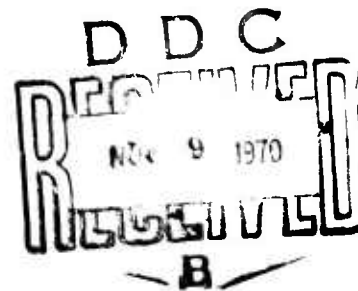


AD 713928

HumRRD



Research By-Product

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

Use of Indirect Supporting Fires

by

Frank L. Brown

March 1969

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
Springfield Va 22151

This document has been approved
for public release and sale; its
distribution is unlimited.

The George Washington University
HUMAN RESOURCES RESEARCH OFFICE

65

This material has been prepared for review by appropriate research or military agencies, or to record research information on an interim basis.

The contents do not necessarily reflect the official opinion or policy of either the Human Resources Research Office or the Department of the Army.

ACCESSION NO.	
CFBTI	WHITE SECTION <input checked="" type="checkbox"/>
DDC	DIFF. SECTION <input checked="" type="checkbox"/>
UNANNOUNCED	<input type="checkbox"/>
JUSTIFICATION	
BY	
DISTRIBUTION/AVAILABILITY CODES	
DIST.	AVAIL. NO./X SPECIAL

The Human Resources Research Office is a nongovernmental agency of The George Washington University. HumRRO's mission in work performed for the Department of the Army (DA Contract 44-188-ARO-2) is to conduct research in the fields of training, motivation, and leadership.

Research By-Product

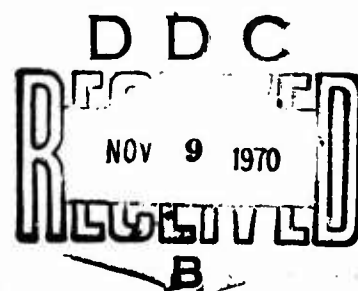
CRITICAL COMBAT PERFORMANCES,
KNOWLEDGES, AND SKILLS REQUIRED OF THE
INFANTRY RIFLE SQUAD LEADER

Use of Indirect Supporting Fires

by

Frank L. Brown

March 1969



Technical Advisory Service

This document does not represent official opinion or policy
of the Department of the Army.

HumRRO Division No. 4
(Infantry)

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

FOREWORD

In response to a request from the United States Army Infantry School (USAIS), HumRRO Division No. 4 (Infantry) initiated a Technical Advisory Service research project to identify and record the critical combat performances, knowledges, and skills required of the Infantry Rifle Squad Leader (IRSL) and the Infantry Fire Team Leader (IFTL).

The requirements imposed upon the IRSL and IFTL are essentially the same, except that the former is responsible for the control of the men and fires of both fire teams in a rifle squad, rather than only one. The senior IFTL within each squad must be prepared to assume effective leadership of the squad immediately if the IRSL becomes a casualty, completes a prescribed combat tour, or is absent for any reason. Since it is common practice to provide the same training for candidates for both positions of leadership and to employ the outstanding candidates in the higher position, each paper in this series will set forth the critical requirements imposed upon the IRSL and, therein, those imposed upon the IFTL as well.

Under Work Unit LEAD, Work Sub-Unit I, the critical combat performances, knowledges, and skills of the Infantry Rifle Platoon Leader were published in a series of 41 papers covering a like number of subject areas. Each paper was published with prior review and concurrence by the USAIS Instructional Departments concerned. These papers are being used as the primary source of data in completing a parallel series of papers for the Infantry Rifle Squad Leader and the Infantry Fire Team Leader. This document details the requirements pertaining to the use of indirect supporting fires.

This Technical Advisory Service research is being performed at HumRRO Division No. 4 (Infantry), Fort Benning, Georgia. The present Director of Research is Dr. T. O. Jacobs.

Military support for the study is being provided by the U.S. Army Infantry Human Research Unit, Fort Benning, Georgia. LTC Chester I. Christie, Jr. is the present Unit Chief.

