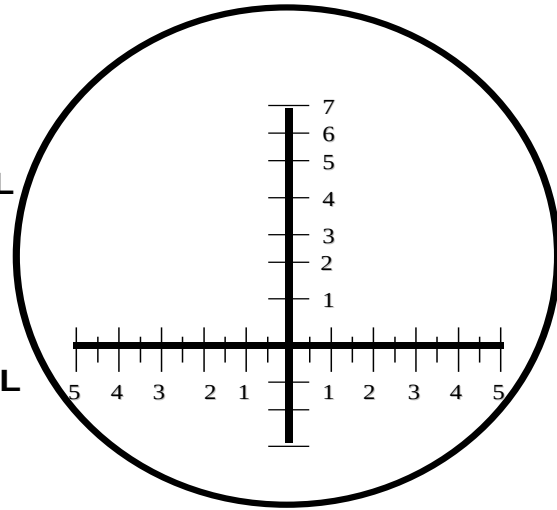
$$\begin{aligned} W &= (R/1000) (M) \\ W &= (2000/1000) (300) \\ W &= 600 \text{ meters} \end{aligned}$$

- Observer Target Line (OTL). The OTL is an imaginary straight line from the FO through the target.
- Observer-Target (OT) Direction. OT direction is the azimuth from the FO to the target. OT direction is always expressed to the nearest 10 mils grid and transmitted with four digits. In order to get direction to the target you will use of on the ways below to obtain direction:
 - Scaling from a map: Use a protractor to determine the azimuth in mils grid from the FO to the target.
 - Lensatic compass: The lensatic compass has an accuracy of +/- 50 mils. The FO reads mils magnetic from the compass and then converts to mils grid by applying the GM angle.
 - Measuring from a reference point: Determine OT direction by using the known azimuth to an identifiable reference point and the M22 binoculars (see diagram below). Follow the steps in the table below to determine OT direction measuring from a reference point.

The Forward Observer and Target Location (Continued)

M22 BINOCULARS

- **GRADUATED EVERY 5 MILS**
- **LABELED EVERY 10 MILS**
- **VISUALLY INTERPOLATE TO 1 MIL**
- **HORIZONTAL SCALE USED IN LATERAL ADJUSTMENTS**
- **ANGULAR DEVIATION IS 100 TOTAL MILS**



Step	Action
1	Measure the angular deviation in mils separating the reference point and the target.
2	If the target is to the • Right, add the mils to the known azimuth • Left, subtract the mils to the known azimuth
Example	

Summary of Direction:

While at TBS the three types of ways to figure out direction to a target will be through the use of a compass (reading mils), map (reading a grid), and a reference point (using binos).

Key Concepts of Distance

Distance. Distance is the second element of target location. Once direction has been determined, the FO must determine the distance to the target. Distance is normally the most difficult variable to determine in target location. The meter is the standard unit of measure.

- Observer-Target (OT) Distance. OT distance is the distance from the FO to the target. OT distance is always expressed to the nearest 100 meters. Determine OT distance using one of these two methods:
 - Estimation: Use a known unit of measurement. For example, think in terms of how many football fields (roughly 100 meters) you are from your target.
 - Visibility: Use this method of estimating when visibility is good. Use the table below as an aid for this method.

The Forward Observer and Target Location (Continued)

Distance	Tree Description
1000 m	• Trunk and main branches are visible • Foliage appears in cluster-like shapes • Daylight may be seen through foliage
2000 m	• Trunk is visible; main branches are distinguishable • Foliage appears as smooth surface • Outline of foliage of separate trees distinguishable
3000 m	• Lower half of trunk is visible • Branches blend with foliage • Foliage blends with adjoining trees
4000 m	• Trunk and branches blend with foliage • Foliage appears as a continuous cluster • Cannot detect motion caused by wind
5000 m and beyond	Whole area covered by trees appears smooth and dark

- Map study: Scale distance from a map.

Summary of Distance:

The two methods to figure out distance to the enemy is through **estimation** using a **map**.

The Forward Observer and Target Location (Continued)

Methods of Target Location

Terrain/map analysis is essential in target location. The results of that analysis (direction and distance) provide the basic data for determining a target's location. The two methods of communicating target location to the FDC are:

- Polar plot
- Grid coordinates

Polar Mission. In the polar plot method, the FO describes the target location in relation to his position. The primary advantage of the polar plot method is that it is fast and can be done without a map. The primary disadvantage is that the FO's position must be first transmitted to the firing unit.

Steps for Determining Data. Follow the steps in the table below to determine the data for the polar plot method.

Step	Action
1	FO determines his location and transmits it to the FDC <i>prior to the CFF</i> in the form of a POSREP. For example, <i>R2S, this is PS1, POSREP Grid 213-415, over.</i>
2	Determine the OT direction to the nearest 10 mils grid.
3	Determine the distance to the target to the nearest 100 meters.

Grid Mission. The FO can locate a target by using the grid system of the military map. If the FO has conducted a thorough terrain/map study, the grid method of target location is recommended. The firing unit does not have to know the FO's position. The FO locates the target to an accuracy of 100 meters (six digit grid).

The Call for Fire

Once you have determined the data required to communicate target location to the FDC, you can start putting together a call for fire. The call for fire is a concise message containing the data necessary to put artillery or mortar rounds on a target. The FO prepares the call for fire and transmits it as a request, not an order. The CFF is sent quickly, but clearly enough to be understood, recorded, and read back without error by the FDC. The call for fire consists of six elements sent in three transmissions with a break and a read back after each part. The three transmissions break down into the six elements as shown in the table below.

Transmission	Elements
First	(1) Observer identification (2) Warning order
Second	(3) Target location
Third	(4) Target description (5) Method of engagement (6) Method of fire and control

**Common Abbreviations in a CFF transmission:

- "k" → "over" or "out"
- "de" → "this is"
- "i/o" → "in the open"
- "i/a" → "in the adjust"
- "i/e" → "in the effect"

The Call for Fire (Continued)

Now let's look at each transmission in detail.

First Transmission [(1) Observer Identification and (2) Warning Order]

- **Observer Identification.** The first element lets the FDC know who is calling for fire and clears the net for the fire mission. Once given, call signs are omitted from subsequent transmissions unless other FOs are conducting missions simultaneously.
- **Warning Order.** The second element consists of the
 - Type of mission
 - Method of target location

The table below describes the two types of missions.

Type of Mission	Description
Adjust Fire	• Announced when the FO decides that an adjustment is needed because of questionable target location • One gun fires one round at a time until the round is close enough for the entire firing unit to engage the target. • Avoids wasted ammunition, but may allow the enemy time to leave the target area or seek cover
Fire for Effect	• Announced when the FO has an accurate target location and is certain that the first volley will have an effect on the target • All guns of the firing unit fire simultaneously • FO should strive for first round fire for effect

- **Method of target location.** If the FO is using either the polar plot method of target location, he announces "polar" after the type of mission.

Note: The FO does not need to announce "grid" because this is the default method of target location.

The Call for Fire (Continued)

First Transmission Examples. The table below provides examples of first transmissions.

Situation	First Transmission
Situation 1: Adjust Fire – Grid Method **Note: Did not announce “grid”	FO: <i>R2S, this is P31, adjust fire, over.</i> FDC: <i>P31, this is R2S, adjust fire, out.</i>
Situation 2: Adjust Fire – Polar Plot Method	FO: <i>R2S, this is P31, adjust fire, polar, over.</i> FDC: <i>P31, this is R2S, adjust fire, polar, out.</i>

Second Transmission [(3) Target Location]. The third element is target location. The FO provides the FDC with the target location data that he determined using either the grid, or polar plot method. The observer transmits the target location data as described in the table below.

Location Data Method	Transmission
Grid	The FO announces the word, “Grid,” followed by the six-digit coordinate of the target.
Polar Plot	The FO announces the word, “Direction,” followed by the four-digit OT direction in mils grid (e.g., 1680), and then the word, “Distance,” followed by the OT distance to the nearest 100 meters (meters is understood).

Second Transmission Examples.

Situation	Second Transmission
Situation 1 Continued: Adjust Fire – Grid Method	FO: <i>Grid 347 689, over.</i> FDC: <i>Grid 347 689, out.</i>
Situation 2 Continued: Adjust Fire – Polar Plot Method	FO: <i>Direction 1680, distance 3500, over.</i> FDC: <i>Direction 1680, distance 3500, out.</i>

Third Transmission [(4) Target Description, (5) Method of Engagement, (6) Method of Fire and Control]

Target Description. The target description should provide enough detail to enable the FDC to determine the amount and type of ammunition to be used. The FO’s description should be brief, but accurate, and contain the:

- Type of target (troops, supply dump, trucks)
- Target activity (digging in, assembly area)
- Number of elements in the target (squad, three trucks)
- Degree of protection (in the open, in fighting holes, in bunkers with overhead cover)

Method of Engagement. Method of engagement is the element that the FO uses to describe the attack of the target. The options used at The Basic School are “Danger close” and Ammunition.

