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**CRITICAL COMBAT PERFORMANCES,  
KNOWLEDGES, AND SKILLS REQUIRED OF THE  
INFANTRY RIFLE PLATOON LEADER**

**Use of Indirect Supporting Fires**

by

**Frank L. Brown**

14 April 1967

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for public release and sale; its  
distribution is unlimited.

**The George Washington University  
HUMAN RESOURCES RESEARCH OFFICE  
operating under contract with  
THE DEPARTMENT OF THE ARMY**

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**Work Unit LEAD: Work Sub-Unit I**

**This document does not represent official opinion or policy  
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**HumRRO Division No. 4  
(Infantry)**

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## FOREWORD

Work Unit LEAD has as its objective the improvement of officer training in the critical skills required for effective combat leadership in small infantry platoons, and is being conducted by the Human Resources Research Office at Fort Benning, Georgia, under the sponsorship of the U.S. Continental Army Command.

In Sub-Unit I, performances, knowledges, and skills required of the leader of an infantry rifle platoon are being identified and categorized according to 46 comprehensive subject areas. This document details the requirements in the area of use of indirect supporting fires.

The LEAD research is being performed at HumRRO Division No. 4 (Infantry), Fort Benning, Georgia. The present Director of Research of the Division is Dr. T.O. Jacobs, who is also the Work Unit Leader. Dr. Carl J. Lange was the Director of Research when the research was begun.

Military support for the study was provided by the U.S. Army Infantry Human Research Unit, Fort Benning, Georgia. LTC Ferdinand O. Barger, Jr. is the present Unit Chief.

HumRRO research is conducted under Army Contract DA 44-188-ARO-2 and under Army Project 2J024701A712 01, Training, Motivation, and Leadership Research.

Meredith P. Crawford  
Director  
Human Resources Research Office

## USE OF INDIRECT SUPPORTING FIRES

### General Considerations

#### Introduction

Lethal, versatile, and highly mobile mortar and artillery fires are an integral part of the system of fires planned and provided for the destruction of enemy targets in combat. The volume, variety, range, and flexibility of indirect supporting fires have increased steadily with technological advances in the design and manufacture of weapons, ammunition, and communications equipment. But the development of the ability of Infantry small-unit leaders to employ available indirect fires has lagged behind technological advances. The junior leaders at fire team, squad, and platoon level are most often in contact with or in close proximity to the enemy. When these small-unit leaders are fully capable of effective employment of all fires available to them, the opportunity to use materiel to the greatest possible extent to accomplish the mission and to conserve human resources can be grasped and fully exploited.

The IRPL and his small-unit leaders frequently will face situations where the fires from all of the platoon's organic weapons will be insufficient to gain the fire superiority required to accomplish the mission. They will also face situations, particularly during patrol missions, where far greater destruction may be wrought upon superior numbers of the enemy if all junior leaders are highly competent in obtaining surprise fire in heavy volume from mortars and artillery. Commanders who assign

missions to rifle platoons habitually plan to use available indirect supporting fires and anticipate the use of these fires by subordinate leaders. For small-unit leaders to attempt to accomplish the mission without employing the indirect fires provided by the commander is unrealistic and the results will often be mission failure, unwarranted friendly casualties, or the escape, unscathed, of enemy that must be faced again. The need to qualify all junior leaders to call for and adjust indirect fires and to ensure that every member of the rifle platoon can recognize and designate targets suitable for engagement by indirect fires stems directly from combat demands.

Frequent engagement with the enemy by separate companies, platoons, and patrols; wide frontages and a lack of safe rear areas common to line-type warfare; monotonous, undeveloped, and inadequately mapped terrain; frequent and rapid movement into distant, unfamiliar terrain with immediate engagement upon arrival; the necessity to fight when visibility is limited by darkness, thick vegetation, inclement weather, dust and smoke; clever enemy use of concealment, cover, and camouflage; the ability of the enemy to gain a local superiority in numbers by using the indigenous population to gain concealment, knowledge of the terrain, and logistical support; and enemy use of ambush and "hugging" or "close embrace" tactics all combine to demand maximum effectiveness by leaders at all echelons in the use of all available fires at every opportunity to deny the initiative to an enemy who habitually avoids contact except when he has an obviously apparent advantage.

Artillery and mortar forward observers and mortar squad leaders accompanying rifle units face the same difficulties encountered by Infantry small-unit leaders and are equally vulnerable to enemy fire, combat stress, and fatigue. When a forward observer is available for attachment to the small unit, his effectiveness will be multiplied many times by the ability of the unit's leaders and men to detect, identify, describe, and designate the locations of enemy targets suitable for engagement with indirect fires. If a forward observer becomes an ineffective casualty or if no forward observer is available, which is often the case with the small patrol, then the Infantry small-unit leader must call for and adjust available indirect fires to destroy or neutralize vulnerable enemy targets if the unit is to accomplish the mission with minimum friendly losses.

The small-unit leaders within the Infantry rifle platoon are not specialists in the adjustment of indirect fire from a specific type of weapon, although forward observer procedure may too often be taught as if this were so. A request for indirect supporting fires from the IRPL or one of his men may be fulfilled from any source available including mortars, artillery, fixed-wing aircraft, armed helicopters, and possibly naval gunfire. Thus the tendency for specialists with any supporting weapon to overemphasize procedures peculiar to their specific weapon must be resisted and the procedures for Infantry small-unit leaders acting as forward observers must be kept as simple as possible and yet remain effective and reasonably safe. That this can be done is evidenced by instances in combat where forward observers and liaison

## Scope

This paper covers the knowledges, skills, and performances required of the IRPL to detect, locate, and identify targets suitable for engagement with mortar and artillery fires; the adjustment, care, and use of binoculars to aid target acquisition, measure horizontal and vertical angles, and spot bursts; the formulation and transmission of calls for fire, the spotting of bursts, application of the mil relation to determine corrections, transmission of corrections, and the surveillance of fire for effect as these procedures apply to the target-grid method of fire control. Range estimation; use of the creeping and bracketing methods of adjustment; the adjustment of deviation, range, and height of burst during illuminating missions; use of WP shell; and the application of combat-tested techniques of fire planning and employment are covered. In addition, the employment of the 81-mm mortar without an FDC is covered to ensure adequate performance by the IRPL when an 81-mm mortar crew is attached to the rifle platoon during semi-independent operations. Directly related material is contained in the papers on Observation, Combat Intelligence, and Reporting; Land Navigation; Mines, Antitank and Antipersonnel, and Warning and Illuminating Devices; Radio Communication; Wire Communication; Visual, Sound, and Tactual Communications; and Infrared Weaponsight and Image Intensification Devices. The material pertinent to fire planning is directly related to all of the papers on tactical operations, including Patrolling. (The designation of targets for attack by armed helicopters and fixed-wing aircraft is covered in detail in Airborne/Airmobile Operations.)

## Materiel

Maps and map substitutes, including sketches and overlays, showing the location of targets, final protective fires, reference points, checkpoints, or other details of fire plans.

Binoculars.

Compass, lensatic, 1-5/8-inch diameter.

Route data cards when checkpoints plotted along any route are to be employed to designate the location of observers or targets to facilitate the delivery of indirect fires.

Radio, wire, and visual communications equipment.

Range cards for organic weapons that include the location and designation of artillery or mortar targets and final protective fires within the sector of responsibility of the weapons operator.

Binoculars, compass, firing charts (maps), firing tables, and communications equipment obtained from any forward observer who becomes an ineffective casualty and cannot be replaced during the conduct of an assigned mission.

The 81-mm mortar and associated fire control equipment, maintenance material, and ammunition and fuzes.

Wheeled and tracked vehicles and helicopters (including sling loads) used for transporting the 81-mm mortar, fire control equipment, maintenance material, and ammunition and fuzes.

## Battlefield Cues

Recognition of any hostile target or suspected target area suitable for engagement with artillery or mortar fires, including reconnaissance by fire.

Orders and instructions from commanders, including designation of locations of useful targets and final protective fires, and announcement of availability of supporting fires and forward observers.

Appearance of targets or reports of existence of targets demanding the delivery of final protective fires in defensive situations.

Recognized need to coordinate forward movement, including the assault, with the delivery and shifting of scheduled or on-call indirect fires.

Observed withdrawal of an enemy when indirect fires are available for pursuit.

Receipt of any patrol mission or security mission that will separate the platoon or any of its elements from the parent unit and thus create a need to coordinate the employment of indirect supporting fires for the detached element, including attachment of an 81-mm mortar and crew.

Recognized need to deny observation to the enemy or to screen the movement of any element of the platoon when smoke shell, including white phosphorus (WP), can be delivered by mortars or artillery.

Perceived wind direction and speed likely to cause WP smoke to interfere with observation or control of friendly troops or likely to affect use of illuminating rounds.

Location of enemy in flammable structures or dry vegetation when WP shell is available and wind direction will facilitate use of WP shell to burn out the enemy without danger to friendly personnel.

Loss of orientation when indirect fires are available for marking a specified map location to permit identification of the same location on the ground.

**Recognized need for illumination to aid reconnaissance, target acquisition, orientation, or the adjustment of fires during darkness.**

**Recognized need to isolate a section of the battlefield, e.g., use of prearranged fires to isolate the objective for a raid.**

**Recognized need to create a diversion to cover the noise or sight of movement of friendly troops where lack of diversionary fires would increase threat of detection by the enemy.**

**Recognized need to plan and have indirect fires registered or adjusted during unlimited visibility to permit rapid and accurate prearranged employment during limited visibility.**

**Recognized need to conserve ammunition for organic weapons when resupply is questionable and mortar or artillery fires can be effectively substituted for or used to supplement fires from organic weapons.**

**Recognized need to salvage, safeguard, and employ the fire control and communications equipment of any forward observer who becomes an ineffective casualty while accompanying a small unit.**

**Shell bursts as observed in relation to the adjusting point and the observer-target (OT) line during adjustment.**

**Time of flight, sound of burst, and estimated direction and distance to sound of bursts when indirect fires must be adjusted in dense vegetation that prohibits visual observation.**

**Availability of air observers when adjusting indirect fires in dense vegetation that precludes visual observation and adjustment by a ground observer.**

Availability of proximity fuze when adjustment must be made over dense vegetation by a ground observer.

Availability of fuze delay when enemy personnel are located in timbered areas where trees exceed 100 feet in height.

Inadequate or inaccurate delivery of indirect fire upon a target during fire for effect.

Observation of or knowledge that friendly personnel are located within 400 meters of the probable point of impact of mortar fires or within dangerous proximity to the possible point of impact of artillery fires, thus requiring use of the creeping method of adjustment.

Indirect fire from friendly sources falling dangerously near or upon unprotected friendly personnel.

Friendly aircraft in flight that are dangerously close to the trajectory of indirect fire weapons delivering fire.

Delivery of accurate and sufficient indirect fire to destroy a designated target.

Changes in the pattern of spatial relationships among apparently natural growths of vegetation (bushes, clumps of grass, etc.) that indicate movement of cleverly camouflaged enemy personnel subject to engagement with indirect fires.

Marginal indications of the presence of enemy targets or unidentified personnel, vehicles, or aircraft as detected with the unaided eye when binoculars are available to aid detection and identification.

Detection and identification of fleeting glimpses of moving targets requiring rapid adjustment and delivery of effective fire to intercept and destroy or neutralize enemy personnel in motion.

Detection of sound or flash of enemy artillery, mortars, or direct fire weapons that will permit location by polar coordinates (sound and flash method) or by intersection.

Recognized opportunity to create an ambush-like situation through the coordinated delivery of organic and supporting fires upon a surprised enemy.

Failure by subordinates to designate targets suitable for engagement with available indirect fires, failure to use prescribed fire control procedure, or failure to record and learn the locations and designations of useful targets, final protective fires, and reference points.

Recognition that a target to be engaged with an 81-mm mortar section exceeds 100 meters in width and thus will require multiple fire orders to permit range shift after coverage of each 100-meter segment of the target.

Threat of capture of indirect fire weapons, ammunition, and fire control equipment.

#### Performances, Knowledges, and Skills

1. UNDER ALL CONDITIONS OF VISIBILITY, THE IRPL MUST CONTINUALLY AND SYSTEMATICALLY OBSERVE FOR, DETECT, LOCATE, IDENTIFY, AND DESIGNATE (OR ENGAGE) HOSTILE TARGETS SUITABLE FOR ENGAGEMENT WITH MORTAR AND ARTILLERY FIRE.

He must : establish and maintain accurate knowledge of his own location and know the locations of his own troops , other friendly troops , and friendly indigenous personnel likely to be affected by his employment of fire .

1

: recognize and ensure that his men recognize and report the following and similar targets appropriate for engagement with mortar or artillery fire ("hard" targets usually requiring engagement by artillery fire or direct fire weapons are underlined): troops in fox-holes , particularly with overhead cover impregnable to M79 fire; troops pinned down by friendly small arms fire or employing cover that prohibits effective engagement with flat trajectory fires; troops attacking en masse; troops accompanying tanks; automatic weapons positions , particularly those in bunkers or otherwise provided with overhead cover; artillery pieces , mortars , antitank weapons , armored personnel carriers , missile sites , and antiaircraft weapons; trucks and armored personnel carriers moving in formation; parked aircraft , including recently landed assault aircraft; vehicle parks; obstacles forming road blocks; supply and ammunition dumps; command and communication installations , such as CP's , OP's , radar sites , and radio relay sites; built-up areas employed as fighting positions; and waterborne craft employed by the enemy .

