

# CHAPTER 3

## PREPARATORY MARKSMANSHIP

### Section I. GENERAL

#### 32. Introduction

a. Preparatory marksmanship training teaches essential skills and develops fixed and correct habits of marksmanship before range practice begins. Thorough instruction and carefully supervised practice in the preparatory phase saves time and ammunition during range firing and develops habits and procedures necessary for well-trained gun crews.

b. Marksmanship and firing explained herein cover both subcaliber and field firing.

#### 33. Sequence of Training

Preparatory marksmanship is divided into steps normally taught in the following sequence:

- Sighting and aiming.
- Positions.
- Adjustment of tire.
- Trigger manipulation.
- Tracking.
- Examination.

### Section II. INDIVIDUAL DUTIES

#### 34. Duties of Squad Leader

The weapons squad leader is in direct command of the crew and is responsible for its equipment. He observes, adjusts, controls, and supervises the conduct of fire of the 90mm rifle. He employs the squad according to orders of the platoon leader and is responsible for properly concealing the weapon. He keeps the platoon leader informed of the status of the ammunition supply and supervises his crew's ammunition resupply.

#### 35. Organization and Equipment for Crew Drill

Crew members	Individual weapon	Individual load
No. 1: Gunner -----	Pistol -----	90mm rifle with telescope sight.
No. 2: Assistant gunner (loader ammunition bearer).	Pistol -----	Ammunition carrying strap, tools, spare parts, cleaning material, and 3 rounds of 90mm ammunition.

Crew members	Individual weapon	Individual load
No. 3: Ammunition bearer*.	Rifle -----	Ammunition carrying strap and 4 rounds of 90mm ammunition. 3 rounds in strap and 1 in hands.

\*Note. See current TOE. The third crew member, while not currently authorized, is considered necessary for efficient operations. In the absence of an individual to perform the duties assigned to No. 3, ammunition bearer, No. 2, the loader, will be responsible for these duties too.

#### 36. Duties of Crew Members

a. No. 1, the gunner, lays and fires the 90mm rifle and is the crew leader. He makes necessary fire adjustments as called for by the squad leader. He is responsible for the maintenance of the rifle and coordinates his actions with No. 2.

b. No. 2, the loader, is responsible for loading the 90mm rifle and acts as gunner should the necessity arise. He secures ammunition and checks clearance of the backblast area prior to firing. He

assists in the maintenance of the rifle and coordinates his movements and duties with No. 1.

c. No. 3, the ammunition bearer, is responsible

for securing ammunition. While not engaged in ammunition resupply, he provides security for the rifle position.

### Section III. CREW DRILL

#### 37. General

a. *Purpose.* The objective of crew drill is to train the individual as a member of the crew to place the rifle in and out of action with precision and speed.

b. *Training.* The attainment of precision is the first step in developing an expert crew and is acquired by strict adherence to the prescribed procedure. Only after the desired individual precision has been attained are the next phases—teamwork and speed—undertaken.

c. *Teamwork.* Teamwork is assured by rotation of duties during drill so each crew member, by practice, becomes familiar with the duties of every other member. Continuity of action is made certain by this phase of training.

d. *Speed.* Practice for speed is instituted as the last phase of instruction in crew drill. Care must be taken during this phase to insure that precision and teamwork are not sacrificed for speed.

#### 38. Forming for Crew Drill

At the command FORM FOR CREW DRILL, members of the crew, except the squad leader, fall in at attention in a column with five paces between men and face the squad leader. To assign positions for crew drill, the squad leader commands COUNT OFF. On that command, the crew calls off from front to rear starting with No. 1 (the gunner).

#### 39. Posting the Squad

At the command POST, all crew members move forward at double time to prone positions directly behind their equipment which is laid out in order.

#### 40. Examine Equipment Before Drill

At the command EXAMINE EQUIPMENT BEFORE DRILL (while crew is in the prone position), crew members examine equipment as follows:

a. *No. 1, Gunner.*

- (1) Checks to see that sight and sight mount are workable, cross level vial is not

broken, and sight is clean and tight in the bracket.

- (2) Checks the operation of the bipod and the monopod.
- (3) Checks the chamber and the functioning of the lockring.
- (4) Checks the firing mechanism and the safety lever for proper functioning.

b. *No. 2, Loader.*

- (1) Checks his ammunition for amount and proper seal of the containers.
- (2) Checks tools, spare parts, and cleaning material.

c. *No. 3, Ammunition Bearer.*

- (1) Checks his ammunition for amount.
- (2) Checks the seals of ammunition containers.

#### 41. Reports

When all equipment is checked, the following reports are given (incorrect items are reported—when a deficiency exists):

a. No. 3, the ammunition bearer, reports AMMUNITION CORRECT.

b. No. 2, loader, reports AMMUNITION, TOOLS, SPARE PARTS, AND CLEANING MATERIAL CORRECT.

c. No. 1, gunner reports ALL CORRECT.

#### 42. Placing Rifle Into Action

To place the weapon into action, the squad leader commands ACTION, and designates by pointing the direction of fire and the general area of the rifle position. He places himself on the flank in a position from which he can observe and control the fire. At the command ACTION, the crew moves rapidly to the position indicated. Where necessary, the squad leader may also indicate the type of position to be taken by No. 1 (prone, sitting).

a. No. 1 selects the exact spot and assumes the firing position from which he can best accomplish his mission. He lays the rifle on the target, places his right hand on the trigger grip, and awaits a report that the rifle is ready to fire. He fires as directed by the squad leader.

b. No. 2 assists No. 1 in placing the rifle in action by holding the rifle while the gunner places his body in position or while the gunner adjusts the bipod. He opens the breech. He inserts the cartridge into the chamber and seats it firmly. He then closes and locks the breech and inspects the backblast area to see that it is clear. If it is clear, he rotates the safety arm to the fire position, taps the gunner, and calls UP to indicate that the rifle is ready to fire.

c. No. 3 takes a position on the right flank from which he can readily bring up ammunition and from which he can provide security for the position.

d. After firing, the loader opens the breech with his right hand and ejects the expended cartridge case.