The Call For Fire (Continued)

Danger close. “Danger Close” is included when the predicted impact of

- A mortar or artillery round is within 600 meters of friendly troops
- A 127mm round (Naval Guns) is within 750 meters of friendly troops

When alerted that the target is danger close, the FDC will take added precautions in the delivery of fires. Ranges beyond 600m have a 99 percent assurance that a casualty producing hit on friendly troops will not occur. THIS DOES NOT MEAN that the mission will not be approved or that fires should not be planned closer than 600/750 meters because there are greater risks that can be taken based off the type caliber of ammunition, the distance at which it is fired, and what tools/observers are being used to call for fire.

- Ammunition. An FO has several types of ammunition available. It is preferred that the observer request the shell fuze combination that is best suited to the type of target you are attacking but the fire support agency will ultimately choose the best type of ammunition based off of a variety of things. However, one of the most important things that agency will go off of is the TARGET DESCRIPTION the observer gives (quantitative and accurate).
 - The standard type of ammunition is HE/Q. The FO must specifically request nonstandard projectiles or fuzes. For example, “ICM” (projectile) or “VT in effect” (fuze). The term, “in effect,”
 - Indicates that the projectile/fuze specified is desired during the fire for effect phase
 - Is only included in an “Adjust Fire” mission

Method of Fire and Control.

- Method of fire. Not used at The Basic School, method of fire is an advanced technique that allows the FO to control the specific weapon and sequence of firing during adjustment and fire for effect.
- Method of control. In the absence of a specified method of control, fire missions are executed “When Ready.” Two other options you may use at The Basic School are “At My Command (AMC) and Time on Target (TOT).”
 - “At my command.” If the FO wants to control the time of delivery of fire, he announces, “At my command” in the method of control. When the pieces (weapons) are ready to fire, the FDC announces, “Section/platoon/battery/battalion is ready, over.” (Call signs are used.) The FO may also request the time of flight of the rounds in order to improve the timing of impact. The FO announces, “Fire,” when he is ready for the pieces to fire (this only applies to adjusting rounds and the first volley of the fire for effect). “At my command” remains in effect during the mission until the FO announces, “Cancel At My Command, over.”

The Call For Fire (Continued)

- “Time on target” (TOT). TOT is a method of firing on a target in which the unit times its fire so that the initial round strikes the target at the time specified by the FO. For example, “TOT 45” (rounds impact at 45 minutes past the hour).

Third Transmission Examples.

Situation	Third Transmission
Situation 1 Continued: Adjust Fire – Grid Method (FO wants to adjust with HE/Q then fire for effect with WP.)	FO: Five trucks refueling in the open, WP in effect, over. FDC: Five trucks refueling in the open, WP in effect, out.
Situation 2 Continued: Adjust Fire – Polar Plot Method (The target is danger close. FO wants HE/Q.)	FO: Infantry platoon in the open, danger close, over. FDC: Infantry platoon in the open, danger close, out.

Correction of Errors

Errors are sometimes made by the FO in transmitting data FDC personnel in reading back the data. If the FO realizes that an error has been made, he announces, “Correction,” and then transmits the entire corrected transmission.

Example. The FO transmits, “Direction 2100, distance 2000, over.” The transmission should have been “Direction 2100, distance 3000, over.” To correct the error, the FO transmits, “Correction, direction 2100, distance 3000, over.”

The Message to Observer

After receiving the CFF, the FDC determines how the target will be attacked. Remember, a CFF is a request, not an order. The FDC’s decisions are announced to the FO in the form of an MTO, which the FO reads back. The MTO should be sent to the FO before the first correction is made. At a minimum the MTO will contain the:

- Unit(s) to fire
- Changes to the call for fire
- Number of rounds
- Target number

Unit(s) to Fire. This portion of the MTO refers to the section, platoon, battery, or battalion that will fire the mission. If the battalion is firing for effect with one battery adjusting, the FDC designates the fire for effect unit (battalion) and then the adjusting unit (battery) by using the last letter of the call sign.

Example. Battery (call sign, R6G) will adjust and the battalion (call sign, A8T) will fire for effect. The MTO will begin, “Message to observer, G...”

The Message to Observer

Changes to Call for Fire. Any changes to the FO's request in the CFF are announced.

Example. The FO requested ICM in effect, and the FDC decides to fire VT in effect. The MTO will begin, "Message to observer, T, VT in effect..."

Number of Rounds. This is the number of rounds per tube in the fire for effect.

Target Number. A target number is assigned at the FDC to each mission in order to facilitate the processing of subsequent corrections.

Example.

FDC: Message to observer, T, VT in effect, four rounds, target number AA 7732, over.

FO: Message to observer, T, VT in effect, four rounds, target number AA 7732, out.

The FO reads the MTO back to the FDC verbatim. In this MTO, the artillery battalion (call sign A8T) will fire for effect, four rounds per tube (6 tubes per battery, 3 batteries per battalion—so 18 tubes in artillery battalion). Thus, $(18) \times (4) = 72$, a total of 72 rounds of HE/VT will land during the fire for effect.

Reports Upon Firing

There are three reports that will be sent by the FDC during a fire mission. They include:

Shot. The firing unit will transmit "Shot" after each round fired in adjustment and the initial round in the fire for effect phase

The FO acknowledges each.

Example.

FDC: Shot, over.

FO: Shot, out.

Splash. When requested by the FO (in the 3rd transmission), "Splash" is called from the FDC to inform the FO when his round is five seconds from detonation. When reported, "Splash" should be transmitted for each round in adjustment and the initial round in each volley of the fire for effect.

- Allows the FO to remain under cover and concealment while awaiting the fires, thus enhancing his survivability
- Helps the FO to identify his rounds if other fire missions are being conducted in the area.

Adjustments of Fire

After the initial round bursts, a “spotting” is made, and a “correction” is transmitted to adjust the fires onto the target. On satisfactory adjustment, the FO enters the fire for effect phase.

Spottings (what you see). A spotting is the FO’s mental determination of the location of the burst relative to the target. Spottings are recorded, but not announced. Spottings must be made the instant that the burst occurs, except where deliberately delayed to take advantage of drifting smoke or dust.

The FO should position his binoculars for spotting before the burst appears by holding the binoculars just below eye level, looking over the top of them with the naked eye until the burst is sighted. Then raise the binoculars to eye level and makes the spotting

Spottings are made for:

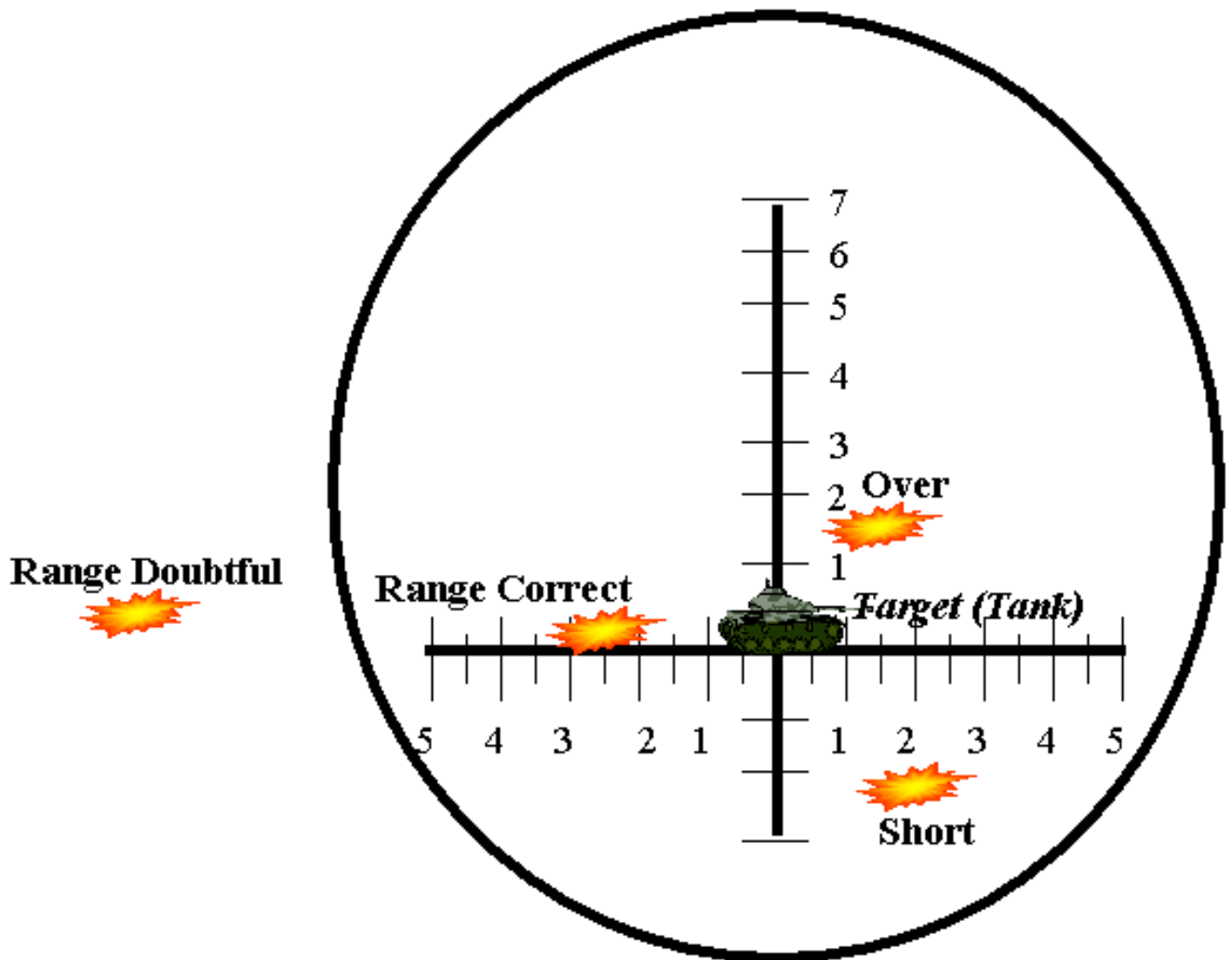
- Range, to determine how far a burst is beyond or short of the target
- Deviation, to determine how far a burst is to the right or left of the OTL