HumRRO research is conducted under Army Contract DAHC 19-69-C-0018 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 IRSL and his IFTL's frequently will face situations where the fires from all of the squad's organic and commonly attached weapons will be insufficient to gain the fire superiority required to accomplish the mission, particularly during reconnaissance patrol and ambush missions. In such situations, far greater destruction will be wrought upon superior numbers of the enemy if all Infantry small-unit leaders are highly competent in obtaining surprise fire in heavy volume from mortars and artillery. Commanders who assign missions to Infantry small units habitually make indirect supporting fires available 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 squad 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 small 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 squad-strength ambush or reconnaissance 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 IRSL 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 officers have patiently coached Infantry soldiers through the adjustment of fires and aided them to obtain adequate delivery of fire for effect upon worthwhile targets.

With three 81-mm mortars organic to the rifle company, the attachment of an 81-mm mortar and crew to the rifle platoon during semi-independent missions must be anticipated. With a mortar and crew attached to the rifle platoon, any small-unit leader who is adequately trained may obtain mortar fire rapidly by direct laying of the mortar or by use of the direct alignment method. Both methods permit rapid engagement of fleeting targets of opportunity likely to be encountered in combat against guerrillas. Neither method requires the use of a fire direction center (FDC). Both the lack of time and the loss of mortar crew members as casualties may prohibit the operation of an FDC. The locations of useful mortar positions and the locations from which targets are visible to the mortar forward observer or the mortar squad leader frequently will not coincide to permit direct laying of the mortar. Further, thick vegetation, rain, fog, and natural darkness may prohibit direct observation of targets demanding use of mortar fire by mortar personnel. Thus it is essential that the small-unit leaders at rifle squad level master the knowledges and skills

required to obtain effective fire from the 81-mm mortar when lack of time or lack of personnel preclude use of an FDC and in situations where targets are not immediately visible to either the mortar forward observer or the mortar squad leader.

Scope

This paper covers the knowledges, skills, and performances required of the IRSL (and his IFTL's) 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 IRSL (and his IFTL's) when an 81-mm mortar crew is attached to his parent 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 the paper on 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, maps, and communications equipment obtained from any forward observer who becomes an ineffective casualty and cannot be replaced during the conduct of an assigned mission.

Battlefield Cues

Recognition of any hostile target or suspected target area suitable for engagement with artillery or mortar fires, including reconnaissance by fire and likely locations for defensive concentrations (targets) required to cover ambush sites.

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.

Forward movement, including the assault, which requires coordination of 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 rifle squads from the parent unit and thus create a need to coordinate the employment of indirect supporting fires for the detached element.

Opportunity to deny observation to the enemy or to screen the movement of the squad 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.

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

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.

Need to plan and have indirect fires registered or adjusted during unlimited visibility to permit rapid and accurate prearranged employment during limited visibility, e.g., in a night ambush site.

Opportunity 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.

Opportunity to salvage, safeguard, and employ the fire control and communications equipment of any forward observer who becomes an ineffective casualty while accompanying an Infantry 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 rapid 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 or in bunkers.

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 indication 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 or materiel 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.

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 IRSI 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 his platoon leader the locations and designations of final protective fires, reference points, selected targets, and checkpoints within the squad'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 transmit target designations, calls for fire, and subsequent corrections and anticipate that his platoon leader will relay the transmissions as required by the situation. 11
- : when a forward observer accompanies the rifle squad, utilize the observer's sources of fire and channels of communication by passing target designations directly to the observer. 12

- : memorize the call signs and frequencies in use by the accompanying 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 : during semi-independent missions (e.g., night ambush) 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 reconnaissance patrol, night ambush, or similar semi-independent mission, pre-arrange 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 the paper on Land Navigation and are not repeated herein.)

16
- : during semi-independent missions, ensure that the senior IFTL is briefed and equipped (to include pyrotechnic signals when necessary) to control indirect fires according to plan in the event the IRSI 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 reticle 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 binoculars for use by himself and his IFTL's as required by specific situations and missions, e.g., reconnaissance patrols and night ambushes conducted by a reinforced rifle squad. 29
- He must : know the configuration and all useful quantitative values, including those not marked with numerals, of the binocular reticle 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 reticle. 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 IFTL's 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 an imaginary straight line running from the observer through the target (adjusting point).