2

: know that barbed wire obstacles and minefields are not appropriate targets for indirect fire weapons and that minefields hit by shell fire are more dangerous and more difficult to clear than undisturbed minefields because of damage to fuzes and firing devices and disruption of the minefield pattern. 3

: know that a target may be (1) personnel, materiel, or a piece of terrain that warrants engagement by fire; (2) an area designated and recorded to facilitate future delivery of fire, such as TARGET AD 0401; or (3) a spotting by an observer when a round hits the target, i.e., "TARGET," during the delivery of destruction fire. 4

: know that final protective fire is an immediately available prearranged barrier of fire designed to impede enemy movement across defensive lines or areas and that final protective fires take priority over all other indirect fire missions. 5

: know that a reference point is a prominent, easily located point in the terrain, readily identified on the map by both the observer and the FDC, and that checkpoints, as employed in plotting routes for land navigation, may serve as reference points to facilitate the delivery of fire by prearrangement. 6

**He will** : determine and record through timely coordination with the forward observer or liaison officer the locations and designations of final protective fires, reference points, selected targets, and checkpoints within the platoon's sector of responsibility or along a movement route to facilitate effective delivery of supporting indirect fires. 7

: disseminate to and ensure that his subordinates record on their range cards and can point out on the ground and identify the locations of final protective fires, reference points, checkpoints, and selected targets within their assigned sectors of responsibility to facilitate accurate and timely designation of appropriate hostile targets in defensive positions. 8

: know and continually emphasize to his men the absolute necessity to navigate accurately and maintain effective communication to facilitate rapid, accurate calls for fire during movement. 9

**He must** : habitually use prescribed communications procedure and ensure that subordinates use prescribed procedure, including the specific procedures pertinent to the transmission of calls for fire and subsequent corrections. 10

- He will :** use the platoon command net to receive target designations, calls for fire, and subsequent corrections from subordinates, and relay the transmissions as required by the situation. 11
- :** when a forward observer is attached to the platoon, utilize the observer's sources of fire and channels of communication by passing target designations, calls for fire, and corrections from subordinate leaders directly to the observer when the observer is unable to see the target and request and adjust fire himself. 12
- :** memorize the call signs and frequencies in use by the attached forward observer to facilitate use of the forward observer's communication equipment in the event the forward observer becomes a casualty. 13
- :** in an emergency, such as the loss of a forward observer, use the forward observer's communication equipment to enter the fire control net and transmit calls for fire and subsequent corrections as required to accomplish the mission. 14
- He must :** when no forward observer is present, use the company command net to call for and adjust fires made available through the company commander from the company mortars, from battalion mortars, through the artillery forward observer with the company, or through the artillery liaison officer at battalion. 15

: prior to departure on a patrol or similar semi-independent mission, prearrange communications and fire control procedures to ensure the availability of indirect supporting fires. (Detailed knowledges and skills required to plan and record routes and to use checkpoints en route to facilitate delivery of indirect fire support are recorded in Annex 11: Land Navigation, and are not repeated herein.) 16

: ensure that the second-in-command is briefed and equipped (to include pyrotechnic signals when necessary) to control indirect fires according to plan in the event the leader becomes a casualty. 17

**He will** : use binoculars for continual terrain evaluation; to aid in the detection, location, and identification of hostile targets, friendly troops, and friendly indigenous personnel; and for measuring angles and spotting bursts when calling for and adjusting fire. 18

: know that failure to adjust binoculars precisely, keep them clean, and take advantage of their magnification and light-gathering qualities during observation may surrender the initiative to the enemy, particularly when operating against an enemy skilled in the use of concealment, cover, camouflage, and stealthy movement. 19

**: to set the interpupillary distance, open the binoculars fully at the hinge, look through the eyepieces at the sky, then close the binoculars until the two circles appear as one sharply defined circle.** 20

**: to focus the lens, set the diopter scales at +4 and with both eyes open look through the eyepieces at a distant object; cup a palm over the lens of one telescope and slowly turn the focusing nut of the other telescope until the object is most clearly defined; note the reading on the diopter scale of the focused telescope; reset the scale at +4 and repeat the focusing procedure for the same telescope. Use the greater plus reading (or the smaller minus reading) of the two trials. Repeat the procedure for the other telescope and make any necessary slight adjustment of the left focusing nut to define the reticule most clearly.** 21

**: note the reading on the interpupillary scale and the diopter scale readings for future use.** 22

**: use a supported position during observation when possible and hold the binoculars correctly to obtain maximum steadiness; bend the thumbs forward and hold them at the sides of the eyes to prevent light from entering; and rest the eyes briefly if observation becomes difficult.** 23

- : examine wide areas systematically by observing overlapping sections, commencing at easily identified points in the terrain; note the spatial relationships among apparently natural objects that might possibly be camouflaged enemy personnel; and seek to detect changes in the pattern of spatial relationships among suspicious objects to detect the movement or existence of cleverly camouflaged enemy personnel.** 24
- : observe with the binoculars during darkness, by moonlight, starlight, and under artificial illumination to ensure the detection of targets that would not be detected by the unaided eye under such conditions.** 25
- : use, handle, and carry binoculars carefully to maintain usefulness as a precision optical device; keep them in the carrying case when not in use; keep them free of dirt, grease, fungus, and moisture; and use lens tissue or toilet paper for cleaning the lens.** 26
- : habitually camouflage the carrying case and, when possible, observe from concealed and covered positions to avoid drawing sniper fire usually directed at any exposed individual carrying or using equipment that marks him as a leader or communicator.** 27

- :** avoid using binoculars where sunlight reflected from the lens would create flashes and draw enemy attention and fire. 28
- :** request issue of additional binoculars for use by subordinate leaders as required by specific situations and missions, e.g., patrols and ambushes conducted by detached squads. 29
- He must :** know the configuration and all useful quantitative values, including those not marked with numerals, of the binocular reticule and reproduce it as a sketch without reference to the binocular as an aid to instructing subordinates. 30
- :** measure vertical and horizontal angles accurately, including horizontal angles exceeding 100 mils in width, by use of the binocular reticule. 31
- He will :** apply the mil relation to determine range, lateral deviation, and vertical distance when designating targets and adjusting fire. 32
- :** know that a circle (e.g., the outer scale of the lensatic compass) is divided into 6,400 angles of one mil (m) each, that at a distance of 1,000 meters an object one meter wide will measure one mil, and that the mil relation applies in any plane; thus, mils can be changed to meters by multiplying the number of mils by the range (distance) taken in thousands of meters and similar computations can be made to aid the adjustment of fire. 33

: know that in the formula  $\frac{W}{Rm} = 1$ , W is the width of the object in meters,  $m$  is the angular width of the object in mils, and R is the range or distance in thousands of meters. 34

: cover the letter of the element to be computed, substitute the known values for the two visible letters, use the method indicated by the visible elements to find the covered one, and substitute H (height) for W in the formula when vertical distance is involved. 35

: ensure through instruction and observation of performance that his subordinate leaders and selected potential leaders can effectively apply the mil relation to make the computations required in initiating calls for fire and in making subsequent corrections. 36

He must : know that the adjusting point is a plainly visible object which may be the target, a portion of the target, or any well-defined point in the target area that can be used by the observer as a reference during the adjustment of fire. 37

: select and use an adjusting point on the basis of his knowledge of the location and vulnerability of the target and his visualization of the distribution of fire for effect to be delivered after necessary adjustment. 38

- :** know that the observer-target line (OT line) is 39  
an imaginary straight line running from the observer  
through the target (adjusting point).
- :** know that the observer-target range (OT range) 40  
is the distance from the observer to the target along  
the OT line and that in locating a target by citing  
polar coordinates the phrase DISTANCE (so many  
meters) is used to announce the OT range.
- He will :** know that accurate range estimation is vital to 41  
obtaining fire quickly in adequate volume on enemy  
targets and necessary to ensure the safety of friendly  
personnel, particularly in fast-moving situations.
- :** determine range from maps or by use of binoculars 42  
and the mil formula when feasible.
- :** estimate range at any distance up to 1,000 meters 43  
by visual examination of the terrain to within 10 per  
cent of the measured distance involved.
- :** when estimating range visually and no confident 44  
estimate of the OT range is apparent, select a mid-  
point, estimate the distance to the midpoint and  
double the estimate to obtain the OT range; or es-  
timate the range along one-quarter of the OT line  
(halfway to the midpoint) and multiply by four.

He must : use the lensatic compass to measure the magnetic direction in mils from the observer's position to the adjusting point. 45

: know that the outer (6,400-mil) scale of the lensatic compass is marked at 200, 400, 600. . . 6,400 mils with a medium tick mark and the numerals 2, 4, 6. . .64; at 100, 300, 500. . .6,300 mils with a long tick mark; and at 20-mil intervals with short tick marks. 46

: hold the lensatic compass level and steady, sight the compass on the adjusting point from the observer's position, and read the magnetic direction under the index line to the nearest 10 mils through the focused lens. 47

: know that use of the term direction in a call for fire or in subsequent corrections means grid direction to FDC personnel and habitually announce MAGNETIC DIRECTION (so many mils) after measuring a direction with the lensatic compass. 48

2. THE IRPL WILL FORMULATE AND TRANSMIT CALLS FOR FIRE AND SPOT BURSTS BY USING PERTINENT ELEMENTS OF THE TARGET-GRID METHOD OF FIRE CONTROL; HE WILL SUPERVISE THE SAME PERFORMANCE BY HIS SUBORDINATE LEADERS AND SELECTED POTENTIAL LEADERS.

**He will** : memorize the elements and prescribed sequence **49**  
of a call for fire and follow the prescribed sequence  
except to omit any element not pertinent to the  
specific call for fire.

- (1) Observer identification.
- (2) Warning order.
- (3) Location of target.
- (4) Description of target.
- (5) Method of engagement.
- (6) Method of fire and control.

**He must** : when requesting fire on an area target, select **50**  
a clearly visible point in the target area as the  
adjusting point; when calling for fire on a stationary  
point target (destruction mission), use the target as  
the adjusting point.

: establish the OT line as the magnetic direction, **51**  
measured to the nearest 10 mils with the lensatic  
compass, from the observer's position to the ad-  
justing point.

**He will** : to initiate a call for fire, transmit the call sign **52**  
of the supporting unit followed by his own call sign  
as (1) Observer identification; e.g., RED VULCAN  
18 THIS IS BLUE RIFLEMAN 24.

**He must :** to transmit (2) Warning order, announce FIRE MISSION to alert FDC personnel that his message is a call for fire and to notify other personnel in the same communication net that his is a priority message. 53

**He will :** transmit (3) Location of target by announcing prearranged data, use of grid coordinates, reference to a known point (shift), polar coordinates, or use of marking rounds. 54

**:** to use prearranged data when a target appears in an area where fire is registered or preplanned, announce the target designation followed by the OT direction; e.g., 55

TARGET ALPHA ECHO 0302;  
MAGNETIC DIRECTION 3210.

**:** to use grid coordinates to locate a target, announce the grid coordinates of the target from the map to the nearest 10 meters when possible (or to the nearest 100 meters as a minimum requirement), then announce the OT direction; e.g., 56

GRID 46913961;  
MAGNETIC DIRECTION 3210.

: to locate a target by reference to a known point,  
such as a registration point, an easily identified  
terrain feature that appears on the map, or a desig-  
nated and recorded (numbered) target, transmit the  
designation of the known point, the magnetic direc-  
tion from the observer to the target (OT line), the  
lateral shift, and the range shift in the order cited,  
omitting reference to any shift requiring no change;  
e.g.,

57

FROM TARGET ALPHA ECHO 0813;  
MAGNETIC DIRECTION 2450;  
RIGHT 200;  
ADD 200.

: to use polar coordinates to locate a target,  
ensure that the location of the observer is known  
at the FDC (do not transmit location of observer in  
the clear), then transmit the magnetic direction  
from the observer's position to the target (OT line)  
and the distance (OT range) from the observer's  
position to the target; e.g.,

58

MAGNETIC DIRECTION 2690;  
DISTANCE 700.

: to use marking rounds to regain orientation and establish a known point from which to shift fire, call for an easily identified round to be fired on a registration point, a previously fired and recorded target, a prominent terrain feature or, as a last resort, into the center of the sector; e.g.,

59

MARK REGISTRATION POINT 1.

MARK TARGET ALPHA ECHO 0813.

MARK HILL 437.

MARK CENTER OF SECTOR.

He must : to transmit (4) Description of target, briefly describe the installation, personnel, or activity observed; state the approximate number of personnel or materiel; announce the dimensions in meters (to the nearest 50 meters) and the magnetic azimuth (to the nearest 50 mils) of the long axis (ATTITUDE) of rectangular targets; and announce the radius in meters (RADIUS) of circular targets; e.g.,

60

MACHINEGUN IN LOG AND EARTH BUNKER.

50 INFANTRY DIGGING IN ALONG RIDGE LINE;

50 BY 300; MAGNETIC ATTITUDE 2450.

TRUCK PARK IN WOODS; RADIUS 300.