The FO should spot first for range and then for deviation.

Range Spotting. Definite range spottings are required to make a proper range adjustment. A graphic portrayal of range spotting is shown below. Normally a burst on or near the OTL provides a definite spotting. The FO can make a definite range spotting when the burst is not on or near the OTL by using his knowledge of the terrain, drifting smoke, and shadows. The four possible range spottings are:

- Over: Round detonates beyond the target
- Short: Round detonates between the FO and the target
- Range correct: Round detonates at the same range as the target
- Range doubtful: Round detonates so far to the right or left of the OTL that a definite range spotting cannot be made

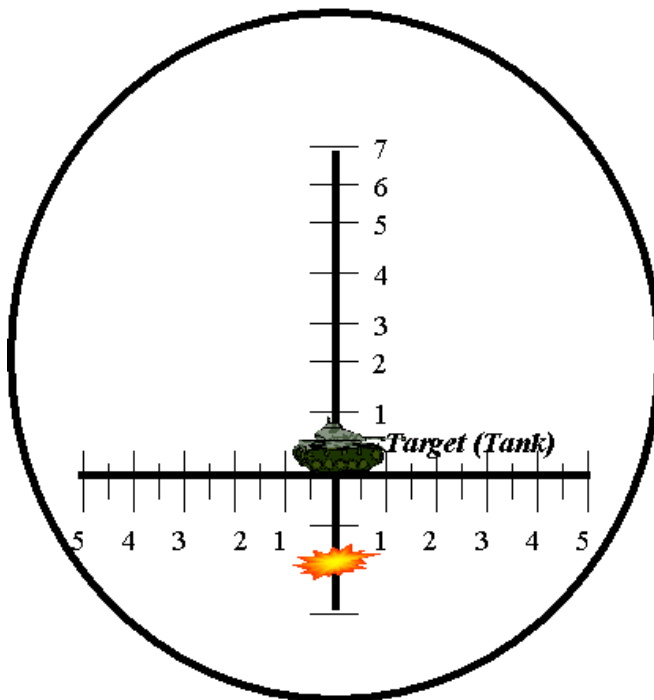
Adjustments of Fire (Continued)



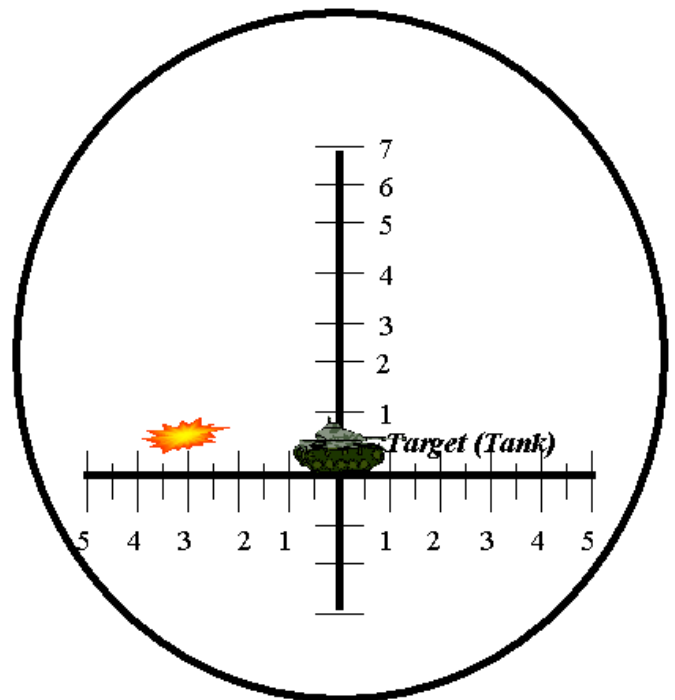
Deviation Spotting. Deviation spottings (see diagram below) determine the angular amount of deviation (measured in mils) from the burst to the target. During a fire mission, the FO measures deviation to the nearest five mils. The three possible deviation spottings are:

- On line: Round detonates along the OTL
- (# of mils) left: Round detonates to the left of the OTL
- (# of mils) right: Round detonates to the right of the OTL

Adjustments of Fire (Continued)



Deviation Spotting – On-Line



Deviation Spotting – 30 Left

Corrections (what you want the round to do and say over the radio). After recording a spotting, the FO determines a correction to move the next round onto the target. Corrections are sent in:

- Meters
- Reverse order of the spotting: deviation followed by range

Corrections can also include appropriate changes to the elements included in the initial CFF.

Sequence of Subsequent Corrections. The table below shows the proper order for subsequent corrections so that you are able to organize your transmissions in a logical flow.

Sequential Order	Correction
1	Direction
2	Danger close
3	Shell
4	Fuze
5	Deviation
6	Range
7	Target description
8	Change in type of mission/control
9	Splash
10	Repeat

Adjustments of Fire (Continued)

Direction. Direction remains a key element for adjustment of rounds. Direction precedes all other subsequent corrections when announced. If direction was not included in the call for fire (i.e., grid mission), it can be sent:

- Immediately after the CFF
- While reading back the MTO
- With the first correction

Refinement or changes to direction are made when the original direction changes by 100 mils or more.

Deviation corrections. The table below lists the steps to determine deviation corrections.

Step	Action	Example																								
1	Determine the observer-target (OT) factor. The OT factor is based on the mil relation formula and is defined as the OT distance divided by 1000. When the OT distance is - Greater than 1000 meters, the OT factor is expressed to the nearest whole number - Less than 1000 meters, the OT factor is expressed to the nearest tenth	- OT distance = 2400 meters = $2400/1000 = 2.4$, express to 2; OT factor = 2 - OT distance = 800 meters = $800/1000 = 0.8$, OT factor = 0.8																								
2	Multiply the deviation spotting by the OT factor. Express to the nearest 10 meters with the minimum correction being 30. The direction of the deviation correction is opposite that of the spotting. The computed deviation correction is announced as "left" or "right" followed by the number of meters.	<table><tr><th>OT Distance (m)</th><th>OT Factor</th><th>Spotting</th><th>Deviation Correction</th></tr><tr><td>4000</td><td>4</td><td>45 right</td><td>"Left 180"</td></tr><tr><td>2500</td><td>2</td><td>100 left</td><td>"Right 200"</td></tr><tr><td>3400</td><td>3</td><td>55 left</td><td>"Right 160"</td></tr><tr><td>1500</td><td>2</td><td>20 right</td><td>"Left 40"</td></tr><tr><td>700</td><td>0.7</td><td>45 left</td><td>"Right 30"</td></tr></table>	OT Distance (m)	OT Factor	Spotting	Deviation Correction	4000	4	45 right	"Left 180"	2500	2	100 left	"Right 200"	3400	3	55 left	"Right 160"	1500	2	20 right	"Left 40"	700	0.7	45 left	"Right 30"
OT Distance (m)	OT Factor	Spotting	Deviation Correction																							
4000	4	45 right	"Left 180"																							
2500	2	100 left	"Right 200"																							
3400	3	55 left	"Right 160"																							
1500	2	20 right	"Left 40"																							
700	0.7	45 left	"Right 30"																							