39
- : know that the observer-target range (OT range) 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.

40
- He will : know that accurate range estimation is vital to obtaining fire quickly in adequate volume on enemy targets and necessary to ensure the safety of friendly personnel, particularly in fast-moving situations.

41
- : determine range from maps or by use of binoculars and the mil formula when feasible.

42
- : estimate range at any distance up to 1,000 meters by visual examination of the terrain to within 10 per cent of the measured distance involved.

43
- : when estimating range visually and no confident estimate of the OT range is apparent, select a midpoint, estimate the distance to the midpoint and double the estimate to obtain the OT range; or estimate the range along one-quarter of the OT line (halfway to the midpoint) and multiply by four.

44
- 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 IRSL 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 FIRE TEAM LEADERS AND SELECTED POTENTIAL LEADERS.

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

- (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 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. 50

- : establish the OT line as the magnetic direction, measured to the nearest 10 mils with the lensatic compass, from the observer's position to the adjusting point. 51
- He will : to initiate a call for fire, transmit the call sign of the supporting unit followed by his own call sign as (1) Observer identification, e.g., RED VULCAN 18 THIS IS BLUE RIFLEMAN 24. 52
- 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 pre-arranged 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 designated and recorded (numbered) target, transmit the designation of the known point, the magnetic direction 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 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 reference point to the nearest 50 mils, e.g., 200 BY 400, MAGNETIC ATTITUDE 2450. 51

: specify PROTECTIVE TARGET as (4) Description of target and announce the dimensions and attitude of the target area when the objective is the adjustment of fire on a terrain feature to obtain prearranged fires, record firing data, and obtain a target designation for future use, e.g.: 52

PROTECTIVE TARGET;
50 BY 100;
MAGNETIC ATTITUDE 2450.

- : know that an adequate description of the target is vital to control personnel and the FDC to establish 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 determine any necessity to change the sheaf. 63
- : omit (4) Description of the target when registration is the objective of the call for fire. 64
- He will : know that (5) Method of engagement covers type of adjustment, trajectory, ammunition (type of projectile 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. 65
- : to announce type of adjustment, specify DESTRUCTION when the objective of the fire is to destroy a stationary point target. 66
- : specify DANGER CLOSE as type of adjustment when mortar fires will fall within 400 meters of friendly personnel or, at the discretion of the observer, when artillery fires will fall within 600 meters of friendly personnel. 67
- : call for and adjust mortar fires that will fall within 400 meters of friendly personnel and call for and adjust artillery fires that will fall within 600 meters of friendly personnel. 68
- (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 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:

70

- (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

<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 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.: 83

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 prearranged 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.

: 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 reticle. 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 IFTL's and selected potential leaders in initiating calls for fire and spotting bursts. 96
3. THE IRSL 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 <u>(1) Magnetic direction</u> when it deviates from the last announced magnetic direction by more than 100 mils.	98
He must	: omit <u>(2) Trajectory</u> unless otherwise instructed.	99
He will	: change <u>(3) Method of fire</u> when necessary to increase clarity of spottings during adjustment, e.g., SECTION (BATTERY) RIGHT (LEFT).	100
He must	: omit <u>(4) Distribution</u> 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 <u>(5) Shell</u> 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 <u>(6) Fuze</u> 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 <u>(7) Deviation</u> 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 mortars, split a 100-meter bracket and fire for effect, e.g., ADD (DROP) 50; FIRE FOR EFFECT.
- (6) 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.
- (7) 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.

- (8) 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., pre-arranged 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., MACHINE-GUN 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 squad 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, e.g., during night ambush missions.
- (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 squad 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 his IFTL's 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 IRSL 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 his IFTL's and selected potential leaders in the employment of illuminating rounds. 133

5. THE IRSL WILL EMPLOY INDIRECT FIRES TO SUPPORT HIS SQUAD 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 and capabilities of weapons; coordination required; and the channels of communication usually available for indirect fire support from rifle-squad level up to and including the direct support artillery battalion in support of the infantry brigade. 135

: prior to any semi-independent operation (e.g., night ambush) 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 or determine 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 for any semi-independent mission, such as a night ambush, wherein he is responsible for the use of indirect fires. 137
- He will : know that his platoon leader will plan the use of available indirect fires (with the aid of the attached forward observer) as an integral part of the platoon fire plan; obtain approval of the platoon fire plan; and obtain and disseminate to 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 subordinate leaders within the platoon to make maximum use of available fire support. 138
- : instruct and supervise his IFTL's and potential leaders in the use of indirect fires 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
- : 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.) 141

- : ensure that his men "lean into" supporting fires during assaults to permit them to close with and destroy the enemy while he is stunned and ineffective from the effects of friendly supporting fires.