: use the parallel line method to determine the **61**  
attitude of a target area, i.e., face parallel to the  
long axis of the target area, select a reference  
point, and measure the magnetic azimuth to the ref-  
erence point to the nearest 50 mils, e.g., 200 BY  
400, MAGNETIC ATTITUDE 2450.

: specify PROTECTIVE TARGET as (4) Description **62**  
of target and announce the dimensions and attitude  
of the target area when the objective is the adjust-  
ment of fire on a terrain feature to obtain prearranged  
fires, record firing data, and obtain a target desig-  
nation for future use, e.g.,

PROTECTIVE TARGET

50 BY 100

MAGNETIC ATTITUDE 2450.

: know that an adequate description of the target **63**  
is vital to control personnel and the FDC to estab-  
lish priorities for the delivery of fire, to determine  
the amount and type of ammunition and fuze type  
most useful for attacking the target, and to deter-  
mine any necessity to change the sheaf.

: omit (4) Description of the target when regis- **64**  
tration is the objective of the call for fire.

- He will : know that (5) Method of engagement covers type 65  
of adjustment, trajectory, ammunition (type of pro-  
jectile and fuze action), and distribution of fire and  
announce these elements in the order cited except  
to omit any element not pertinent to a specific call  
for fire.
- : to announce type of adjustment, specify DE- 66  
STRUCTION when the objective of the fire is to  
destroy a stationary point target.
- : specify DANGER CLOSE as type of adjustment 67  
when mortar fires will fall within 400 meters of  
friendly personnel or, at the discretion of the ob-  
server, when artillery fires will fall within 600  
meters of friendly personnel.
- : call for and adjust mortar fires that will fall 68  
within 400 meters of friendly personnel and call for  
and adjust artillery fires that will fall within 600  
meters of friendly personnel.
- (1) Estimate the range to the target and add 200  
meters to ensure that the first round is over  
the target. (Under all other circumstances  
the intent is to obtain a first-round hit.)

- (2) Decrease range by bounds of one-half the estimated range error (overage) of the preceding burst from the target until a correct range is obtained.
- (3) If a burst is spotted short of the target prior to entering DROP 25, use the bracketing method of adjustment.
- (4) Once DROP 25 is transmitted, continue to DROP 25 until a target hit is obtained or until a burst is obtained short of the target.
- (5) If, on a correction of DROP 25, a burst is short of the target, choose from the last two bursts the burst nearest the target and FIRE FOR EFFECT; if the last two bursts appear to be the same distance from the target, choose the last burst and FIRE FOR EFFECT.

: omit trajectory unless otherwise instructed. 69

: to transmit type of projectile, know the effects 70

of commonly available projectiles such as high explosive (HE), white phosphorus (WP), and smoke (HC), including colored smoke and illuminating shell, and adhere to the following guide lines:

- (1) Omit the element to obtain HE during adjustment and during fire for effect.

- (2) Anticipate use of HE during adjustment to be followed by the type of projectile requested when fire for effect is commenced.
- (3) Request any available type of projectile or combination of projectiles deemed most likely to be effective during fire for effect; e.g. ,

**HE AND WP IN EFFECT.**

**: to transmit fuze action, know and adhere to the following guide lines:**

**71**

- (1) Omit the element to indicate FUZE QUICK or a lack of choice, e.g. , illuminating shell and HC smoke are always fuzed with time fuze. .
- (2) Know that FUZE QUICK bursts on impact before penetration, is effective against personnel and materiel in the open, and will produce lethal tree bursts in ordinary wooded areas, orchards, hedgerows, rubber plantations, etc.
- (3) Request FUZE DELAY to penetrate dug-in positions, tunnels, earth and log bunkers, and roofs and floors of multistoried buildings.
- (4) Request a combination of FUZE DELAY and FUZE SUPERQUICK to penetrate dense jungle canopy and ensure a combination of tree and surface bursts.

- (5) Specify FUZE PROXIMITY to obtain air bursts at a predetermined height over enemy personnel and materiel with no requirement to adjust height of burst.
- (6) Anticipate use of FUZE QUICK during adjustment; specify any other fuze action desired in fire for effect in the initial call for fire.

: omit distribution of fire unless otherwise instructed but know that distribution of fire pertains to the sheaf or lateral distance between bursts fired by two or more weapons and that an adequate description of the target, including width, depth, and attitude of rectangular targets and radius of circular targets, will permit the FDC to control the sheaf effectively without further aid from the observer.

72

: know the typically effective dimensions of final protective fires delivered by weapons from which indirect fire is usually available and apply the knowledge when planning, calling for, and adjusting fires, e.g., visualize the area (width and depth) likely to be covered by lethal fragments from a section of 81-mm mortars. (Use figures in table as a guide only.)

73

Typically Effective Dimensions of Final Protective Fires			
<u>Weapon</u>	<u>Unit</u>	<u>Width</u>	<u>Depth</u>
81-mm mortar	Squad (1 tube)	50 meters	50 meters
81-mm mortar	Section (3 tubes)	100 meters	50 meters
4.2-inch mortar	Squad (1 tube)	50 meters	50 meters
4.2-inch mortar	Section (4 tubes)	200 meters	50 meters
105-mm howitzer	Battery (6 tubes)	200 meters	150 meters
155-mm howitzer	Battery (6 tubes)	300 meters	150 meters

: when troop safety is not involved, omit all elements of (5) Method of engagement to obtain area fire with shell HE and fuze quick delivered in adjustment and in fire for effect with a sheaf designated by the FDC on the basis of the observer's description of the target.

74

He must : to transmit (6) Method of fire and control, adhere to the following guide lines:

75

- (1) Know that volley is a method of fire in which the pieces of a unit or a portion thereof fire simultaneously; anticipate the delivery of artillery fire in two-round volleys during adjustment unless otherwise requested; and know that after the initial volley, corrections must be furnished to move the center of impact of the following volleys to the adjusting point prior to firing for effect.

- (2) Request SECTION (PLATOON/BATTERY) RIGHT (LEFT) to obtain a method of fire whereby the weapons of a unit are discharged from the right (left) one after the other at five-second intervals (artillery) or ten-second intervals (mortars) unless otherwise specified; e.g., during adjustment a breeze blowing across the OT line from the observer's right would demand BATTERY LEFT in which the weapons would fire in order from left to right so the smoke and dust would be blown away from successive bursts to facilitate spotting.
- (3) Terminate the call for fire with FIRE FOR EFFECT to gain surprise and increase enemy casualties by firing without adjustment when the enemy is at a surveyed location, within a recently fired and recorded target, or on a prominent terrain feature easily identifiable on the ground and on an accurate map.
- (4) When adjustment is possible and necessary, terminate the call for fire with ADJUST FIRE.
- (5) To control time of delivery of fire, terminate the call for fire with AT MY COMMAND, ADJUST FIRE. When supporting unit is ready, the FDC will announce SECTION (BATTERY) IS READY and discharge the weapons when the observer transmits FIRE.

- (6) Terminate the call for fire with AT MY COMMAND FIRE FOR EFFECT upon observing personnel or vehicles moving into the area of a preplanned target, to intercept moving personnel or vehicles, or to engage helicopters or parachutists on or over a landing site. The FDC will announce TIME OF FLIGHT \_\_\_\_\_ SECONDS, then SECTION (BATTERY) IS READY. Transmit FIRE, taking time of projectile flight into consideration as required.
- (7) To cancel AT MY COMMAND, transmit CANCEL AT MY COMMAND.
- (8) Terminate the call for fire with CANNOT OBSERVE, FIRE FOR EFFECT when a target is believed to exist at the announced location but cannot be seen with clarity that permits adjustment; e.g., a dispersed enemy patrol observed entering a small ravine that appears on the map but is largely in defilade as viewed from the CP-OP.

**He will :** when calling for and adjusting fires, anticipate a read-back by the FDC of the data he has transmitted after the first two elements and after the second four elements or after each element if communication is poor or if jamming occurs.

76

- : anticipate the elimination of call signs to save time after identities have been established and when no confusion will result.** 77
- : listen carefully to each read-back and ensure that the FDC or the individual relaying the data has received it correctly.** 78
- : read back all transmissions originating with the FDC that are pertinent to the fire mission he is conducting.** 79
- He must : if he makes an error in transmitting data and recognizes the error before making the next transmission, announce CORRECTION, followed by the element in its correct form; e.g.,** 80
- MAGNETIC DIRECTION 4680;**
- CORRECTION;**
- MAGNETIC DIRECTION 4860;**
- OVER.**

**He will** : upon noting an omission, error in transmission, or error in FDC read-back pertinent to location of the target, transmit CORRECTION immediately, followed by the complete location of the target; e.g.,

81

FROM TARGET ALPHA DELTA 0401;

MAGNETIC DIRECTION 5680;

LEFT 200;

ADD 400;

25 INFANTRY IN THE OPEN;

ADJUST FIRE.

CORRECTION;

FROM TARGET ALPHA DELTA 0401;

MAGNETIC DIRECTION 5680;

RIGHT 200;

ADD 400;

OVER.

**He must** : if any element other than a target location element is omitted or incorrectly stated, transmit the corrected element to the FDC as a separate transmission; e.g., an observer terminates a call for fire with ADJUST FIRE, OVER, notes omission of desired fuze action, and transmits:

82

CORRECTION;

FUZE DELAY;

OVER.

**He will :** transmit CHECK FIRING to cause a temporary halt in firing immediately upon discovery that fire data that may endanger friendly personnel has been transmitted or to stop firing temporarily for any reason, then explain the reason for the order; e.g.,

**CHECK FIRING;**

**FRIENDLY PATROL IN DANGER AREA.**

**:** transmit CANCEL CHECK FIRING to continue a fire mission. **84**

**:** transmit END OF MISSION to end firing on a specific target or to terminate the delivery of final protective fire. **85**

**He must :** know the meanings of and respond to standard phrases transmitted or relayed to the observer from the FDC during the conduct of fire: **86**

- (1) Anticipate announcement of FUZE (type) or SHELL (type) by the FDC when a fuze or shell different from the one requested by the observer is to be fired and observe for bursts indicated by the announced shell and fuze type. (Even when fuze action and type of projectile are known, the recognition of bursts may be made difficult for the observer by dust, smoke, vegetation, or enemy fire falling in the target area.)

- (2) Anticipate transmission of SHOT to the observer by the FDC as each round or volley in an adjustment is fired.
- (3) Interpret SPLASH as a five-second warning transmitted by the FDC preceding the impact of a round(s) on the target area and request SPLASH during the conduct of fire when the warning will aid identification of bursts or permit the observer to make maximum use of concealment and cover.
- (4) Request TIME OF FLIGHT from the FDC and anticipate FDC transmission of TIME OF FLIGHT (so many) SECONDS to aid the observer to intercept moving targets after transmitting AT MY COMMAND, to aid in identification of his own rounds, permit use of concealment and cover, interrupt constant use of binoculars (provide eye rest), and to permit close-in observation, particularly when a small-unit leader must call for and adjust fire and control his own unit, as when patrolling.
- (5) Anticipate FDC announcement of number of rounds per tube to be fired on a specified target, e.g., SECTION; TWO ROUNDS.

- (6) Interpret FIRING FOR EFFECT as an announcement by the FDC to the observer that a specified unit(s) or weapon(s) is commencing to fire for effect and as a cue for the observer to focus on the target area and prepare to report results of fire or make corrections .
- (7) Interpret ROUNDS COMPLETE as notification that all rounds requested by the observer or specified by the FDC have been fired and that any additional fire to be delivered on the target engaged must be called for by the observer.
- (8) Anticipate and record target designations transmitted by the FDC , e.g. , TARGET ALPHA BRAVO 0402; and use the recorded designations and their respective locations later to obtain pre-arranged fires or as reference points from which shifts can be made to near-by targets not previously engaged.
- (9) Know that the FDC will transmit instructions to the observer if a mission cannot be fired as requested.

**He will :** know the effects of and identify the type of projectile and fuze action employed in the delivery of artillery and mortar fire from the appearance of bursts , including:

87

- (1) Shell HE, fuze quick, including tree bursts.
- (2) Shell HE, air burst, fuze proximity.
- (3) Shell HE, fuze delay, mine action.
- (4) Shell HE, fuze delay, ricochet (fired by artillery only).
- (5) Shell WP, fuze quick.
- (6) Shell HC and colored smoke, fuze time.
- (7) Shell illuminating, fuze time.

**He must :** spot the locations of bursts for range with respect to the adjusting point and for lateral deviation with respect to the OT line on the basis of what is observed at the moment the burst occurs and determine necessary corrections.

88

**:** make range spottings:

89

- (1) Spot bursts which appear beyond the adjusting point as OVER (so many meters).
- (2) Spot bursts which appear between the observer and the adjusting point as SHORT (so many meters).
- (3) During destruction missions, spot an impact burst which hits a point target as TARGET.
- (4) In area fire, spot a burst at the proper range as RANGE CORRECT.

- (5) Spot an observed burst as DOUBTFUL when it cannot be sensed for range as OVER, SHORT, TARGET, or RANGE CORRECT and make a correction to permit a positive spotting on the next round.
- (6) Spot a burst as LOST when it can neither be seen nor heard.
- (7) Spot a burst as ERRATIC when it bursts out of the normal dispersion pattern for either range or deviation.