Range corrections. The FO must be aggressive in his adjustment—striving to enter fire for effect as soon as possible. To accomplish this, the FO makes range corrections along the OTL. Range corrections consist of the following commands:

- “Add (number of meters)” to move burst away from the FO
- “Drop (number of meters)” to move burst closer to the FO

Range corrections are transmitted in multiples of 100 meters with the smallest correction being 100 meters. However, a 50-meter correction is used when entering fire for effect. The four methods of conducting range corrections are:

- Hasty bracketing
- On-round adjustment
- Creeping fire
- Successive bracketing

Adjustments of Fire (Continued)

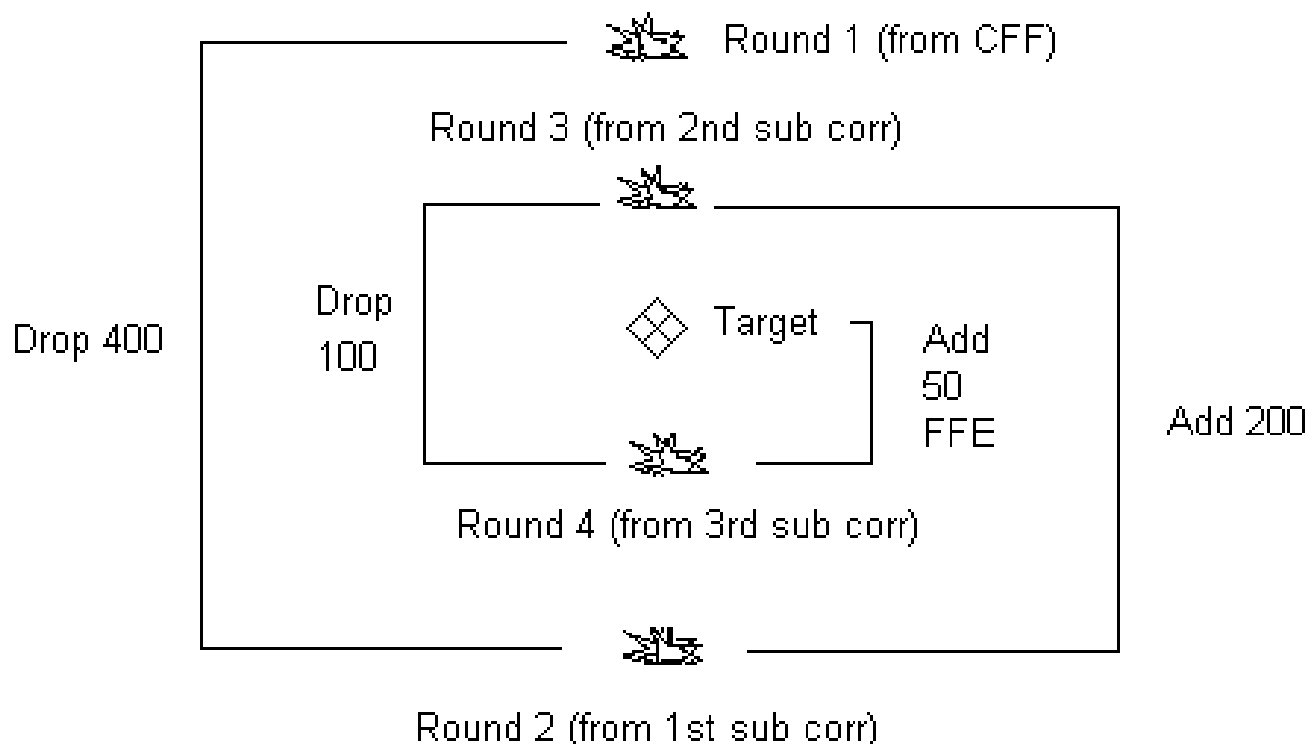
The only method used and evaluated at The Basic School is successive bracketing discussed below.

Successive bracketing. After a definite range spotting of “over” or “short” has been determined, the FO selects a range correction that is sufficiently large to ensure that the next round’s impact is on the opposite side of the target. The objective here is a bracket—defined as one round over the target and one round short of the target.

To determine the **initial** range correction, the FO uses the range bracketing guide provided below. Once a bracket has been established, subsequent range corrections are split in half, always moving the next burst toward the target. The FO continues this process until a 100-meter bracket is established around the target. He then adds or drops 50 (with a deviation correction as required) and enters the fire for effect phase.

Range Bracketing Guide	
OT Distance (in meters)	Range Correction
0 – 1000	Add/drop 100
1000 – 2000	Add/drop 200
Greater than 2000	Add/drop 400

The diagram below shows an example of successive bracketing (OT distance equals 2600 meters).



Round	Spotting	Correction
1	Over, on line.	"Drop 400, over."
2	Short, on line.	"Add 200, over."
3	Over, on line.	"Drop 100, over."
4	Short, on line.	"Add 50, fire for effect, over."

Adjustments of Fire (Continued)

Fire for Effect Phase.

Entering Fire for Effect. The fire for effect phase is entered:

- When the deviation and range are correct
- If effective fire will result when the range bracket is split

The FO specifically enters the fire for effect phase when

- An adjusting round has an effect on the target
- Splitting a 100-meter bracket

To enter the fire for effect phase, the FO announces, "Fire for effect," preceded by any corrections.

Example.

"Fire for effect, over."

"Right 30, add 50, fire for effect, over."

Following Fire for Effect. The FO analyzes the results of the fire for effect. The situation may require additional rounds to be fired on the same location or on a different location:

Repeat	If additional fire is needed, the FO announces, "Repeat." The term, "Repeat," indicates the FO's desire to use the same volume of fire.
Adjust the Point of Impact	If the location of the fire for effect needs to be moved to achieve satisfactory results, the FO • Announces the appropriate corrections (refinement) and "Repeat" • May reenter adjust fire

Example.

"Right 100, repeat, over."

"Add 400, adjust fire, over."

Ending a Fire Mission

On achieving the effects desired on the target, the FO should transmit an end of mission statement to the firing unit. Four items are included in the end of mission or RREMS statement:

- **Refinement**
- **Record as target**
- **End of Mission**
- **Surveillance**

Refinement. If fires have been inaccurate but have produced sufficient results, the FO transmits a refinement to the FDC. Refinements are sent in increments of 10 meters and may be less than 30 meters.

Record as Target. If the FO wants the target to be plotted for future use, he announces, "Record as target." The FDC:

- Applies the refinement
- Conducts a replot, when necessary
- Announces the adjusted grid to the target

The target number will be the same target number that was provided in the MTO.

End of Mission. "End of mission" followed by surveillance is the last transmission in the course of the fire mission. Once it has been announced, the mission is considered to be terminated.

Surveillance. Surveillance should be brief but should provide casualty and/or damage information as accurately as possible. This requires the correct usage of the terms, "destroyed," "neutralized," and "suppressed."

Example:

1) "End of mission. BMP neutralized, estimate six casualties over."

Or

2) "Right 20, add 20, record as target, end of mission, three trucks destroyed, estimate 15 casualties, over."

**Both are correct

Call For Suppressive Fires

In addition to adjust fire and fire for effect missions, an FO can also call for suppressive fires. Suppressive fires are delivered as

- An immediate suppression mission: used to fire on a planned target or target of opportunity that has taken friendly units under fire
- A suppression mission: used to fire on a planned target that is not currently active

Firing on a planned target is more responsive than firing on a target of opportunity. Both immediate suppression and suppression missions yield suppressive results only during the time when fire is being delivered. Thus, the maneuver unit must do something while the suppressive fires are impacting. For example, maneuver against the target, position the FO to adjust fire on the target, or bypass the target. At The Basic School you will be evaluated on your understanding of the immediate suppression mission. Information on the suppression mission is not testable.

Immediate Suppression. An immediate suppression mission normally requires a minimum volume of fire. Unit SOP establishes the:

- Type of ammunition
- Units to fire
- Volume

For example, mortar platoon, one round of HE/PD, one round of HE/VT.

This call for fire is sent in one transmission. The call for fire consists of the:

- Observer identification
- Warning order "immediate suppression"
- Target location

There is no MTO and no RREMS statement.

Example.

FO: This is W2P, immediate suppression, grid 221 432, over.

FDC: W2P, this is R2S, immediate suppression, grid 220 432, out.

Suppression. The suppression mission consists of the:

- Observer identification
- Warning order "suppress"
- Target number of the planned target
- Duration and rate of fire

This call for fire is sent in one transmission.

Example.

FO: R2S, this is W2P, suppress AB3104, four minutes, four shells per minute, over.

FDC: W2P, this is R2S, suppress AB3104, four minutes, four shells per minute, over.