142
- : anticipate 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 men on reaction to the colored smoke to coordinate the assault when this technique is scheduled for use.

143
- : anticipate the employment of 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.

144
- : anticipate and forewarn his men of the probable 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.

145
- : recognize the need 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 and notify his platoon leader when the progress of his squad requires fires to be shifted.

146
- : report rapid advances and changes in direction of movement promptly to permit planning, displacement of supporting weapons, and the maintenance of close support capability.

147
- : 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.

148
- 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.

149

- : habitually determine and disseminate to his men the locations and designations of available indirect fires registered forward of the squad defensive sector at the first opportunity after occupation of the position.

150
- : know and inform his men that defensive final protective fires are planned so the near edge of the impact area is no closer than 200 meters to occupied friendly troop positions to permit squad 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.)

151
- : 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.

152
- : 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.

153
- : 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.

154
- : when the sound (detonation of propelling charge) of enemy mortars or artillery can be heard, obtain intersecting azimuths from two known points, plot the azimuths on a map, and call for counterbattery fire on the gun positions indicated by the intersection of the azimuths. (This applies to patrolling as well as to the occupation of defensive positions.)

155
- : 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.

156
- : 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.

157

- : 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.

158
- : brief his men and employ designated 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.

159
- 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; use available fires accordingly.

160
- : habitually plan fires directly on friendly troop positions to permit withdrawal and rapid engagement of advancing enemy with indirect fires, particularly when the enemy is known to employ "hugging" tactics, e.g., in a night ambush situation.

161
- : anticipate possible loss of control during retrograde operations and use emergency channels of communication to obtain fire support, i.e., establish radio contact with any higher headquarters and initiate a call for fire.

162
- : make maximum use of HE and WP mixed 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.)

163
- 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 and use fires accordingly, including indirect fire support for reconnaissance and ambush patrols involved in internal defense and development operations.

164
- : 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.

165

- : 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.

166
- : 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.

167
- : use indirect fires to cover noise and exposure likely to occur when friendly troops are breaching enemy wire entanglements and minefields, maneuvering in noisy undergrowth, or crossing streams or other open areas.

168
- : 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.

169
- : consider use of prearranged box barrage fire to forestall an enemy attack on a small perimeter, e.g., night ambush position; to isolate an enemy objective and prevent reinforcement during a raid; or to cover a stream crossing toward an enemy-held far shore.

170
- : 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.

171
- : anticipate use of his squad as 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; anticipate withdrawal of such observers by helicopter.

172
- : 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.

173

- : 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 or artillery and the delivery of indirect fire weapons and resupply of ammunition by helicopter, i.e., possible sites for LZ's and fire support bases.

174
- : 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.

175
- : adjust, and ensure that his IFTL's 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.

176
- : use colored smoke or panels 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.

177
- : plan and employ prearranged illumination to aid reconnaissance of specific objectives, to facilitate the delivery of friendly fire from ambush, and to aid in the adjustment and surveillance of indirect fires during darkness.

178
- : anticipate and forewarn his men of 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.

179
- : particularly during internal defense situations, 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.

180
- : know, and ensure that his men know, what supporting 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.