**He must :** make deviation spottings with respect to the OT line as so many mils RIGHT, so many mils LEFT, or LINE (bursts centering on the OT line). 90

**:** measure the lateral deviation to the nearest five mils from the OT line to the burst or center of bursts by using the horizontal scale of the binocular reticule. 91

**He will :** determine deviation corrections in meters to the nearest 10 meters on the basis of spottings measured in mils by applying the mil relation ( $W = Rm$ ) to the OT factor (distance in thousands of meters from the observer to the target); e.g., the OT distance is 1,500 meters, so the OT factor is 1.5; the spotting is 40 mils RIGHT; 1.5 multiplied by 40 equals 60, so the correction would be LEFT 60. 92

**: exercise caution in making deviation corrections in the direction of friendly personnel and know that artillery and mortar fires falling within 200 meters of unprotected personnel may cause casualties.** 93

**He must : determine range corrections on the basis of spottings and include required range shifts in subsequent corrections; i.e., ADD (so many meters) for spottings short of the adjusting point; DROP (so many meters) for spottings beyond the adjusting point; and omit reference to range when no corrections are required.** 94

**: when the location of the burst cannot be determined, report LOST to the FDC and anticipate delivery of the next round with data transmitted for the previous round.** 95

**He will : instruct and supervise his subordinate leaders and selected potential leaders in initiating calls for fire and spotting bursts.** 96

**3. THE IRPL WILL, AFTER SPOTTING THE INITIAL BURST, FORMULATE AND TRANSMIT SUBSEQUENT CORRECTIONS UNTIL THE FIRE MISSION IS COMPLETED.**

**He must :** memorize the elements of subsequent corrections in the prescribed sequence; transmit the elements that require change according to the prescribed sequence on the basis of spottings; and omit any elements for which no change is required.

97

- (1) Magnetic direction.
- (2) Trajectory.
- (3) Method of fire.
- (4) Distribution.
- (5) Shell.
- (6) Fuze.
- (7) Deviation.
- (8) Range.
- (9) Height of burst.
- (10) Control.

**He will :** change (1) Magnetic direction when it deviates from the last announced magnetic direction by more than 100 mils.

98

**He must :** omit (2) Trajectory unless otherwise instructed.

99

**He will :** change (3) Method of fire when necessary to increase clarity of spottings during adjustment, e.g., SECTION (BATTERY) RIGHT (LEFT).

100

- He must :** omit (4) Distribution and anticipate control of the sheaf by the FDC based upon adequate description of the dimensions and attitude of the target. 101
- He will :** change (5) Shell as required by the results of observed fire for effect on the target by announcing type, e.g., WP, HC, ILLUMINATING. 102
- He must :** change (6) Fuze as required by results of observed fire for effect on the target; e.g., if tree bursts obtained with fuze quick over enemy located in a tree line fail to suppress enemy fire, request FUZE DELAY prior to repeating fire for effect. 103
- He will :** transmit (7) Deviation corrections as RIGHT or LEFT (so many meters) to the nearest 10 meters to bring the bursts to the OT line. 104
- :** make adjustments to compensate for the appearance of range dispersion as deviation from the OT line when angle T (the angle between the gun-target line and the observer-target line) is 500 mils or greater. 105
- :** anticipate that the FDC will notify the observer when angle T exceeds 500 mils by announcing the value of the angle to the nearest 100 mils. 106

: when a deviation correction causes the next round to burst on the opposite side of the OT line with sufficient deviation to make spotting for range difficult, systematically reduce the size of subsequent deviation corrections until deviations become small enough to ignore; e.g., as a guide, compute the deviation in the usual manner and apply one-half of it. 107

He must : transmit (8) Range corrections as ADD or DROP (so many meters) to bring the bursts to the adjusting point. 108

: adhere to the following guide lines when making range corrections: 109

- (1) Employ the creeping method of adjustment as required by the proximity of friendly personnel.
- (2) Know that bracketing means to enclose the target between over and short bursts and adjust to obtain a bracket as quickly as possible except when the nearness of friendly personnel to the target demands use of the creeping method of adjustment.

- (3) Base range corrections on positive estimates of the location of observed bursts; but when there is no definite indication of the amount of range error, adhere to the following minimum guides for establishing a bracket: if OT distance is less than 1,000 meters, use an initial change of 100 meters; if the OT distance is between 1,000 and 2,000 meters, use an initial change of 200 meters; and if the OT distance is over 2,000 meters, use an initial change of 400 meters.
- (4) Once a bracket is established, systematically split the last bracket formed until ready to fire for effect.
- (5) When adjusting area fire with artillery or 4.2-inch mortars, split a 100-meter bracket and fire for effect, e.g., ADD (DROP) 50; FIRE FOR EFFECT.
- (6) When adjusting area fire with 81-mm mortars, split a 100-meter bracket and fire for effect, e.g., ADD (DROP) 50; FIRE FOR EFFECT.
- (7) Split a 50-meter bracket and fire for effect during a destruction mission with mortars unless the FDC directs otherwise, keeping in mind that destruction missions are fired only at stationary point targets.

- (8) When engaging a moving target with area fire, make range changes to hit the target in its anticipated location or go into a bracketing method of adjustment if the target halts between rounds.
- (9) Know that prolonged adjustment permits enemy troops to take cover or move away; obtain accurate and adequate fire for effect with minimum loss of time.

**He will :** omit (9) Height of burst as it pertains to the adjustment of air bursts using fuze time. (The adjustment of air bursts using fuze time is deemed to be beyond the scope of this paper. The adjustment of height of burst for illuminating rounds is covered under a separate performance.) 110

**He must :** exercise (10) Control during adjustment and during fire for effect. 111

- (1) Terminate subsequent corrections with OVER when additional adjustment is possible and necessary.
- (2) When adjusting fires for future use, i. e., prearranged fires, announce END OF MISSION; ADJUSTMENT COMPLETE, upon splitting a 100-meter bracket and record the target number furnished to the observer by the FDC.

- (3) Request FIRE FOR EFFECT upon adjusting the mean point of impact or burst within the desired distance of the target or adjusting point.
- (4) To control time of delivery of rounds in adjustment (e.g., to permit dust and smoke to clear to increase visibility) or in delivery of fire for effect (e.g., to intercept a moving target with area fire), announce AT MY COMMAND; command FIRE at the desired time after FDC transmits SECTION (BATTERY) READY; and relinquish control by transmitting CANCEL AT MY COMMAND.
- (5) If unable to identify his round(s) from among several rounds landing in the target area at the same time, transmit REPEAT, REQUEST SPLASH, and anticipate refiring using the same firing data.

**He will :** correct omissions, errors in transmissions, and errors in FDC read-back in subsequent corrections as in the call for fire; if an error is made in any element pertinent to burst location (deviation, height of burst, range), repeat all of these elements correctly.

112

**He must :** carefully observe the results of fire for effect on area targets and act toward completion of the mission:

113

- (1) If fire was effective and sufficient, announce END OF MISSION and report effect observed, e.g., 20 CASUALTIES; INFANTRY DISPERSED.
- (2) If fire was accurate, but insufficient, request REPEAT and anticipate refiring of fire for effect using the same firing data.
- (3) If any element of the adjustment was sufficiently in error so that the effect sought was not obtained, transmit the necessary correction(s) and request repeat of fire for effect, e.g., RIGHT 50; ADD 50; REPEAT.
- (4) If the number of weapons allocated to the mission was not adequate to cover the target area effectively, make successive shifts in fire for effect to ensure coverage of the target, e.g., LEFT 100; REPEAT.

**He will :** carefully observe the results of mortar fire for effect on stationary point targets (destruction missions) and act toward completion of the mission.

114

- (1) Anticipate that upon completion of adjustment the mortar FDC will fire an announced number of rounds (e.g., SIX ROUNDS; SHOT) and suspend firing pending a report from the observer.

- (2) Announce corrections if required and request refiring if necessary to destroy the target , e.g. , DROP 25; REPEAT.
- (3) Request fuze change if necessary to destroy the target.
- (4) Continue to request REPEAT until the target is destroyed.
- (5) When the target is destroyed, so indicate and report the effect of the fire, e.g. ,  
END OF MISSION; BUNKER DESTROYED.

He may : to destroy or neutralize a point target with artillery fire in an emergency situation, describe the target accurately in the initial call for fire, e.g. , MACHINEGUN IN LOG AND EARTH BUNKER; adjust the center of impact of the volleys as closely as possible to the target through normal procedures; request FIRE FOR EFFECT followed by REPEAT, if necessary, until the target is destroyed or neutralized; then terminate the mission.

115

(NOTE: The detailed procedures for the conduct of destruction missions with field artillery fire are deemed to be beyond the scope of this paper.)

**He will :** know that the ability to detect targets and adjust fire rapidly and accurately on stationary point targets will increase enemy casualties and increase the destruction of enemy materiel, frequently will permit the platoon to gain fire superiority where it might otherwise have been pinned down, minimize the danger to near-by friendly troops and indigenous personnel, and significantly reduce damage to civilian property when using indirect fires in habitated areas during internal defense.

116

**He must :** record information prior to and during the conduct of fire to facilitate rapid and accurate response by supporting units.

117

- (1) Determine and record target locations and designations in advance for points of probable activity.
- (2) If necessary, record corrections transmitted to the FDC during adjustment to maintain knowledge of the size of the bracket and the last deviation correction.
- (3) To make a correction to improve the accuracy of a recorded target location for future use, announce the correction, e.g., LEFT 30; ADD 25, followed immediately by END OF MISSION.

- (4) Habitually record target locations and the target designations (e.g., ALPHA ECHO 0414) transmitted to the observer by the FDC during the conduct of fire to facilitate future delivery of fire in the same location and to permit rapid shifts to near-by target areas.

**He will :** know that a smoke-screening mission requires the authorization of the highest commander whose troops will be affected, usually a division, brigade, or battalion commander; that time for registration and large amounts of ammunition are required for initial screening and maintenance of a smoke screen; and that if a platoon leader is involved in the use of pre-planned screening smoke he may be furnished a target designation and instructed as to when to request delivery.

118

**:** adhere to the following specific guide lines when using WP shell on his own initiative:

119

- (1) Avoid the use of WP shell close to friendly troops when wind direction and speed will cause the smoke to interfere with control or observation and in situations where the smoke may aid the enemy; e.g., WP smoke blown down wind from enemy positions toward friendly troops may conceal an enemy advance.

- (2) Limit use of WP shell to attack on enemy automatic weapons, antitank weapons, observation posts, enemy located in flammable structures or dry vegetation, marking rounds, and similar missions that do not entail establishment and maintenance of a smoke screen.
- (3) To produce maximum casualties with WP, place the range center of impact on the target; adjust with HE after requesting WP in effect in the call for fire.
- (4) Know that flooded areas (such as rice paddies and swamps) and deep snow will seriously reduce the effectiveness of WP shell.

He must : instruct and supervise subordinate leaders and selected potential leaders in making subsequent corrections after initiating a call for fire; in surveillance of fire for effect, and in the use of WP shell, including use by small units to break contact with a superior force.

120

4. THE IRPL WILL EMPLOY ARTILLERY AND MORTAR ILLUMINATING ROUNDS IN ACCORDANCE WITH UNIT SOP OR SPECIFIC INSTRUCTIONS WHEN OPERATING AS PART OF A LARGER UNIT AND AS REQUIRED BY THE SITUATION DURING PATROL MISSIONS.

**He will** : know that control over the use of illuminating rounds is exercised by the battalion commander in coordination with adjacent units through higher headquarters. 121

: know that illumination planned by higher headquarters usually provides on-call illuminating missions for small-unit leaders. 122

: determine and record target designations and locations, and employ planned illumination within his area of responsibility to obtain timely delivery of illuminating rounds. 123

**He must** : use illuminating rounds during darkness to adjust mortar and artillery fire, to facilitate target detection and the delivery of fire from organic and supporting weapons, to illuminate areas of suspected enemy activity, for enemy harassment, and to indicate direction of movement to friendly troops and patrols. 124

: when illuminating rounds are used to indicate direction of movement, request rounds well in advance of friendly troops to avoid undesirable illumination of his own men, and note wind direction and speed to ensure that wind drift does not cause flares to illuminate his own or other friendly troops. 125

- : provide alternate means of illumination in form of trip flares , parachute flares , hand-held ground signals , and flame field expedients for use when mortar and artillery illumination may not be immediately available.** 126
- He will : adjust illuminating rounds delivered by mortar or artillery.** 127
- : know that , generally , illuminating rounds should be at one flank of the adjusting point and at about the same range; for targets on a forward slope , adjust to place the flare on a flank and at a slightly shorter range; and when the adjusting point is a very prominent target , place the flare beyond the target to silhouette it.** 128
- : use standard procedures for adjusting range and deviation , except that adjustment of illumination closer to the target than 200 meters is usually not necessary.** 129
- : consider the effect of wind drift when selecting initial point of burst in relation to the adjusting point and observe the drift of the initial flare(s) to compensate for wind drift during adjustment.** 130

: know the approximate rate of fall for illuminating rounds fired from each separate indirect fire weapon commonly used in the area of operations, or request the information from the FDC for the specific weapon being fired. 131

: correct (9) Height of burst UP or DOWN to the nearest 50 meters based on a known rate of fall so the flare burns out as it strikes the ground; e.g., a low flare with a rate of fall of 10 meters per second hits the ground and burns for 14 seconds (a slow count of 14);  $14 \times 10 = 140$  or a correction of UP 150. On high flares, make a bold correction DOWN to obtain burn out on the ground and then correct UP to the nearest 50 meters. 132

He must : instruct and supervise subordinate leaders and selected potential leaders in the employment of illuminating rounds. 133

5. THE IRPL WILL PLAN AND COORDINATE THE USE OF INDIRECT FIRES FOR HIS PLATOON IN OFFENSIVE, DEFENSIVE, RETROGRADE, AND PATROLLING OPERATIONS; KNOW COMBAT-TESTED TECHNIQUES OF EMPLOYMENT OF INDIRECT FIRES; SELECT AND EMPLOY TECHNIQUES TO DOMINATE SPECIFIC SITUATIONS; VARY THE TECHNIQUES EMPLOYED TO PREVENT THE ENEMY FROM PREDICTING AND AVOIDING THE EFFECTS OF INDIRECT FIRES; AND MAKE MAXIMUM USE OF INDIRECT SUPPORTING FIRES PLANNED AND DELIVERED BY HIGHER HEADQUARTERS.