Additional Information

At The Basic School, you are expected to apply the rules of successive bracketing during adjustment of indirect fire. Successive bracketing is the only technique that mathematically guarantees you will have effects on target. However, successive bracketing has its disadvantages. Three alternate techniques for adjusting indirect fire onto a target are discussed below. These techniques are introduced for your information and are not testable.

Hasty Bracketing. Experience has shown that effectiveness on the target decreases as the number of rounds used in adjustment increases, due to the loss of surprise. An alternative to successive bracketing is hasty bracketing. In this technique, the FO uses an initial bracket as a yardstick to determine a correction necessary to move the next round(s) onto the target in fire for effect. Hasty bracketing can achieve effective results depending on the:

- Nature of the target
- Terrain
- Firing unit's proficiency
- FO's experience

One Round Adjustment. One round adjustment does not require the establishment of a bracket. The FO:

- Spots the location of the first round
- Calculates and transmits a correction that is necessary to move the next burst on to the target
- Fires for effect

One round adjustment requires an experienced FO who is familiar with the terrain. This technique can be used when:

- Insufficient time exists for adjustment
- The FO is equipped with a laser range finder
- The continued support adjustment of fire may endanger the FO

Creeping Fire. The creeping fire method of adjustment is used when the FO desires to make range corrections by creeping the rounds closer to the target instead of bracketing or making large corrections. Creeping fire method of adjustment is always used in danger close missions. In danger close situations, the FO must keep in mind the position of the friendly troops to ensure that a correction will not cause rounds to endanger them. This may be applicable in situations where lost rounds are likely. For example, adjust onto a target location on the topographic crest of a hill. The FO makes corrections for creeping fire in 100-meter increments or less while moving rounds toward friendly forces. All mortars that will fire for effect are used in adjustment.

Call for Fire Worksheets

This worksheet is designed to prepare you for the B2C2497 Call for Fire, classroom instruction, B2C2617 Call for Fire Practical Application, and B2C3097 Call for Fire Field Firing Exercise/Close Air Support Demonstration. You should make use of the B2C2497 Call For Fire student handout to locate the answers to the questions contained in this worksheet. Upon completion of the worksheet, you will be better prepared for subsequent instruction and more familiar with the indispensable warfighting skill of calling and adjusting indirect fire.

1. What are the three elements of the Fire Support System?

2. A mil is a unit of angular measurement equal to
1/_____ of a circle.

3. Why do artillery and mortars use mils instead of degrees?

4. To convert degrees to mils, we multiply the number of degrees by?

5. What is northwest in mils?

6. What are the three methods used to determine observer-target (OT) direction?

7. When the FO determines the azimuth to the target (OT direction) with a compass, the result is in mils _____. Before direction can be sent in a CFF, the FO must apply the _____ in order to convert to mils _____

8. Direction should be determined to an accuracy of _____.

9. Binoculars are one of the FO's best tools to measure angular deviation.

☐ True ☐ False

10. What are two methods used to determine observer-target (OT) distance?

11. Distance is expressed to the nearest _____ meters.

Call for Fire Worksheets (Continued)

12. What are the two methods of communicating target location?

13. The primary disadvantage of the polar plot method of target location is that the FDC must know the FO's _____. The FO transmits this to the FDC in the form of a _____.

14. With the grid method of target location, the FO locates the target to an accuracy of _____ by sending _____ digit grid.

15. In which method(s) of target location is the FO's position not needed by the FDC?

- a. Grid
- b. Polar
- c. A and B

16. When using the grid method of target location, the FO must transmit _____ to the FDC prior to the first correction.

17. The CFF has _____ elements and is sent in _____ transmissions.

18. List the elements of the CFF in order.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____

19. The first transmission of the CFF consists of _____ and _____.

20. The second transmission of the CFF consists of _____.

21. The third transmission of the CFF consists of _____, _____, and _____.

22. What are the four types of missions that can be requested at The Basic School?

23. What method of target location is not announced in the first transmission? Why?

24. Explain the difference between an "adjust fire" mission and a "fire for effect" mission.

Call for Fire Worksheets (Continued)

25. In what transmission are "danger close" or a requested shell/fuze combination announced?

26. What is "danger close" for mortars and artillery?

27. What would the FO announce if he wanted to control when the firing unit fires?

28. What would the FO announce if he wanted the rounds to impact at a specific time?

29. What type of artillery round contains 88 small grenade-like shaped charges and is effective against area personnel targets and armored vehicles?

30. What fuze should be requested for effects against troops in fighting holes or trenches?

31. What fuze should be requested for troops in heavy vegetation or with overhead cover?

32. What shell should be requested in order to have an incendiary effect on combustible targets such as a refueling station?

33. What shell is MOST effective for obscuration and screening?

34. What are the four elements of the message to observer (MTO)?

35. What should the FO do upon receipt of the MTO?

36. Unscramble the following information contained in a MTO: (Target #AB2067, B, 2 rounds, ICM, over, MTO).

37. When an adjusting round or the first round in the fire for effect is fired by the firing unit, the FDC announces

38. What is "splash"?

Call for Fire Worksheets (Continued)

39. After the initial round bursts, a _____ is recorded and then a _____ is transmitted to the FDC in order to adjust the rounds onto the target.

40. What are the *four* possible range spottings?

41. What are the three possible deviation spottings?

42. Deviation spottings are made to the nearest _____ mils.

43. What is the "OT factor"?

44. The method we use for range corrections (type of bracketing) at The Basic School is _____.

45. Define a "bracket."

46. What is the minimum deviation correction sent to the FDC during the adjustment phase?

47. Given the OT distances below, compute the OT factors:

a. Range 1300, OT Factor =

b. Range 6400, OT Factor =

c. Range 900, OT Factor =

d. Range 2200, OT Factor =

48. What are the *two* possible range corrections?

49. What is the minimum range correction sent to the FDC during the adjustment phase?

50. Once a bracket has been established, what will the FO do to each subsequent range correction?

Call for Fire Worksheets (Continued)

51. What are the *three* conditions that allow us to *enter the fire for effect phase*?

52. What are the *four* elements of the RREMS statement?

53. Unscramble the following elements of a RREMS statement (end of mission, infantry platoon neutralized, over, add 40, left 10, record as target, estimate 11 casualties).

Call for Fire Worksheet Answers

1. Forward Observer (FO), Fire Direction Center (FDC), Firing Unit
2. 6400
3. Accuracy and the mil relation formula's ability to easily convert angular deviation into lateral distance.
4. 17.8
5. 5600
6. (1) Scaling from a map
(2) Lensatic compass
(3) Measuring from a reference point
7. magnetic, GM angle, grid
8. 10 mils
9. True
10. Estimation, Visibility, Map Study
11. 100 meters
12. (1) Polar Plot
(2) Grid Coordinates
13. position / location, POSREP
14. 100 meters, six
15. a. A
16. direction
17. six, three
18. (a) Observer Identification
(b) Warning Order
(c) Target Location
(d) Target Description
(e) Method of Engagement
(f) Method of Fire and Control
19. Observer Identification, Warning Order
20. Target Location
21. Target Description, Method of Engagement, Method of Fire and Control
22. Adjust Fire, Fire for Effect, Immediate Suppression, Suppression
23. Grid, because it is the standard method of target location
24. Adjust Fire – announced when the FO decides an adjustment is needed because of questionable target location. One gun fires one round at a time until the round is close enough for the entire firing unit to engage the target. Fire for Effect – announced when the FO has an accurate target location and is certain that the first volley will have effect. All guns of the firing unit fire simultaneously.
25. Third transmission
26. 600
27. "At my command"
28. "Time on Target" / "TOT"
29. Improved Conventional Munitions (ICM)
30. Variable Time (VT) for artillery or Proximity (prox) / Near Surface Burst (NSB) for mortars
31. HE / Delay
32. HE / White Phosphorous (WP)
33. Smoke – M825 (fired by artillery only)
34. Unit(s) to Fire, Changes to the Call for Fire, Number of Rounds, Target Number
35. Read it back verbatim
36. MTO, B, ICM in effect, 2 rounds, Target # AB 2067, over.
37. "Shot, over"
38. Transmission that informs the FO when his round is five seconds from detonation.
39. spotting, correction
40. Over, Short, Range Correct, Range Doubtful

Call for Fire Worksheet Answers (Continued)

- 41. Left, Right, On-Line
- 42. 5 mils
- 43. Observer-Target Factor is defined as the OT Distance divided by 1000. When OT Distance is greater than 1000 meters, the OT Factor is expressed to the nearest whole number. When OT Distance is less than 1000 meters, the OT Factor is expressed to the nearest tenth. The OT Factor is used to convert deviation spottings into deviation corrections.
- 44. Successive Bracketing
- 45. One round over the target, one round short of the target.
- 46. 30 meters
- 47. (a) 1
(b) 6
(c) 0.9
(d) 2
- 48. Add, Drop
- 49. 100 meters – except when entering the fire for effect phase
- 50. Split the range correction in half
- 51. (1) When an adjusting round has effect on the target
(2) When splitting a 100-meter bracket
(3) IF YOU HAVE ACCURATE TARGET LOCATION (known grid and/or direction/distance of the target)
- 52. Refinement, Record as Target, End of Mission, Surveillance
- 53. Left 10, Add 40, Record as Target, End of Mission, Infantry platoon neutralized, Estimate 11 casualties, over.