181

- : know, and ensure that his men know, that forward observers, artillery liaison officers, FDC personnel, or other experienced personnel monitoring 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. 182
- He must : instruct and supervise his IFTL's 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. 183
- : 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. 184
- : 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. 185
- : forewarn his men of the scheduled use of H & I fires in any situation where friendly H & I fires may be mistaken for enemy fires and thus cause unwarranted fear or confusion, e.g., in night ambush positions or during reconnaissance patrol missions. 186
- 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 the paper on Airmobile Operations and is not repeated herein.) 187
- 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. 188

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. 189

: request and obtain night-vision sights 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. 190

: employ night-vision sights himself to maintain effective surveillance and to adjust indirect fires in situations where the adjustment of indirect fires during darkness is critical, e.g., in a night ambush situation. (Detailed operation and user maintenance of infrared and image intensification devices are covered in the paper on Infrared Weaponsight and Image Intensification Devices and are not repeated herein.) 191

6. THE IRSL WILL EMPLOY SUPPORTING FIRES FROM THE 81-MM MORTAR OPERATING WITHOUT A FIRE DIRECTION CENTER DURING TACTICAL MOVEMENT AND IN DEFENSIVE POSITIONS WHEN A MORTAR SQUAD IS ATTACHED TO HIS PARENT PLATOON.

He will : anticipate the attachment of 81-mm mortar squads and forward observer parties to his parent platoon during raids, ambushes, establishment of patrol bases, establishment of combat outposts covering communications routes, defense of landing zones, and similar semi-independent operations. 192

: 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 personnel in addition to the mortar crew to serve as ammunition bearers. 193

: 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. 194

: know that decisions pertinent to the attachment of mortars usually will be made by the rifle platoon leader or a higher commander and that his rifle platoon leader will:

195

- (1) 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.
- (2) 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.
- (3) Habitually employ helicopters or surface vehicles to deliver 81-mm mortars and mortar ammunition to security positions, patrol bases, combat outposts and similar positions when use of powered transport will not cause loss of surprise and initiative.

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.

196

: 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 he and his IFTL's are capable of using the direct alignment method of adjusting fires when operating without an FDC.

197

He will : know (for fire planning purposes) the minimum 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.

198

- : 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 target. 199
- : 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 fired on a specific target according to the terrain in the target area. 200
- : 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. 201
- : 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. 202
- He must : know that, upon the attachment of an indirect fire team to his parent platoon, the rifle platoon leader will plan and coordinate the employment of the attached indirect fire team in conjunction with the mortar forward observer, the mortar squad leader, and the rifle platoon's organic small-unit leaders, i.e., the rifle platoon leader will: 203
- (1) Determine the number of men attached by duty assignment and their level of training, including cross-training. (Combat casualties and lack of replacements often will alter TOE figures.)
 - (2) 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.
 - (3) Inspect the weapons and equipment carried by the attached indirect fire team to ensure completeness and serviceability and obtain replacement items if necessary.

- (4) 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).
- (5) Ensure that 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.
- (6) 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.
- (7) Ensure that the M2 compasses carried by the attached mortar forward observer and the mortar squad leader are zeroed to reflect magnetic azimuth 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.
- (8) 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.
- (9) 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 the need.)
- (10) 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.

- (11) Obtain and distribute to his small-unit leaders, 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 observers with clarity to permit effective creeping adjustment.
- (12) 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.
- (13) Integrate the attached indirect fire team into the 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.
- (14) Issue timely warning orders and operations orders to and brief, inspect, and rehearse the indirect fire team as an integral part of his total force.
- (15) 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.
- (16) 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.

- (17) 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.
- (18) Monitor and deny or approve calls for indirect fire from subordinate leaders within the rifle 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.

He will : know, apply, and ensure that his IFTL's know and can apply, the SOP established by the rifle platoon leader for attached mortar crew members to permit the organic leaders within 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:

204

- (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 must : when prearranged fires are available on call from aircraft, artillery, or mortars other than the attached mortar, request the on-call fires through his platoon leader to support his squad 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. 205

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 squad, and may interfere with the effectiveness of the attached indirect fire team. 206

: when the situation and the availability and qualifications of the attached mortar personnel permit, designate the target(s) demanding use of indirect fires and direct the attached mortar forward observer or the mortar squad leader to order fire, adjust, and deliver fire for effect using the target-grid method (on-call fires) or the direct lay method or the direct alignment method (attached mortar), as applicable. 207

- : anticipate that mortar forward observers and mortar squad leaders acting as observers will use standard fire orders peculiar to the 81-mm mortar when communicating with a mortar crew operating without an FDC and avoid interfering with their communication except to correct any error that would endanger friendly personnel or waste ammunition.