- He must :** know that the fires of all indirect fire weapons are planned to complement each other to take maximum advantage of the capabilities of the weapons system, and that fire support from tactical air and armed helicopters is closely coordinated and controlled as an integral part of the over-all fire plan for each operation or continuing phases of an operation. 134
- :** know the unit sources; types, numbers, and capabilities of weapons; coordination required; and the channels of communication usually available for indirect fire support from rifle-platoon level up to and including the direct support artillery battalion in support of the infantry brigade. 135
- :** prior to any operation involving indirect fire support, determine the status and types of ammunition available for indirect fire weapons as a basis for planning and requesting indirect fires. 136
- :** know the ranges within which close supporting fires can be delivered from available weapons, determine the types and locations of available supporting weapons, and ensure that planned fires are realistic. 137

**He will :** upon the receipt of any mission, plan the use of available indirect fires (with the aid of his attached forward observer) as an integral part of his platoon fire plan; obtain approval of the platoon fire plan; and obtain and disseminate to his subordinate leaders the locations and designation numbers of targets and final protective fires, location of any pertinent fire coordination line or no fire line, description and time of delivery of any scheduled fires, availability of tactical air or armed helicopters, and any other information pertinent to the fire plan that will assist his unit to make maximum use of available fire support.

138

**:** instruct and supervise subordinate leaders and potential leaders in fire planning for offensive, defensive, retrograde, and patrolling operations and ensure that they know the channels of communication to be used to obtain supporting fires according to plan and in emergency situations; i.e., each higher headquarters has contact with sources of indirect fires and can relay emergency calls for fire if necessary.

139

**He must :** know, and ensure that his men know, that supporting fires in the attack are normally planned as: preparatory fires to destroy or neutralize enemy defending forces prior to initiation of attack by the assault echelon; fires in support of movement to the objective, including fires planned on critical terrain, avenues of approach, known and suspected enemy positions, and targets of opportunity; and fires beyond the objective or on any open flank of the objective to assist in reorganization and consolidation.

140

**:** consider interrupting the delivery of preparatory fires for periods of two to five minutes or more when engaging dug-in enemy to permit the enemy to expose himself (man his defenses) and increase his vulnerability; avoid patterns of interruption likely to be anticipated by the enemy.

141

**:** plan or recommend the planning of immediately available supporting fires, including illumination, to cover a night attack by stealth in the event surprise is lost before the attacking troops close on the main enemy positions. (This applies to small-unit raids as well as to large-scale attacks.)

142

- : ensure that his men "lean into" supporting fires during assaults to permit them to close on the enemy and destroy him while he is stunned and ineffective from the effects of friendly supporting fires.** 143
- : consider the use of a colored smoke round dropped 50 to 100 meters short of the target area to signal shifting of friendly supporting fires prior to the assault, and brief all of his personnel on reaction to the colored smoke to coordinate the assault.** 144
- : employ friendly indirect fires (air bursts) over friendly tanks and armored personnel carriers en route to the objective to protect them from dismounted enemy troops armed with portable armor-piercing weapons.** 145
- : anticipate the survival of significant numbers of the enemy despite use of friendly indirect fires when the enemy uses small foxholes, tunnels, and overhead cover; coordinate application of accurate, well-distributed fires in heavy volume from organic weapons with the shifting of friendly indirect fires.** 146
- : plan to shift indirect fires to cover reverse slopes and possible enemy approaches to the flanks as opposed to lifting (ceasing) fires during an assault on a specific objective.** 147

**: report rapid advances and changes in direction of movement promptly to permit planning, displacement of supporting weapons, and the maintenance of close support capability.** 148

**: use supporting indirect fires to pursue a withdrawing enemy as long as target indications are visible or a reasonable estimate of the location of the enemy can be made.** 149

**He will : know, and ensure that his men know, that supporting fires in the defense are normally planned as: long-range defensive fires in support of the combat outposts to force early deployment of the enemy and to delay and deceive him as to the location of the main defensive position; close defensive fires planned to destroy the attacking enemy force prior to assault; final protective fires planned to prohibit or break up the enemy assault on the forward defense area; and fires within the forward defense area to limit enemy penetrations, support counterattacks, prevent enemy reinforcements, and to destroy the enemy within any penetration.** 150

**: habitually have available indirect fires registered in defensive positions at the first opportunity that visibility permits, except when surprise must be maintained.** 151

**: plan defensive final protective fires so the near edge of the impact area is no closer than 200 meters to occupied friendly troop positions to permit organic weaponsmen to engage oncoming enemy who may pass through the indirect fire and continue the assault. (Unprotected troops closer than 200 meters to impacting indirect fires may become casualties.)** 152

**: direct and supervise the installation of Claymores, trip flares, trip-wired grenades and similar warning devices to indicate enemy movement, cause enemy casualties and facilitate delivery of preplanned indirect fires during limited visibility.** 153

**: in situations where resupply of ammunition for organic weapons is questionable and indirect fires are readily available, conserve ammunition for organic weapons by substituting indirect fires or using indirect fires to supplement the effects of organic weapons.** 154

**: employ HE and WP mixed against enemy infantry-tank teams to destroy the enemy foot troops protecting the tanks, limit the visibility of the tank crews, and increase the vulnerability of the tanks to friendly AT weapons as the tanks emerge from the smoke.** 155

- : when the sound (detonation of propelling charge) of enemy mortars or artillery can be heard, obtain intersecting azimuths from known points, plot the azimuths on a map, and call for counterbattery fire on the gun positions indicated by the intersection of the azimuths. 156**
- : use the sound and flash method to locate enemy direct and indirect fire weapons, report the location (grid coordinates or polar coordinates), and call for and adjust counterbattery fire. 157**
- : when prearranged "flash fires" (air bursts) are planned over friendly bunkers, delay delivery of the fires until the enemy has lifted or shifted his indirect fires and enemy troops are closing on the bunkers in the assault. 158**
- : ensure that his men know that friendly indirect fires (HE, fuze quick) will be planned for delivery on positions where adequate foxholes with overhead cover are available so the surface can be swept clean of enemy overrunning the position. 159**
- : specify and employ visual signals (e.g., green star cluster) to forewarn friendly troops to take cover to permit friendly indirect fires to sweep overrunning enemy from the surface around covered positions. 160**

- He must :** know, and ensure that his men know, that fire support planning in retrograde operations is similar to that employed in the defense with increased emphasis upon the use of on-call indirect fires, tactical air, and armed helicopter support upon approach routes and targets of opportunity as the enemy seeks to develop resistance; plan fires accordingly. 161
- :** habitually plan fires directly on friendly troop positions to permit withdrawal and rapid engagement of advancing enemy with indirect fires, particularly when the enemy seeks to employ "hugging" tactics. 162
- :** anticipate possible loss of control during retrograde operations and emphasize the use of emergency channels of communication to obtain fire support, i.e., establish radio contact with any higher headquarters and initiate a call for fire. 163
- :** make maximum use of HE and WP mix to cause casualties, deny observation, and cover withdrawal of small units to prevent decisive engagement with superior enemy forces. (This applies to patrolling as well as to retrograde operations.) 164

**He will** : know, and ensure that his men know, that indirect fires are planned in support of patrols to cause casualties, conduct reconnaissance by fire, aid navigation, divert enemy attention, deny enemy use or observation of selected terrain, isolate the objective, and to provide illumination; plan fires accordingly, including indirect fire support for patrols involved in internal defense and development operations.

165

: habitually file a quantitative description (azimuths, distances, and checkpoints) or overlay of patrol or other movement routes with the commander who is to monitor the operation to facilitate rapid, accurate delivery of on-call supporting fires en route.

166

: when the availability of mortar and artillery ammunition permits, combine adjustment and reconnaissance by fire during open tactical movement as a guard against ambush and to obtain adjustment on specific points from which indirect fire can be shifted rapidly to enemy positions in the event of contact.

167

: request delivery of a specific type of round (e.g., high air burst in wooded terrain, illuminating round during darkness, WP in open areas) to mark designated coordinates as an aid to navigation or to establish a known point from which fire can be shifted to a near-by target.

168

**: use indirect fires to cover noise and exposure likely to occur when friendly troops are breaching enemy wire entanglements and minofields, maneuvering in noisy undergrowth, or crossing streams or other open areas.** 169

**: anticipate enemy "close embrace" or "hugging" tactics by application of a maximum volume of organic fires upon contact and initiation of an immediate request for indirect supporting fires to prevent the enemy from closing and thus avoiding the effects of indirect fires during meeting engagements and in the defense of patrol bases and security positions.** 170

**: consider use of prearranged box barrage fire to forestall a mass attack on a small perimeter, to isolate an enemy objective and prevent reinforcement during a raid, or to cover a stream crossing toward an enemy-held far shore.** 171

**: know that Communist "sparrow warfare" is the continual harassment of a friendly column by teams of three to five guerrilla snipers moving parallel to the column; employ indirect fire against such enemy personnel without hesitation when ammunition is available in quantity.** 172

**: consider the use of concealed stay-behind observers to request and adjust indirect fires upon enemy guerrillas who return to a battle area to salvage weapons and equipment and evacuate dead and wounded; withdraw observers by helicopter.** 173

**: consider the use of HE with fuze quick to probe inundated areas when enemy seek to escape by submerging themselves in water; use a pattern of delivery that will flush the enemy on the friendly side of indirect fires and employ small arms fire to increase destruction or force surrender.** 174

**: during movement in heavily wooded areas, report the dimensions and locations of areas with overhead clearance and hard standing suitable for the emplacement of mortars and the delivery of mortars and resupply of ammunition by helicopter.** 175

**: during enemy contact in heavily wooded areas, coordinate and monitor the initial adjustment of indirect fires by aerial observers with the ground observer assuming control, completing adjustment, and directing fire for effect as the fires are brought near friendly troops.** 176

: adjust, and ensure that his small-unit leaders can adjust, indirect fire on the basis of sound of burst when dense vegetation precludes visual observation of the burst, i. e., use the creeping method of adjustment to "walk" the fire toward the target from the side of the target opposite his own troops. 177

: use colored smoke for identifying friendly troop locations and know that in calm weather colored smoke may be more easily visible to aerial observers than panels; anticipate that wind may cause colored smoke to drift and present an inaccurate picture of the location of friendly troops, particularly when troops are located in small clearings or tight perimeters. 178

: plan and employ prearranged illumination to aid reconnaissance of specific objectives, to facilitate the delivery of friendly fire from ambush, to illuminate raid objectives during the assault, and to aid in the adjustment and surveillance of indirect fires during darkness. 179

: anticipate the possible effect of forest and brush fires resulting from the use of indirect fires when friendly troops are located in dense, dry vegetation that is down wind from prospective targets. 180

**: particularly during internal defense situations , 181**  
**consider the probable effect of the use of indirect**  
**fires upon members of the indigenous population**  
**and their property; avoid the use of supporting fires**  
**that may cause useless loss of life or property**  
**damage without contributing to the mission.**

**: know, and ensure that his men know, what sup- 182**  
**porting fires are planned for each patrol operation**  
**in which they participate and how to obtain fires**  
**planned for on-call delivery if the forward observer**  
**and leaders become casualties.**

**: know, and ensure that his men know, that for- 183**  
**ward observers, artillery liaison officers, FDC**  
**personnel, or other experienced personnel moni-**  
**toring calls for fire often will talk a novice observer**  
**through a successful adjustment of fire and obtain**  
**fire for effect if the novice will remain calm and**  
**answer questions intelligently.**

**He must : instruct and supervise his subordinate leaders 184**  
**and selected potential leaders in the techniques**  
**of employment of indirect fires to prepare them to**  
**serve as patrol leaders and as replacements for**  
**other leaders who become casualties or complete**  
**tours of duty.**

**: review the elements of the call for fire, subsequent corrections, and adjustment procedures periodically with subordinates to ensure retention of knowledges and skills required to use indirect fires during patrols or other semi-independent missions.** 185