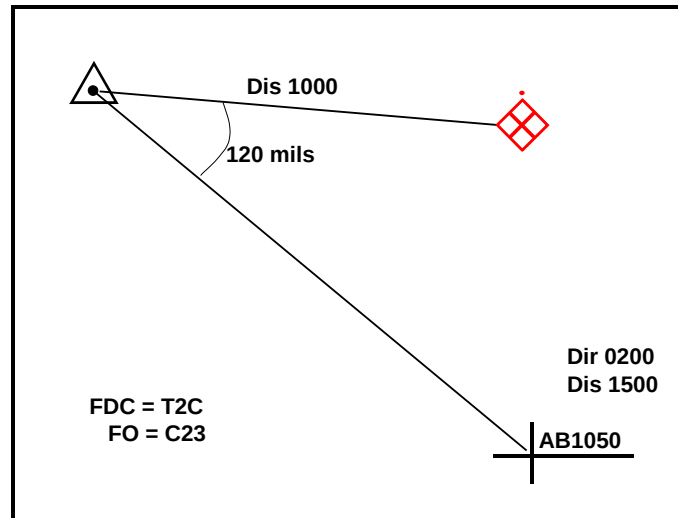
Call For Fire Problems

Section A

Directions: For the problems in this section, using the graphic, fill in your call for fire using the polar method of target location.

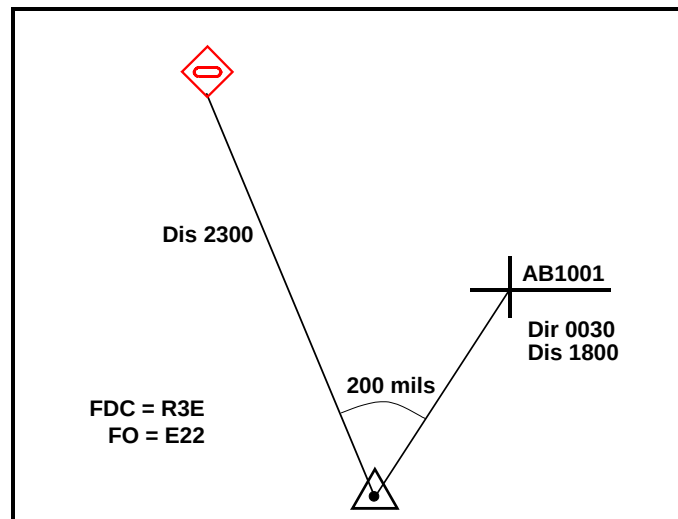
1. Target Description: Infantry squad in the open.

- _____, over.
- Dir _____ Dis _____, over.
- _____, over.



2. Target Description: Tank in the open.

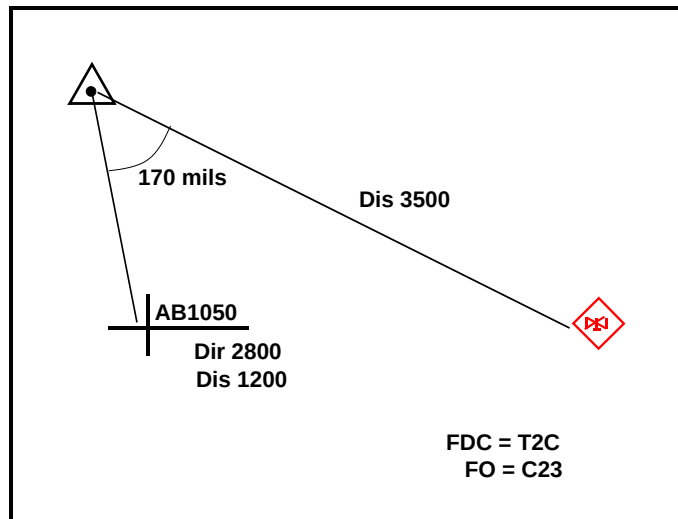
- _____, over.
- Dir _____ Dis _____, over.
- _____, over.



Call for Fire Problems (Continued)

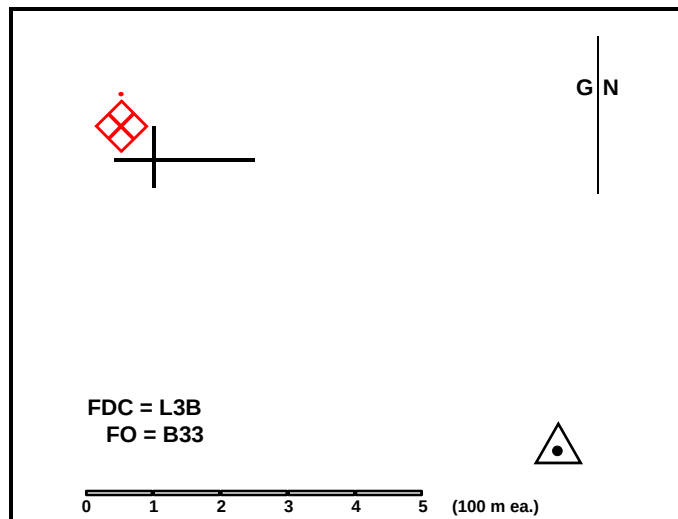
3. Target Description: Helicopters refueling.

- _____, over.
- Dir _____ Dis _____, over.
- _____, over.



4. Target Description: Infantry squad under triple-canopy jungle.

- _____, over.
- Dir _____ Dis _____, over.
- _____, over.



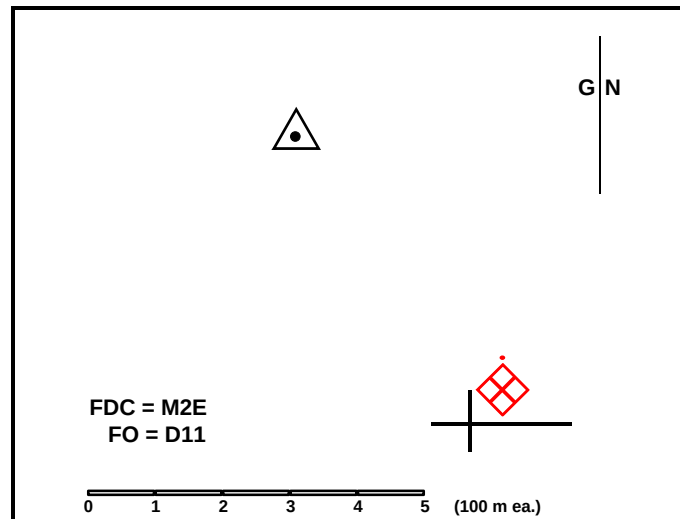
Call for Fire Problems (Continued)

Section B

Directions: For the problems in this section, using the graphic, fill in your call for fire.

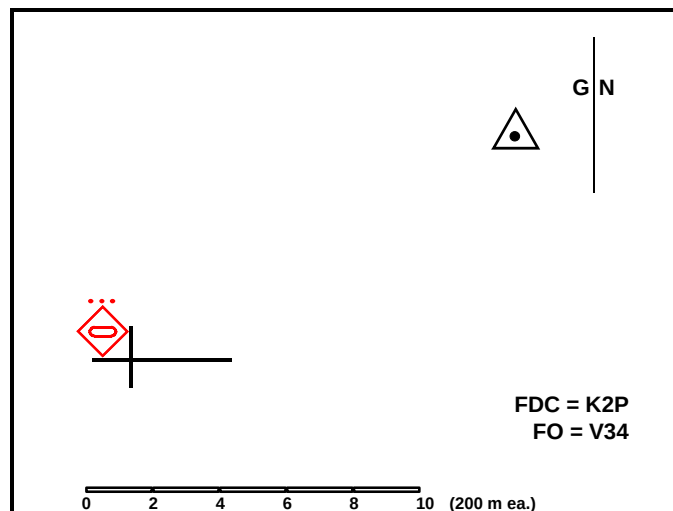
1. Target Description: Machine gun bunker.

- a. _____, over.
b. _____, over.
c. _____, over.