208
- : having operated effectively with a specific mortar forward observer and mortar crew, habitually recommend attachment of the same mortar personnel to his parent platoon on subsequent missions to profit from teamwork developed by common experiences.

209
- He must** : maintain, and ensure that his IFTL's 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.

210
- : instruct and supervise his IFTL's and selected potential leaders in the critical knowledges and skills required to use an attached 81-mm mortar without an FDC.

211
- : 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.

212
- : 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.

213
- He will** : 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.

214

- 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. 215
- : 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. 216
- : 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. 217
- : 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. 218
- : 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. 219
- : adhere to the minimum range change guide rules during adjustment by bracketing. 220
- 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). 221
- 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. 222

- He will : when using the direct lay method, know that the 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. 223
- : know that the best place for the forward observer during use of the direct lay method is at or near the mortar to assure direct voice communication with the gunner. 224
- He must : when using the direct alignment method, know that 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 observer's binocular reticle to be applied directly as deviation corrections on the mortar sight to achieve effective 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. 225
- : when using the direct alignment method where the 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. 226
- : 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). 227
- 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. 228

- 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. 229
- 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. 230
- : 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. 231
- He must : ensure that each observer (including himself) within his squad maintains a range sketch to aid the observer or any relieving observer to locate targets and bring fire upon them. 232
- : know that a separate computer sheet is maintained at the mortar position for each registration point and each target fired upon to facilitate rapid delivery of effective fire. 233
7. WHEN EMPLOYING THE 81-MM MORTAR WITHOUT A FIRE DIRECTION CENTER, THE IRSL 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: 234
- (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.: 235

LITTLE VULCAN 18 THIS IS BLUE
RIFLEMAN 24.

: where direct voice communication is effective and identification is obvious, omit (1) Observer identification. 236

He must : to transmit (2) Warning order, announce FIRE 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. 237

He will : transmit (3) Location of target by use of direct laying, polar coordinates, reference to a known point (shift), prearranged data, or grid coordinates where maps are available to observer and crew. 238

: when speed in destroying the target takes 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. 239

: 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.: 240

MAGNETIC DIRECTION 2690;
DISTANCE 700.

: to locate a target by reference to a known point, 241
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 re-
quiring no change, e.g.:

FROM REGISTRATION POINT ONE;
RIGHT TWC ZERO (mils);
ADD 150.

: to use prearranged data when a target appears in an 242
area where fire is registered, announce the target des-
ignation, e.g.:

TARGET AF7020.

: to use grid coordinates to locate a target, announce 243
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.:

GRID 46913961;
MAGNETIC DIRECTION 3210.

He must : announce (4) Description of the target and point out 244
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 observer; when using the direct
alignment method, describe the target to provide a basis
for allocation of ammunition or for denying the request
where higher priorities for mortar fire exist.

He will : when initiating a call for fire without an FDC, omit 245
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.

He must : to transmit (6) Method of fire and control when 246
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 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. 247
- : to cancel AT MY COMMAND, transmit CANCEL AT MY COMMAND. 248
- He will : know that a standard call for fire provides all of 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.: 249
- 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. 250
- : 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. 251
- : if a round in adjustment is erratic after the base plate is seated, order a confirming round using the same data, i.e., REPEAT. 252
- : 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. 253
- He will : anticipate use of the ladder method of adjustment by mortar crew members when troop safety permits. 254
- He must : after spotting the initial burst(s), formulate and transmit subsequent corrections according to the prescribed sequence and omit any elements for which no data or no change is required during adjustment, i.e.: 255

- (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, (3) Method of fire, and (4) Distribution during subsequent corrections of fire from an 81-mm mortar without an FDC. 256
- : omit (5) Shell during adjustment and anticipate the use of HE when observing for the bursts or specify WP or ILLUMINATING as required. 257
- He must : omit (6) Fuze during adjustment and anticipate the use of fuze quick when observing for the bursts or specify PROXIMITY as required, e.g., when adjusting in tall, dense vegetation, specify PROXIMITY to obtain a burst visible above the growth. 258
- 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. 259
- : omit (7) Deviation when the burst is spotted on the mortar-target line or within 10 mils of the mortar-target line. 260
- 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. 261