**: know, and ensure that his men know, that harassing fire is delivered to disturb the rest of the enemy, to curtail movement and, by threat of losses, to lower morale; that interdiction fire is placed on an area or point to prevent the enemy from using the terrain under fire; and that harassing and interdiction (H & I) fires are planned and scheduled in support of operations with the times for firing varied to prevent establishing a pattern.** 186

**: recommend use of air bursts over roads and canals as harassing and interdiction fire to reduce known and suspected enemy movement and curtail the mining of communications routes.** 187

**He will : when indirect fire support is unavailable, request tactical air support or attack by armed helicopters as a substitute. (The designation of targets for armed helicopters and fixed-wing aircraft is covered in Annex 5: Airborne/Airmobile Operations, and is not repeated herein.)** 188

**He must :** know that knowledge of results enhances performance and habitually provide mortar and artillery crews and forward observers with details of the effects of their fires when possible; if supporting fires are unresponsive, inaccurate, or inadequate, make necessary corrections, request repetition of the fire, and report inadequate responses stemming from human error to his commander. 189

**He will :** when infrared or image intensification devices are available, supervise the employment of the devices by selected personnel (e.g., attached mortar forward observer) to detect targets and adjust indirect fires during darkness through use of daylight procedures. 190

**:** request and obtain night vision devices well in advance of need and ensure effective employment and adequate operator maintenance through instruction and review of operation by designated operators prior to use. 191

**:** employ night vision devices himself to maintain effective surveillance and to adjust indirect fires in situations where the adjustment of indirect fires during darkness is critical, e.g., loss of forward observer during enemy attack. (Detailed operation and user maintenance of infrared and image intensification devices are covered in Annex 34: Infrared Weaponsight and Image Intensification Devices, and are not repeated herein.) 192

**6. THE IRPL WILL EMPLOY AND SUPERVISE THE EMPLOYMENT OF THE 81-MM MORTAR WITHOUT A FIRE DIRECTION CENTER DURING TACTICAL MOVEMENT AND IN DEFENSIVE POSITIONS WHEN A MORTAR SQUAD IS ATTACHED TO HIS PLATOON.**

**He must :** subject to limitations imposed by the attachment order, exercise the same degree of command and control over and assume the same responsibility for the welfare of attached troops as he does over units and individuals organic to his command. **193**

**:** anticipate the need for the attachment of 81-mm mortar squads and forward observer parties during raids, ambushes, establishment of patrol bases, establishment of combat outposts covering communications routes, defense of landing zones, and similar semi-independent operations and request the attachment of indirect fire teams to his platoon when they can make a positive contribution to the accomplishment of the platoon mission. **194**

**:** know that in any situation where rapid and extensive dismounted maneuver is demanded by the mission the attachment of an 81-mm mortar will reduce the rate of march, require use of organic personnel to provide security for the mortar during movement and at halts, and require attached personnel in addition to the mortar crew to serve as ammunition bearers. **195**

**: know that the limited amount of 81-mm mortar ammunition that can be carried on the backs of dismounted soldiers (in addition to their fighting loads) usually will decree that only one mortar be carried on semi-independent missions despite the availability of a full section of mortars for attachment.** **196**

**: habitually consider the tactical and logistical advantages of employing a single 81-mm mortar with an overstrength crew in any situation demanding extensive foot movement and man-packing of weapons and ammunition.** **197**

**: avoid burdening his men with the weight of the 81-mm mortar and ammunition in extremely rough terrain where rapid dismounted movement is vital to gaining and maintaining contact, e.g., in areas where water-sodden terrain and dense vegetation combine to increase the difficulty of movement, make improbable the location of useful temporary mortar sites, and limit visibility to such short ranges that grenade launchers would be more useful than the mortar.** **198**

- : habitually employ helicopters or surface vehicles** 199  
**to deliver 81-mm mortars and mortar ammunition to**  
**security positions, patrol bases, combat outposts**  
**and similar positions when use of powered trans-**  
**port will not cause loss of surprise and initiative.**
- He will : know (for fire planning purposes) the minimum** 200  
**and maximum effective ranges of the 81-mm mortar**  
**and the inclusive ranges within which optimum**  
**close support can be furnished by an adequately**  
**trained indirect fire team.**
- : know the job assignment and primary duties of** 201  
**each member of the 81-mm mortar section head-**  
**quarters and each member of an 81-mm mortar**  
**squad.**
- : know the purpose and functioning of each major** 202  
**item of TOE indirect fire equipment assigned to the**  
**81-mm mortar section headquarters and the 81-mm**  
**mortar squad as employed in the delivery of mortar**  
**fire without an FDC.**
- : know the weight (to the nearest pound) of the** 203  
**81-mm mortar barrel, base plate, bipod assembly,**  
**and the weight of the standard HE and WP rounds.**

: know that for fire planning purposes the effective bursting area of 81-mm HE shell is approximately 25 meters in diameter when used with point detonating fuze on open, hard-surfaced terrain; use the 25-meter diameter for planning coverage of an area. 204

: know that the distribution of lethal fragments from HE shell may be reduced by 50 per cent or more when shells detonate in dense brush, deep snow, unfrozen muskeg, swamps, mud flats, rice paddies or similar terrain; plan the number of rounds to be carried on a specific mission according to the terrain in the area of operations. 205

: know that the smothering effect of snow, muck, and water is more pronounced on shell WP than on shell HE; that deep snow and water (e.g., flooded paddy fields) render WP virtually useless; but that WP impact bursts will quickly ignite dry vegetation, thatch, and other exposed flammable material. 206

: know that one 81-mm illuminating shell will illuminate an area approximately 1,100 meters in diameter for approximately one minute and that the rate of fall for the shell is four meters per second. 207

- He must :** upon the attachment of an indirect fire team to his platoon, determine the number of men attached by duty assignment and their level of training, including cross-training. (Combat casualties and lack of replacements will alter TOE figures.) 208
- :** inspect the weapons and equipment carried by the attached indirect fire team to ensure completeness and serviceability and obtain replacement items if necessary. 209
- :** specify and ensure the procurement of the amounts and types of ammunition and fuzes required to accomplish the mission and arrange for resupply of mortar ammunition (from the same ammunition lot numbers as the basic load if practicable). 210
- :** plan the assignment of personnel to carry TOE mortar components and ammunition to equalize and reduce combat loads to optimum individual or shared loads within the limits of available personnel and ammunition requirements during dismounted operations; obtain additional ammunition bearers if necessary. 211
- :** determine (or establish if necessary) the chain of command within the attached indirect fire team to provide for the effective delivery of mortar fire despite the occurrence of casualties among the attached mortar personnel. 212

- He will** : ensure that he, the mortar forward observer, the mortar squad leader, and the gunner each have a copy of the firing tables for each type of ammunition to be employed. **213**
- : provide maps for and require the mortar forward observer and mortar squad leader to assist in maintaining accurate orientation and knowledge of current location through the use of map-terrain association during all movement. **214**
- : ensure that the M2 compasses carried by the attached mortar forward observer and the mortar squad leader are zeroed to reflect magnetic azimuths so the azimuths read from their M2 compasses and from the lensatic compasses carried by the IRPL and his subordinate leaders will be from the same base line (magnetic north); remind mortar leaders to specify **MAGNETIC DIRECTION** in calls for fire to supporting units, e.g., supporting artillery. **215**
- : obtain binoculars for the mortar squad leader so he can act as forward observer at or near the mortar using the direct lay method or direct alignment method in an emergency, e.g., loss of the attached forward observer or the appearance of enemy targets to the flanks or rear of a formation or defensive position that may be visible to the mortar crew but not visible to the forward observer. **216**

**He must :** know that heavy brush, tall grass, natural darkness, smoke, and fog, rain, or snow may limit the visibility of mortar squad leaders and observers and require the platoon's organic leaders to call for and adjust fire, particularly in perimeter defense and during meeting engagements. 217

**:** know that the locations of useful mortar positions and the locations from which targets are visible to a forward observer (or mortar squad leader) frequently will not coincide to permit use of the direct lay method; ensure that all small-unit leaders organic to the rifle platoon are capable of using the direct alignment method of adjusting fires when operating without an FDC. 218

**:** ensure the availability of binoculars for his rifle squad leaders who are most likely to be required to serve as forward observers, e.g., those on the flanks or rear of a moving formation. (Depending upon the requirements of the mission, redistribution of binoculars assigned to the weapons squad of the rifle platoon may fulfill this need.) 219

**He will :** obtain a radio and communication wire for the mortar squad leader to permit fire control within the platoon command net by radio during tactical movement and by telephone in perimeter defense. 220

: obtain and distribute to his small-unit leaders, 221  
the mortar forward observer, and attached mortar  
crew members the call signs, frequencies, and  
authentication data necessary to permit coordination,  
including the adjustment of supporting artillery and  
mortar fires by aerial observers when the initial rounds  
in adjustment cannot be seen or heard by ground ob-  
servers with clarity to permit effective creeping  
adjustment.

He must : seek recommendations and advice from the senior 222  
members of the attached indirect fire team during  
planning, but habitually remain aware that he is  
responsible for evaluating the advice and recom-  
mendations and for making decisions upon which  
action is based.

: issue timely warning orders and operations orders 223  
to and brief, inspect, and rehearse the indirect fire  
team as an integral part of his total force.

: continually emphasize the need to cross-train 224  
attached members of the 81-mm mortar squad to  
permit maintenance of alert skeleton crews over  
long periods of time and to provide for immediate  
replacement of key personnel who become casu-  
alties.

: establish, and ensure that all members of the attached mortar crew know and adhere to, the SOP required to permit members of the rifle platoon to use the standard call for fire and subsequent corrections when employing an attached mortar using the direct lay method or the direct alignment method; e.g., the mortar crew members will:

- (1) During tactical movement, seek the nearest useful mortar position and prepare to mount and lay the mortar upon receipt of observer identification and the warning order, e.g.,  
LITTLE VULCAN 18, THIS IS BLUE RIFLEMAN  
24, FIRE MISSION, OVER.
- (2) Anticipate that the target location, in calls for fire during tactical movement and prior to registration in any area where a target appears suddenly and is not visible to the mortar crew, will consist of the magnetic direction to the nearest 10 mils from the mortar to the target and the distance to the nearest 25 meters from the mortar to the target, i.e., a polar plot with the known position of the mortar serving as the point of origin, e.g.,

MAGNETIC DIRECTION 2840;

DISTANCE 450.

- (3) Upon receipt of the initial data, acknowledge receipt, select a useful mortar position, mount and lay the mortar, and report NUMBER ONE, UP (or READY) as soon as the mortar is laid for the specified azimuth and range.  
(Upon receipt of the initial data the squad leader will face the specified azimuth by sighting his compass, set a base plate stake, rest the compass on the stake, direct the placement of an aiming stake on the specified azimuth, then direct the placement of the base plate and the mounting and laying of the mortar.)
- (4) When no type of projectile is announced by the observer, use HE.
- (5) When no fuze action is specified by the observer, use fuze quick.
- (6) When no number of rounds is announced by the observer, fire one round upon receipt of ADJUST FIRE, upon receipt of OVER, or upon receipt of the command FIRE when preceded by AT MY COMMAND; fire the specified number of rounds cited in a modified fire command or upon receipt of FIRE FOR EFFECT or upon receipt of the command FIRE when preceded by AT MY COMMAND.

- (7) When a forward observer transmits REPEAT , fire again the same number of rounds with the data specified for the last order fired or as changed by the observer, e.g. , DROP 50; REPEAT.
- (8) Know that all azimuths used are magnetic azimuths to permit the leaders within the supported rifle platoon to use their lensatic compasses to obtain mortar-target azimuths.
- (9) Anticipate the probable necessity to deliver fire in any direction when contact occurs during tactical movement; select positions and place out aiming stakes accordingly as soon as time permits after reaction to initial call for fire; record the magnetic azimuths of each aiming stake and ensure that any individual acting as gunner knows the azimuth of each stake.
- (10) Know that all calls for mortar fire from rifle platoon members will be approved and relayed by the IRPL to guard against indiscriminate use of indirect fire .
- (11) Transmit SHOT after firing each round in adjustment and ROUNDS COMPLETE upon completing each order of fire for effect .