2. Target Description: Platoon of T-64s in the open.

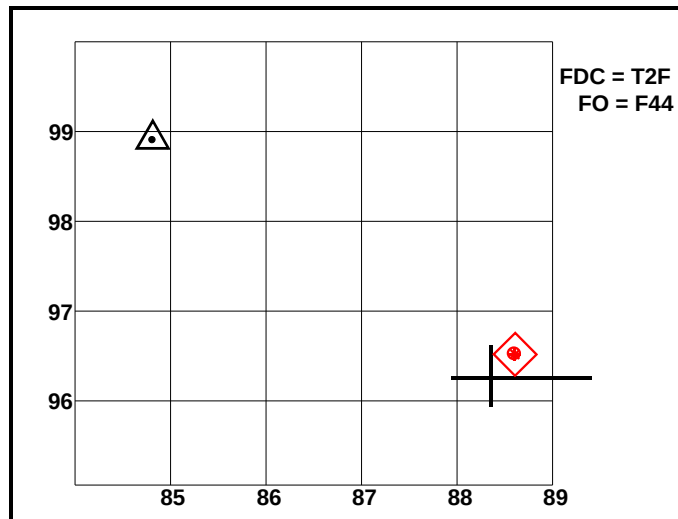
- a. _____, over.
b. _____, over.
c. _____, over.



Call for Fire Problems (Continued)

3. Target Description: Truck with dismounted infantry.

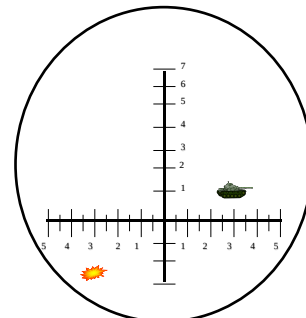
- a. _____, over.
 b. _____, over.
 c. _____, over.



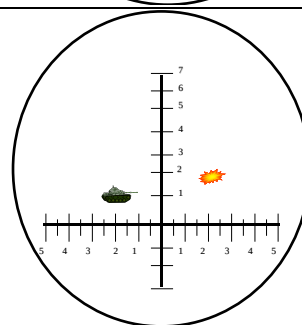
Section C

1. Your initial call for fire has been sent. Each subsequent graphic is what you observe after you have made your correction. OT distance is 2500 meters. Write your spotting and correction for each round.

a.

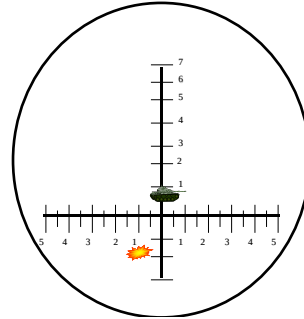


b.

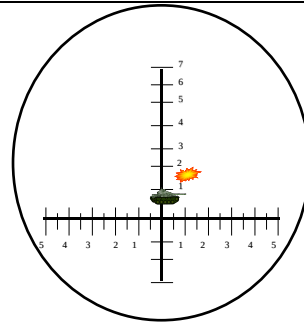


Call for Fire Problems (Continued)

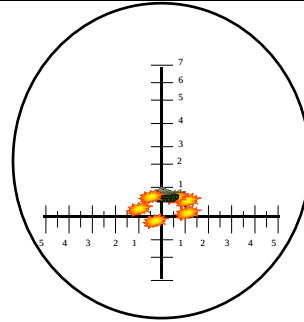
c.



d.



e.



2. Listed below are the OT distance and spotting for the initial round of *four separate missions*. Write the correction you would make based on the spotting.

	OT Distance (in meters)	Spotting	Correction
a.	900	Over, 30 Left	
b.	2300	Short, 20 Right	
c.	3500	Doubtful, 15 right	
d.	1200	Over 20 Left	

Call for Fire Problems (Continued)

Section D

Directions: Using the map on page 40, complete problems 1 through 6 below.

1. You are located at OP 1. Using the polar method, develop a CFF on target #2, a communications installation. Then, using the grid method, develop another CFF on the same target.

Polar Method	Grid Method

What is your OT factor?

You spot your first round as Over, 40 Left. What is your correction?

2. You are located at OP 2. Using the polar method, develop a CFF on target #1, a T-72 tank platoon in the open. Then, using the grid method, develop another CFF on the same target.

Polar Method	Grid Method

What is your OT factor?

You spot your first round as Range doubtful, 210 Left. What is your correction?

3. You are located at OP 1. Using the polar method, develop a CFF to target #7, a D-30 battery. Then, using the grid method, develop another CFF on the same target.

Polar Method	Grid Method

What is your OT factor?

You receive the following transmission, "Message to observer, B, T, 2 rounds, Target # AL2303, over." What does this transmission mean?

Call for Fire Problems (Continued)

4. You are located at OP 2. Determine an immediate suppression mission to target #5, an infantry squad in the open.
 Immediate suppression

5. You are located at OP 1. Using the polar method, develop a CFF to target #3, an infantry platoon entrenched without overhead cover. Then, using the grid method, develop another CFF on the same target.

Polar Method	Grid Method

What is your OT factor?

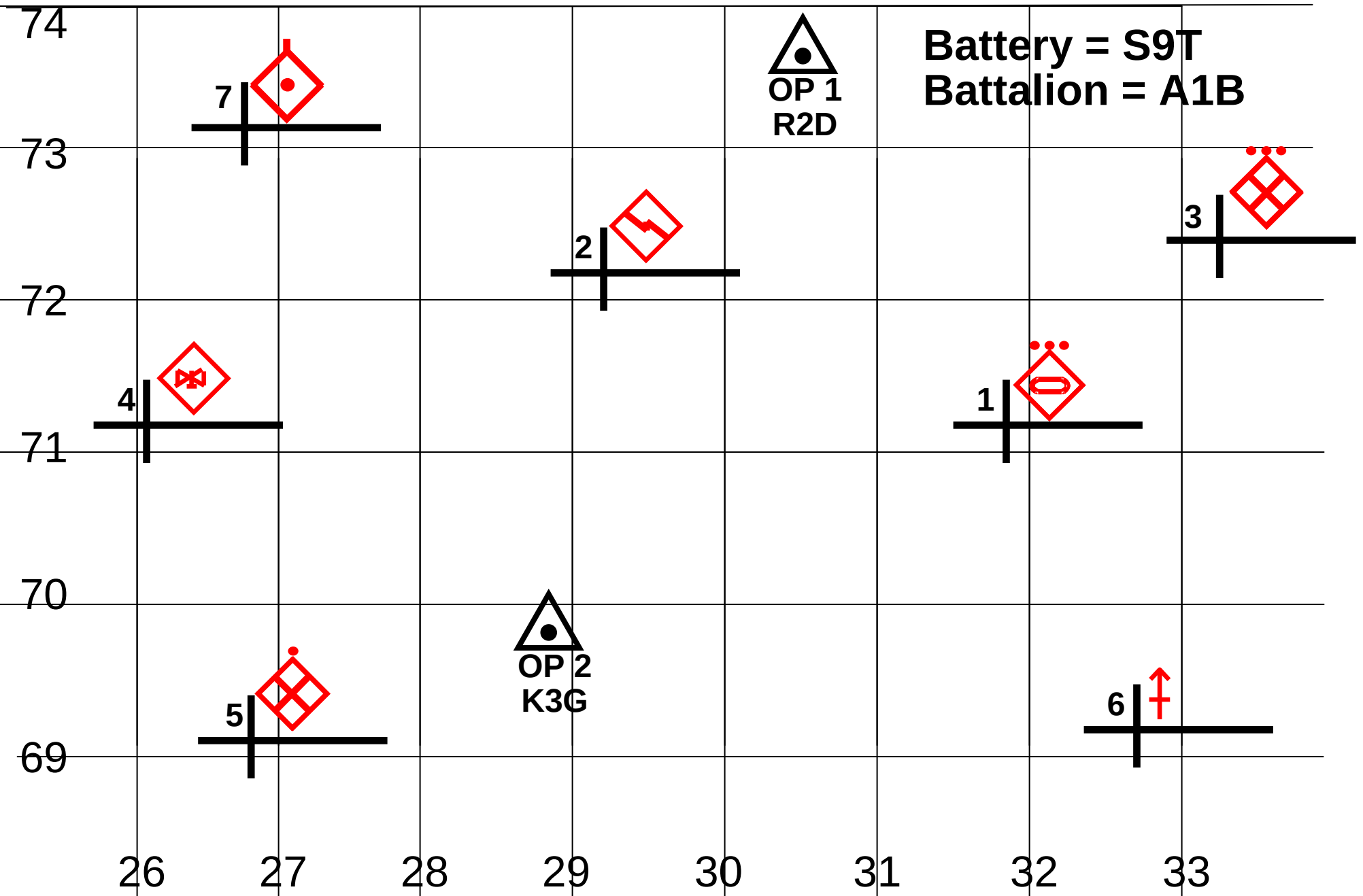
You spot your first round as Short, 30 Right. What is your correction?