- 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 paper.) 262
- He must : exercise (10) Control by terminating subsequent corrections with OVER when additional adjustment is possible and necessary. 263
- : 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. 264
- : request fire for effect upon adjusting the mean point of impact within the desired distance of the target (adjusting point). 265
- : 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. 266
- : upon spotting a round SHORT after a range change greater than 25 meters during a creeping adjustment, change to the bracketing method of adjustment. 267
- : 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. 268
- : when requesting fire for effect without an FDC, 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.: 269

HE AND WP, SIX ROUNDS.

- : when requesting fire for effect, terminate the request with FIRE FOR EFFECT or, to engage moving targets, terminate the request with AT MY COMMAND, FIRE FOR EFFECT, then order FIRE when the targets reach the impact area. 270
- : terminate a call for fire for effect with OVER when transmitting modified fire commands electronically. 271
- He will : obtain effective fire on a point target or a segment 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 casualty-producing fragments in firm, open terrain with sparse vegetation. 272
- 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: 273
- 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. 274
- : 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. 275

- 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. 276
- : 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. 277
- 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. 278
- : 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. 279
- : 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. 280
- : 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. 281
- 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 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. 282

- : 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. 283
- : 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. 284
- : 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. 285
- 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. 286
- 8. THE IRSL WILL, UPON OCCUPATION OF TERRAIN WITH INTENT TO DEFEND IN PLACE, PLAN DEFENSIVE INDIRECT FIRES WITH THE AID OF HIS PLATOON LEADER 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. 287
- : if required to defend a landing zone or a potential landing zone, know that the mortar will be positioned 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. 288
- make a reconnaissance of his squad sector with the rifle platoon 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). 289

: with the aid of the senior mortar crew member and the platoon leader, plan, register, and obtain target designations for the fires within his squad sector, including illumination, required to defend the sector, 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. 290

: know and ensure that his IFTL's know the locations and designations of registered fires within and immediately adjacent to their squad sector, and know how to shift preplanned fires, e.g., TARGET AD 0401, DROP 50, to increase effectiveness against moving enemy. 291

: know that the platoon leader will anticipate the need to deliver mortar fire on any azimuth (full 6,400 mils) around the perimeter and will require aiming stakes to be installed accordingly. 292

: 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. 293

9. AS DIRECTED BY HIS RIFLE PLATOON LEADER, THE IRSL WILL ENSURE THAT THE MORTAR, AMMUNITION, AND FIRE CONTROL EQUIPMENT ARE SAFEGUARDED AGAINST CAPTURE AND DESTROYED IF CAPTURE BECOMES IMMINENT.

He will : recognize that the mortar crew members cannot deliver effective mortar fire and simultaneously defend themselves and their mortar, ammunition, and equipment from enemy attack. 294

: 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. 295

	: know that his squad, or an element of his squad, may be directed to provide close-in security for an indirect fire team attached to his parent platoon at a patrol base, an ambush site, a combat outpost, a landing zone, or similar position during semi-independent operations.	296
	: anticipate enemy attempts to attack mortar positions with infiltrators; provide alert 360-degree security when so directed by the rifle platoon leader; 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.	297
	: where subsurface water prevents digging emplacements, use sandbagged emplacements constructed <u>on</u> 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.	298
He must	: know that the mortar squad leader and the mortar gunner each carry two thermite grenades for destruction of the mortar if capture becomes imminent.	299
	: if necessary, order the destruction of the mortar, ammunition, and fire control equipment to prevent capture by the enemy and actively aid in the destruction if the occurrence of casualties among mortar crew members so requires.	300
	: have ammunition destroyed by firing at the maximum practicable rate at any target within range.	301
	: smash the mortar sight and similar equipment to render it useless to the enemy.	302
	: burn the bipod assembly with thermite grenades to fuse the traversing and elevating mechanisms.	303
	: 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 small arms fire if time permits.	304