**(12) When friendly air traffic is apparent in the area or scheduled to enter the area, ensure that one mortar crew member observes for friendly aircraft along the mortar-target line to order CHECK FIRING if friendly aircraft are endangered by their proximity to the trajectory of the weapon.**

**He will : supervise the tactical loading of the 81-mm mortar section headquarters personnel and a mortar squad, i.e., designate the placement of each major item of equipment and the position of each attached individual in wheeled transportation, tracked vehicles, or helicopters to maintain tactical integrity and to facilitate rapid employment of the weapon upon dismounting from the vehicle or aircraft.**

**226**

**: supervise the preparation of 81-mm mortar ammunition for initial delivery of basic load (or for resupply) by helicopter as a sling load.**

**227**

**: integrate the attached indirect fire team into his platoon (patrol) formation to provide protection during movement and at temporary halts with special emphasis upon the protection of attached mortar personnel during their delivery of indirect fire or preparation to deliver fire.** **228**

**: usually keep the attached mortar forward observer party within easy voice range during dismounted tactical movement, integrate the forward observer party into the CP-OP during halts or in perimeters, but avoid denying the forward observer the freedom of movement and the use of vantage points vital to reconnaissance, the maintenance of adequate surveillance, and the delivery of effective indirect fire.** **229**

**: monitor and deny or approve calls for indirect fire from subordinate leaders within the platoon to the mortar squad leader in situations where the target is not visible to either the mortar forward observer or the mortar squad leader.** **230**

**He must :** when prearranged fires are available on call

**231**

from aircraft, artillery, or mortars other than the attached mortar, use the on-call fires to support his unit when the reaction time is equal to or more rapid than that of the attached mortar to maintain secrecy of the existence and location of the attached mortar, to conserve immediately available mortar ammunition, to take advantage of the greater volume of fire available from on-call sources, to make maximum use of the flexibility of the target-grid method of fire delivery employed by the on-call sources, and to maintain a reserve source of indirect fire in the event several widely separated enemy targets demand the application of indirect fire simultaneously, e.g., the attached mortar FO may use the radio to call for and adjust artillery fire on one target using the target-grid method while the mortar squad leader conducts fire from a position at or near the attached mortar using the direct lay method to engage a second target.

**He will :** know that undue involvement with the details and mechanics of indirect fire delivery will detract from his ability to maintain a current estimate of the situation, reduce his over-all control of his fires and his maneuver units, and may interfere with the effectiveness of the attached indirect fire team.

**232**



- He must :** maintain, and ensure that the mortar forward observer, the platoon sergeant, and the rifle squad leaders maintain, current knowledge of the location of the mortar (direction and distance to within plus or minus 50 meters) during tactical movement and upon emplacement of the mortar within a perimeter so any small-unit leader can call for and obtain fire on targets of opportunity not visible from the mortar position and not visible to the mortar forward observer. **236**
- :** instruct and supervise his subordinate leaders and selected potential leaders in the critical knowledges and skills required to use an attached 81-mm mortar without an FDC to prepare them for patrol missions and for service as replacements when other leaders become casualties or complete tours of duty. **237**
- :** know the basic requirements for a useful mortar position: overhead clearance and mask clearance, hard standing to support the base plate, cover or concealment from ground observation, in the order named. **238**
- :** recognize, mentally mark, and point out useful temporary mortar positions to the mortar forward observer and mortar squad leader during tactical movement in any situation where contact is possible. **239**

**: know that by shifting the bipod between fire orders , an 81-mm mortar crew can fire in any direction through 6 ,400 mils of traverse from a completely useful mortar position.** 240

**He will : select positions for rest halts on defensible terrain that will provide the best available fields of fire and observation and thus facilitate the employment of the attached indirect fire team , as opposed to halting for rest according to a rigid time schedule without regard for the effect of the terrain upon the security and fire delivery capability of his unit.** 241

**: ensure that the mortar is mounted and laid with minimum delay during rest halts , as demanded upon contact or anticipation of contact during movement , and upon occupation of any position he intends to defend , e.g. , a perimeter; cite an initial direction of fire (magnetic azimuth) and an initial range based upon a current estimate of the situation; and require the mortar squad leader to report when the mortar is mounted, laid, and ready to fire.** 242

**: know that the sounds of a mortar being fired (and muzzle flashes during darkness) signal the location of the mortar to the enemy and thus invite attack, particularly in open, non-linear warfare where abundant vegetation and rough terrain facilitate concealed enemy movement.** **243**

**: anticipate enemy attempts to attack mortar positions with infiltrators; provide alert 360-degree security; ensure that the mortar, ammunition, communication equipment, fire control equipment, mortar crewmen, and security personnel are protected by well-prepared fighting holes as soon as possible after occupation of a base; and avoid isolating attached mortars from protective security at any time.** **244**

**: where subsurface water prevents digging emplacements, use sandbagged emplacements constructed on the surface to protect the mortar, crew, and ammunition from flat trajectory fire and fragments and to support the base plate when time and the availability of sandbags will permit.** **245**

He must : know that speed , absence of necessity for precise map-terrain orientation , and the operation of one or more mortars with a minimum number of trained crewmen accrue as advantages when employing the 81-mm mortar without an FDC , but that limited movement of the forward observer (with resultant limitations on the width of the sector of fire) , frequent exposure of mortars and crew to enemy direct fires and observed indirect fires , and the loss of flexibility inherent in the target-grid method of fire control with an FDC combine to make use of the direct lay method and the direct alignment method acceptable only as temporary measures .

246

: to employ the direct lay method or the direct alignment method , know that the base line for the initial direction of fire and for subsequent corrections in deflection is a straight line (magnetic azimuth to the nearest 10 mils) running from the mounted mortar through the target (adjusting point) , i.e. , the mortar-target line; that the criterion for range is the range (to the nearest 25 meters) from the mounted mortar directly to the target (adjusting point) , i.e. , the mortar-target distance .

247

- :** when ordering 81-mm mortar fire that will fall within 400 meters or less of friendly personnel, add 200 meters to the initial mortar-target distance and use the creeping method of adjustment. 248
- :** anticipate that during operations against guerrillas the large majority of targets will be moving personnel detected at ranges of less than 400 meters; emphasize mastery of the creeping method of adjustment. 249
- :** when the safety of friendly personnel is not involved, habitually attempt to obtain a first-round hit and use the bracketing method of adjustment when a first-round hit is not obtained. 250
- :** adhere to the minimum range change guide rules during adjustment by bracketing. 251
- He will :** use the direct lay method when the target is clearly visible from the mortar position and the gunner can lay the mortar sight directly on the target (adjusting point). 252
- He must :** use the direct alignment method when the target is not visible from the mortar position and the mortar can be laid for deflection by use of an aiming stake located near the mortar and on the mortar-target line. 253

**He will** : when using the direct lay method, know that the 254  
gunner will use the mortar sight to spot and correct  
for the deviations of bursts from the mortar-target  
line while the forward observer spots bursts and  
orders range corrections for the gunner to the nearest  
25 meters or multiple of 25 meters.

: know that the best place for the forward observer 255  
during use of the direct lay method is at or near the  
mortar to assure direct voice communication with the  
gunner.

**He must** : when using the direct alignment method, know that 256  
location of the forward observer in any direction from  
and at any distance within 100 meters of the mortar will  
permit target-burst deviation values read from the ob-  
server's binocular reticule to be applied directly as  
deviation corrections on the mortar sight to achieve ef-  
fective adjustment, e.g., a burst spotted 30 mils left  
of the target would be corrected RIGHT THREE ZERO (mils)  
from any observer position within 100 meters of the mortar.

: when using the direct alignment method where the 257  
mortar-observer distance exceeds 100 meters, know  
that the observer must be located within 100 meters of  
the mortar-target line (preferably on the mortar-target  
line) and apply a correction factor to the number of mils  
spotted before ordering a deviation correction.

: when the mortar-observer distance exceeds 100 meters, estimate the observer-target (OT) distance to the nearest 100 meters; estimate the mortar-target (MT) distance to the nearest 100 meters; use the OT distance as the numerator of a fraction and the MT distance as the denominator of the fraction and multiply the target-burst deviation by the fraction to obtain the value of the deviation correction to be applied to the mortar sight, e.g., OT equals 300 meters, MT equals 600 meters, target-burst deviation spotted right 40 mils:  $300/600 (1/2)$  times 40 equals 20 mils, so the correction would be LEFT TWO ZERO (mils).

258

**He will** : when using the direct alignment method, announce all corrections in deviation in mils to the nearest 10 mils from the last round spotted and announce all corrections in range in meters to the nearest 25 meters or multiples of 25 meters from the last round spotted except when modified fire commands are used.

259

**He must** : determine the attitude and dimensions of each mortar target quickly prior to the delivery of the initial round in adjustment to aid planning the method of engagement and thus deliver fire for effect with minimum time loss after surprise is lost.

260

**He will :** habitually coordinate the use of indirect fires with any action required of his organic or attached elements that will be involved in the action either as part of the base of fire or as maneuvering forces. 261

**:** issue fragmentary orders as data are obtained or computed to give maximum time to the mortar crew for preparation to deliver fire, e.g., during tactical movement the warning order (FIRE MISSION) must serve as a signal for the mortar crews to locate the most suitable mortar position and mount the mortar. 262

**He must :** ensure that each observer (including himself) maintains a range sketch to aid the observer or any relieving observer to locate targets and bring fire upon them. 263

**:** ensure that a separate computer sheet is maintained at the mortar position for each registration point and each target fired upon. 264

7. WHEN EMPLOYING THE 81-MM MORTAR WITHOUT A FIRE DIRECTION CENTER, THE IRPL WILL FORMULATE AND ISSUE CALLS FOR FIRE AND MAKE SUBSEQUENT CORRECTIONS TO OBTAIN FIRE FOR EFFECT ON POINT AND AREA TARGETS; HE WILL DESIGNATE TARGETS FOR ATTACK WITH SEARCHING OR TRAVERSING FIRE BY THE MORTAR SQUAD LEADER OR MORTAR FORWARD OBSERVER.

**He must :** to order fire from attached mortars when operating without an FDC , follow the prescribed sequence of the standard call for fire and omit any element not pertinent to the specific order:

265

- (1) Observer identification.
- (2) Warning order , including size of fire unit desired in fire for effect if multiple mortars are attached.
- (3) Location of target.
- (4) Description of target.
- (5) Method of engagement.
- (6) Method of fire and control.

**He will :** to initiate a call for fire when observing from a position that prohibits direct voice communication , transmit the call sign of the attached mortar squad leader followed by his own call sign as (1) Observer identification , e.g. ,

266

**LITTLE VULCAN 18 THIS IS BLUE RIFLEMAN 24.**

**:** where direct voice communication is effective and identification is obvious , omit (1) Observer identification.

267

**He must :** to transmit (2) Warning order, announce FIRE 268

MISSION to alert mortar crewmen that his message is a call for fire, to notify all stations in the net that his is a priority message when using electronic communication, and to signal the mortar crew to locate a useful position and mount the mortar when mortar fire is required during tactical movement.

**He will :** transmit (3) Location of target by use of direct 269

laying, polar coordinates, reference to a known point (shift), prearranged data, or grid coordinates where maps are available to observer and crew.

**:** when speed in destroying the target takes 270

priority over cover and concealment and the target is clearly visible from a useful mortar position, point out the target, estimate and announce the mortar-target distance to the nearest 25 meters, and have the gunner use a clearly defined aiming point at the target for direct laying of the mortar.

**He will :** to use polar coordinates, know that the mortar position always serves as the point of origin for polar coordinates when operating without an FDC, transmit the magnetic direction to the nearest 10 mils from the mortar to the target as obtained with the lensatic compass from the mortar-target line or by the parallel line method, then transmit the mortar-target distance as visually estimated to the nearest 25 meters, e.g.,

**MAGNETIC DIRECTION 2690;**

**DISTANCE 700.**

**:** to locate a target by reference to a known point, such as a registration point or a recorded (numbered) target, transmit the designation of the known point, the deviation shift in mils to the nearest 10 mils, and the range shift to the nearest 25 meters in the order cited, omitting reference to any element requiring no change, e.g.,

**FROM REGISTRATION POINT ONE;**

**RIGHT TWO ZERO (mils);**

**ADD 150.**

**:** to use prearranged data when a target appears in an area where fire is registered, announce the target designation, e.g.,

**TARGET AF7020.**

: to use grid coordinates to locate a target,  
announce the grid coordinates of the target to  
the nearest 10 meters followed by the magnetic  
direction to the nearest 10 mils from the mortar  
to the target, e.g.,

274

GRID 46913961;

MAGNETIC DIRECTION 3210.

**He must :** announce (4) Description of the target and point  
out the target to the gunner when using the direct  
lay method or when designating a target for attack  
by the mortar squad leader or mortar forward ob-  
server, omit the description to save time when he  
intends to conduct fire on a target using the direct  
alignment method, and require subordinate leaders  
to describe the target to provide a basis for alloca-  
tion of ammunition or for denying the request where  
higher priorities for mortar fire exist.

275

**He will :** when initiating a call for fire without an FDC, omit  
all elements of (5) Method of engagement to obtain de-  
livery of one round of HE, fuze quick: if a type of  
projectile other than HE, fuze action other than fuze  
quick, or more than one round is desired, so specify  
in the sequence shown; e.g., to obtain two rounds to  
speed seating of the base plate on a mortar just mounted,  
specify TWO ROUNDS in (5) Method of engagement after  
designating the type of projectile and the fuze action or  
in lieu of the type of projectile and fuze action if HE,  
fuze quick is desired.

276

- He must :** to transmit (6) Method of fire and control when **277**  
initiating a call for fire without an FDC, terminate  
the call for fire with ADJUST FIRE and anticipate  
delivery of the initial round(s) as quickly as the  
crew can lay or, during movement, mount and lay  
the mortar.
- :** to control the time of delivery of fire, terminate **278**  
the call for fire with AT MY COMMAND, ADJUST  
FIRE; anticipate that the senior mortar crewman will  
announce NUMBER (specify) UP (or READY), when the  
mortar is mounted and laid, then drop the hung round  
when the observer commands FIRE.
- :** to cancel AT MY COMMAND, transmit CANCEL **279**  
AT MY COMMAND.
- He will :** know that a standard call for fire provides all of **280**  
the information required for an adequately trained  
and briefed mortar crew to mount and lay the mortar  
and deliver the initial round(s) in adjustment, e.g.,
- FIRE MISSION;  
NUMBER ONE;  
MAGNETIC DIRECTION 2690;  
DISTANCE 700;  
TWO ROUNDS;  
ADJUST FIRE.