6. You are located at OP 2. Using the polar method, develop a CFF to target #6, a machine gun position. Then, using the grid method, develop another CFF on the same target.

Polar Method	Grid Method

What is your OT factor?

You spot your first round as Over, 40 Left. What is your correction?



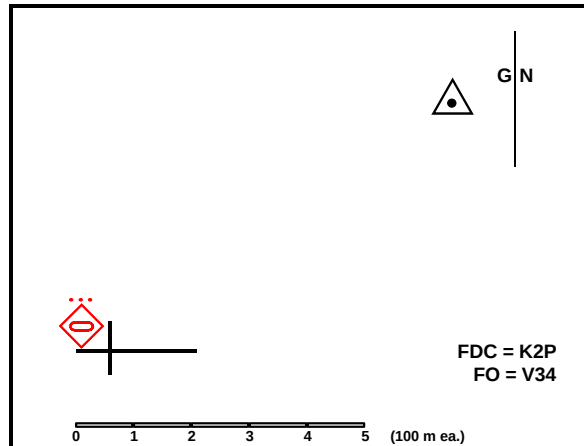
Call for Fire Problems (Continued)

Section E

Directions. Using the graphic (and your protractor, when appropriate), fill in your call for fire.

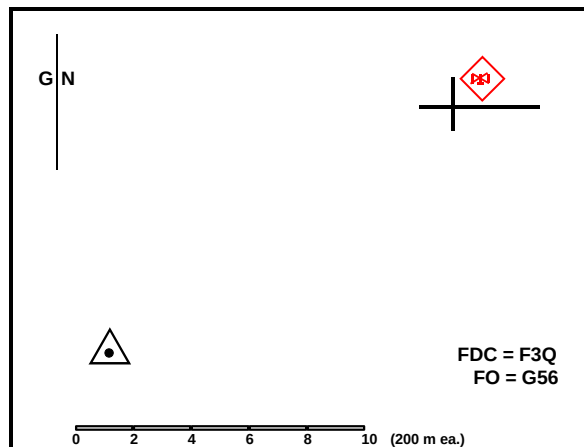
1. Target Description: Platoon T-72s.

- a. _____, over.
 b. Dir _____ Dis _____, over.
 c. _____, over.



2. Target Description: Helicopters refueling.

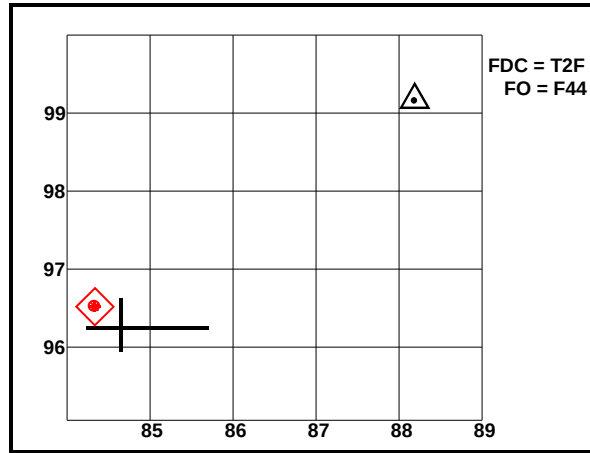
- a. _____, over.
 b. Dir _____ Dis _____, over.
 c. _____, over.



Call for Fire Problems (Continued)

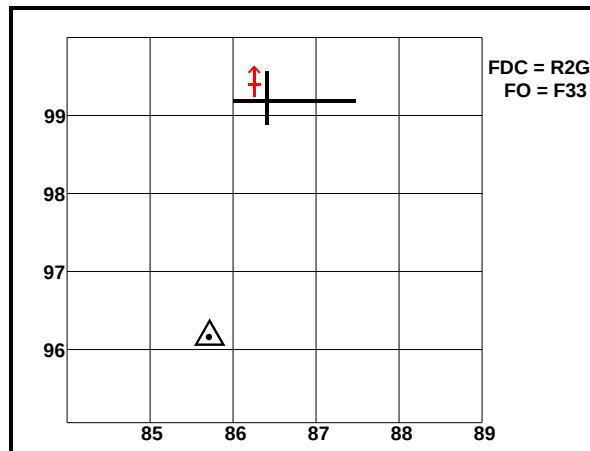
3. Target Description: Truck with dismounted infantry.

- a. _____, over.
 b. _____, over.
 c. _____, over.



4. Develop an immediate suppression mission. Target Description: Machine gun position.

- a. _____, over.
 b. _____, over.
 c. _____, over.



Call for Fire Problems Answers

Section A

1. a. T2C de C23, AF, polar, k.
b. Dir 0080, Dis 1000, k.
c. Inf sqd i/o, k. (VT i/e or Time i/e also correct)
2. a. R3E de E22, AF, polar, k.
b. Dir 6230, Dis 2300, k.
c. Tank i/o, ICM i/e, k.
3. a. T2C de C23, AF, polar, k.
b. Dir 2630, Dis 3500, k.
c. Helos refueling, HE/WP i/e, k.
4. a. L3B de B33, AF, polar, k
b. Dir 5440, Dis 700, k.
c. Inf sqd in triple-canopy jungle, Delay i/e, k.

Section B

1. a. M2E de D11, AF, polar, k
b. Dir 2640, Dis 600, k.
c. MG bunker, Danger Close, Delay i/a, Delay i/e, k.
2. a. K2P de V34, AF, polar, k.
b. Dir 4280, Dis 1400, k.
c. Plt of T-64s i/o, ICM, i/e.
3. a. T2F de F44, AF, k.
b. Grid 883 962, k.
c. Truck w/dism inf, ICM i/e, k

Section C

1.

	Spotting	Correction
a.	S, 60 L	R 120, +400, k.
b.	O, 40 R	L 80, -200, k.
c.	S, 10 L	+100, k.
d.	O, 10 R	-50, FFE, k.
e.	RC, 0 L	EOM, Tank destroyed, Est 3 cas, k.

2.

	Correction
a.	R 30, -100, k.
b.	L 40, +400, k.
c.	L 60, k.
d.	-200, k

Call for Fire Problems Answers (Continued)

Section D

1.

Polar Method	Grid Method
S9T de R2D, AF, polar, k.	S9T de R2D, AF, k.
Dir 3940, Dis 2000, k.	Grid 292 722, k.
Comm Instl, VT i/e, k.	Comm Instl, VT i/e, k.

OT Factor: 2

Correction: R 80, -400, k.

2.

Polar Method	Grid Method
S9T de K3G, AF, polar, k.	S9T de K3G, AF, k.
Dir 1160, Dis 3300, k.	Grid 318 712, k.
T-72 platoon i/o, ICM i/e, k.	T-72 platoon i/o, ICM i/e, k.

OT Factor: 3

Correction: R 630, k.

3.

Polar Method	Grid Method
S9T de R2D, AF, polar, k.	S9T de R2D, AF, k.
Dir 4680, Dis 3800, k.	Grid 267 732, k.
D-30 Btry i/o, ICM i/e, k.	D-30 Btry i/o, ICM i/e, k.

OT Factor: 4

MTO: The battery will fire in adjustment. The battalion will fire for effect, 2 rounds per tube—total of 36 rounds on the deck.

4. de K3G, Immediate Suppression, Grid 268 691, k.

5.

Polar Method	Grid Method
S9T de R2D, AF, polar, k.	S9T de R2D, AF, k.
Dir 2040, Dis 3100, k.	Grid 333 724, k.
Inf plt entrenched, VT i/e, k.	Inf plt entrenched, VT i/e, k.

OT Factor: 3

Correction: L 90, +400, k.

6.

Polar Method	Grid Method
S9T de K3G, AF, polar, k.	S9T de K3G, AF, k.
Dir 1780, Dis 3900, k.	Grid 327 692, k.
MG pos'n, VT i/e, k.	MG pos'n, VT i/e, k.

OT Factor: 4

Correction: R 160, +400 k.

Call for Fire Problems Answers (Continued)

Section E

1. a. K2P de V34, AF, polar, k.
b. Dir 4160, Dis 700, k.
c. T-72 Platoon i/o, ICM i/e, k.
2. a. F3Q de G56, AF, polar, k.
b. Dir 0980, Dis 1500, k.
c. Helos refueling, HE/WP i/e, k.
3. a. T2F de F44, AF, k.
b. Grid 846 963, k.
c. Truck w/dismount inf, ICM i/e, k.
4. de F33, Immediate Suppression, Grid 864 992, k.

References

MCWP 3-16	Fire Support Coordination in the Ground Combat Element
MCWP 3-16.6	Supporting Arms, Observer, Spotter, and Controller

Notes