- He must :** anticipate possible erratic delivery of the first two or three rounds fired from a new mortar position because of settling of the base plate due to recoil. 281
- :** when two rounds are ordered in the call for fire to speed settling of the base plate, spot the center of impact of the two bursts and base the subsequent corrections on this center of impact. 282
- :** if a round in adjustment is erratic after the base plate is seated, order a confirming round using the same data, i.e., REPEAT. 283
- :** when acting as a forward observer without an FDC, spot the location of each burst for range with respect to the adjusting point (target), and for deviation with respect to the mortar-target line on the basis of what is observed at the moment the burst occurs and determine necessary corrections. 284
- He will :** anticipate use of the ladder method of adjustment by mortar crew members when troop safety permits. 285

**He must :** after spotting the initial burst(s), formulate and 286  
transmit subsequent corrections according to the pre-  
scribed sequence and omit any elements for which no  
data or no change is required during adjustment, i.e.,  
(1) Magnetic direction.  
(2) Trajectory.  
(3) Method of fire.  
(4) Distribution.  
(5) Shell.  
(6) Fuze.  
(7) Deviation.  
(8) Range.  
(9) Height of burst.  
(10) Control.

**He will :** omit (1) Magnetic direction, (2) Trajectory, 287  
(3) Method of fire, and (4) Distribution during sub-  
sequent corrections of fire from an 81-mm mortar  
without an FDC.

: omit (5) Shell during adjustment and anticipate 288  
the use of HE when observing for the bursts or  
specify WP or ILLUMINATING as required.

**He must :** omit (6) Fuze during adjustment and anticipate 289  
the use of fuze quick when observing for the bursts  
or specify PROXIMITY as required; e.g., when ad-  
justing in tall, dense vegetation, specify PROXIMITY  
to obtain a burst visible above the growth.

- He will** : transmit (7) Deviation corrections as RIGHT or LEFT (so many mils) as measured to the nearest 10 mils with binoculars to bring the burst to the mortar-target line; apply the OT/MT correction factor when located in excess of 100 meters from the mortar. 290
- : omit (7) Deviation when the burst is spotted on the mortar-target line or within 10 mils of the mortar-target line. 291
- He must** : transmit (8) Range corrections as ADD or DROP (so many meters) to the nearest 25 meters or multiple of 25 meters as required by use of the creeping or bracketing method of adjustment. 292
- He will** : omit (9) Height of burst except when adjusting illuminating shell. (The adjustment of height of burst for illuminating rounds is covered elsewhere in this annex.) 293
- He must** : exercise (10) Control by terminating subsequent corrections with OVER when additional adjustment is possible and necessary. 294
- : to conserve ammunition when conducting a registration, announce END OF MISSION; REGISTRATION COMPLETE upon splitting a 50-meter bracket and not usually request a round to show the effect of the final correction. 295

- : request fire for effect upon adjusting the mean point of impact within the desired distance of the target (adjusting point). 296
- : during a creeping adjustment, cease adjustment and commence fire for effect when he obtains a TARGET spotting; when he obtains a RANGE CORRECT spotting with a deviation error of 10 mils or less; if on a correction of DROP 25, a burst is short of the target, choose from the last two bursts (one OVER, one SHORT) the burst nearest the target and fire for effect; if the last two bursts appear to be the same distance from the target, choose the last burst and fire for effect. 297
- : upon spotting a round SHORT after a range change greater than 25 meters during a creeping adjustment, change to the bracketing method of adjustment. 298
- : during a bracketing adjustment, cease adjustment and commence fire for effect when he observes a TARGET spotting, when he observes a RANGE CORRECT spotting with a deviation error of 10 mils or less, or when he splits a 50-meter bracket with a deviation error of 10 mils or less. 299

: when requesting fire for effect without an FDC , 300  
habitually specify the number of rounds to be fired  
immediately after announcing (5) Shell and (6) Fuze;  
in lieu of (5) Shell and (6) Fuze when both elements  
are omitted to indicate HE , FUZE QUICK; or after  
announcement of either (5) Shell or (6) Fuze alone ,  
e.g. ,

HE AND WP , SIX ROUNDS.

: when requesting fire for effect , terminate the 301  
request with FIRE FOR EFFECT or , to engage moving  
targets , terminate the request with AT MY COM-  
MAND , FIRE FOR EFFECT , then order FIRE when  
the targets reach the impact area.

: terminate a call for fire for effect with OVER when 302  
transmitting modified fire commands electronically.

**He will** : obtain effective fire on a point target or a seg- 303  
ment of an area target by firing an adequate number  
of rounds upon completion of adjustment without  
changing the lay of the mortar , anticipate normal  
dispersion of fire around the adjusting point , and  
know that three rounds fired from a single mortar  
with no change in deflection or elevation will cover  
an area approximately 50 meters square with cas-  
ualty-producing fragments in firm , open terrain  
with sparse vegetation.

**He must :** specify the type (other than HE) and number of rounds desired in fire for effect and make final minor corrections within the order for fire for effect to conserve ammunition and speed delivery of fire, e.g., with the base plate settled, the initial round in adjustment is spotted 25 meters beyond the adjusting point and 20 mils left of the mortar-target line; the subsequent order would be:

304

HE AND WP, SIX ROUNDS;  
RIGHT TWO ZERO (mils);  
DROP TWO FIVE (meters);  
FIRE FOR EFFECT.

**He will :** systematically shift fire for effect to neutralize point and area targets with priority of fire to the targets posing the greatest threat to the accomplishment of his mission.

305

**:** determine and order rapid shifts in range and deviation to intercept moving enemy targets with fire for effect on the basis of fleeting glimpses of enemy personnel, moving vegetation, dust, smoke, sounds of firing and other battlefield cues that indicate approximate target dimensions and probable direction of movement, e.g., issue a subsequent order after adjustment or shift from a known point: **THREE ROUNDS; RIGHT 30; DROP 50; AT MY COMMAND, FIRE FOR EFFECT;** then command **FIRE** when glimpses of the targets or other battlefield cues indicate enemy entering the impact area.

306

**He must :** carefully observe fire for effect and order additional fire with any necessary corrections if the previously delivered fire failed to neutralize or destroy the target as required. 307

: to request again the same number of rounds in fire for effect with the same data, transmit REPEAT or specify minor corrections and transmit REPEAT. 308

**He will :** know that traversing fire is obtained on fixed and moving targets extending in width approximately perpendicular to the mortar-target line by firing a specified number of rounds with a specified number of turns of the traversing hand wheel between rounds during delivery of fire for a given order, e.g., a mortar forward observer may adjust on the right end of a wide target and order SIX ROUNDS, TRAVERSE LEFT TWO TURNS, ELEVATION 1297, to cover a target 100 meters wide at a range of 1,000 meters with a single fire order. 309

: know that the primary objective in employing traversing fire is to place an adequate number of correctly spaced rounds on a wide target in less time than would be required to engage the same target with a succession of orders requiring shifts of fire across the target. 310

: know that the mortar forward observer, the mortar squad leader, and the mortar gunner are trained to compute data and formulate orders to attack wide targets effectively with traversing fire. 311

: designate wide targets for attack with traversing fire by the mortar forward observer or qualified crew members when practicable to obtain effective fire with minimum time loss. 312

**He must :** know that searching fire is obtained on fixed and moving targets extending in depth approximately parallel to the mortar-target line by firing a specified number of rounds with a specified number of turns of the elevating crank between rounds during delivery of fire for a given order, e. g. , a mortar forward observer may adjust on the far end of a deep target and order **SIX ROUNDS, SEARCH UP ONE TURN, ELEVATION 1208,** to cover a target extending 100 meters in depth between 800 and 900 meters in range. 313

: know that the primary objective in employing searching fire is to place an adequate number of correctly spaced rounds on a deep target in less time than would be required to engage the same target with a succession of orders requiring range shifts along the axis of the target. 314

: know that the mortar forward observer, the mortar squad leader, and the mortar gunner are trained to compute data and formulate orders to attack targets extending in depth effectively with searching fire. 315

: designate deep targets for attack with searching fire by the mortar forward observer or qualified mortar crew members when practicable to obtain effective fire with minimum time loss. 316

**He will** : as time permits, obtain instruction from qualified mortar forward observers or mortar crew members and learn to compute data and engage targets with traversing and searching fire using modified fire commands. 317

8. THE IRPL WILL, UPON OCCUPATION OF TERRAIN WITH INTENT TO DEFEND IN PLACE, PLAN DEFENSIVE FIRES IN CONJUNCTION WITH HIS SQUAD LEADERS AND THE SENIOR MORTAR CREW MEMBER AND PROVIDE SUBORDINATES WITH THE LOCATIONS, DESIGNATIONS, AND DESCRIPTIONS OF TARGETS TO PERMIT THEM TO REQUEST AND OBTAIN DEFENSIVE FIRES UNDER ALL CONDITIONS OF VISIBILITY.

**He must** : know that personnel shortages due to casualties or enemy pressure resulting from a meeting engagement may demand the use of an attached 81-mm mortar without an FDC in either a deliberately chosen or a hastily chosen defensive position. 318

**: if required to defend a landing zone or a potential landing zone, position the mortar off-center from the probable touchdown points of aircraft so the mortar position does not become an obstacle to aircraft during landings or take-offs.** **319**

**: make a reconnaissance of each squad sector with the rifle squad leader and the senior mortar crew member and select target areas parallel to the perimeter to provide final protective fire (traversing fire) and target areas on approach routes to the perimeter (fixed or searching fire).** **320**

**: with the aid of the senior mortar crew member and the squad leader for each squad sector, plan, register, and assign target designations for the fires, including illumination, required to defend the position, e.g., a request to fire TARGET AD 0401 may mean that the mortar crew will fire six rounds, traversing right two turns from a specific registration point for which range and deflection are recorded on the computer sheet for the specific target as a result of earlier registration.** **321**

**: ensure that each rifle squad leader and his subordinate leaders within each squad sector know the locations and designations of registered fires within their sectors, and know how to shift preplanned fires, e.g., TARGET AD 0401, DROP 50, to increase effectiveness against moving enemy.** **322**

**: anticipate the need to deliver mortar fire on any azimuth (full 6,400 mils) around the perimeter; install aiming stakes accordingly.** 323

**: know that the placement of an aiming stake directly on line between the mortar position and each rifle squad leader's position on a perimeter will permit each rifle squad leader to request and adjust mortar fire within his sector of responsibility when operating without an FDC.** 324

**9. THE IRPL WILL ENSURE THAT THE MORTAR, AMMUNITION, AND FIRE CONTROL EQUIPMENT ARE MAINTAINED IN OPERATING CONDITION, SAFEGUARDED AGAINST CAPTURE, AND DESTROYED IF CAPTURE BECOMES IMMINENT.**

**He will : ensure that adequate cleaning materials accompany the mortar to the field and are included in requests for resupply.** 325

**: periodically inspect the mortar, ammunition, and fire control equipment to ensure that routine maintenance is accomplished, particularly after extensive delivery of fire and during exposure to terrain and weather conditions likely to demand extra attention to maintenance.** 326

**: ensure that he and all mortar crew members follow safe procedures in handling misfires, with emphasis on returning the mortar to action with minimum delay.** 327

- : ensure through inspection and instruction that mortar ammunition is protected from weather and small arms fire within the limits permitted by the mission.** 328
- He must : maintain a current record of the mortar ammunition and fuzes available by type and request resupply as required on a timely basis, preferably by helicopter as a sling load.** 329
- : when the available supply rate (ASR) per weapon per 24 hours of operation is limited (e.g., 20 to 30 rounds), employ mortar fire only upon observed targets which threaten the mission and cannot be successfully engaged by any other fire source.** 330
- He will : prior to departure on a mission, ensure that all mortar crew members know how to destroy the mortar, fire control equipment, and ammunition in the event capture becomes imminent.** 331
- : ensure the issue of two thermite grenades to the squad leader and two to the gunner prior to departure on a mission for destruction of the mortar if capture becomes imminent.** 332
- : if necessary, order the destruction of the mortar ammunition and fire control equipment to prevent capture by the enemy.** 333

**: have ammunition destroyed by firing at the maximum practicable rate on any target within range. 334**

**: smash the sight and similar equipment to render it useless to the enemy. 335**

**: burn the bipod assembly with thermite grenades to fuse the traversing and elevating mechanism. 336**

**: burn and fuse the firing pin, cap, and base plug with thermite grenades by dropping the grenades into the tube; perforate the hot tube crosswise with bursts of machinegun fire if time permits. 337**

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13. ABSTRACT This document is one of a series of research by-products that details the critical skills, knowledges, and performances the infantry rifle platoon leader must possess for effective individual and unit combat performance. The overall goal of the research is to improve officer training in these critical combat skill areas necessary for effective leadership. This document concerns the critical skill requirements in the area of use of indirect supporting fires.			

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