### 43. Taking the Rifle Out of Action

The squad leader commands OUT OF ACTION. Upon this command, the loader clears the 90mm rifle, calls CLEAR, and closes the breech. No. 2 takes the rifle from No. 1. (When the rifle is fired from the prone position, No. 2 holds the rifle while No. 1 adjusts the bipod for the shoulder carry.) No. 2 now secures his ammunition and tools. No. 3 secures his ammunition. The squad leader indicates the line of march by facing in that direction. The crew places itself in column behind the gunner, and moves on command from the squad leader.

### 44. Service of the Piece

a. *Unloading 90mm Rifle* (fig. 17). To open the breech, the loader grasps the locking handle with his right hand (over the chamber), lifts up on the

locking handle (rotating the breechblock approximately 45° clockwise), and then rotates the breechblock vigorously to the rear.

b. *Loading 90mm Rifle* (fig. 18). To load the 90mm rifle, the loader inserts a cartridge into the chamber and completely chambers it by sharply pushing the cartridge all the way forward. To close and lock the breech, he grasps the locking handle with his right hand, moves the breechblock forward until it is seated in the breech, and rotates the locking counterclockwise until it is fully locked. Upon locking the breech, he inspects the backblast area to see that the area is clear. If the area is clear, he moves the safety arm to the fire position *F* (fig. 19), taps the gunner on the shoulder, and calls UP to indicate to the gunner that the rifle is ready to fire. Figure 19 shows the safety arm in the safe position.

c. *Firing*. To fire the 90mm rifle, the gunner depresses the trigger grip safety and then the trigger.

d. *Clearing the Rifle*. The loader opens the breech and checks the chamber to see that the piece is unloaded. He calls 90 CLEAR.

e. *Safety*. The loader's safety enables the gunner to move with a cartridge in the chamber of the rifle without danger of accidental discharge. The loader, after loading a cartridge, closes the breech without rotating the safety arm to the fire position. In this position, the firing mechanism is mechanically blocked so it cannot be fired. To prepare the 90mm rifle for firing, the loader has only to check the backblast area, rotate the safety arm to the fire position, tap the gunner, and call UP.

## Section IV. GUNNER AND ASSISTANT GUNNER TRAINING

### 45. Sighting and Aiming

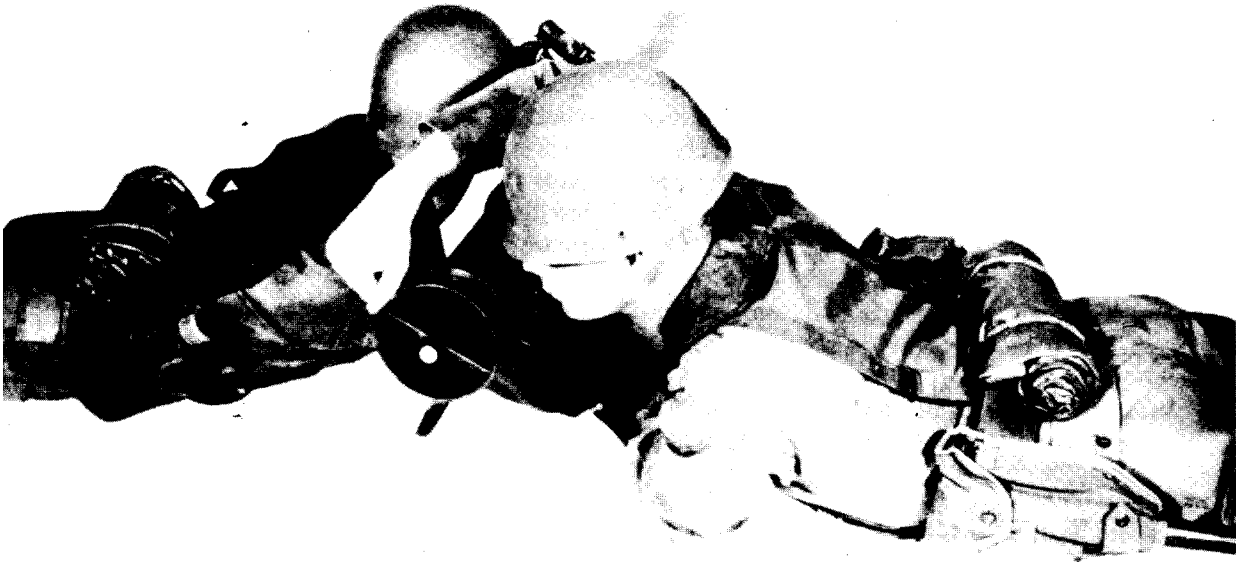
#### a. *Aiming for Range*.

- (1) During the first exercise, a stationary 1,000-inch "A" rifle target (or some other appropriate target) is used as an aiming point. To aim for range, select the correct segment of the vertical line of the reticle and place it on the center of the visible mass of the target.
- (2) Find the correct sight picture for each successive 50 meters of range on the reticle. Then progress to sight pictures that require interpolation of range on the

reticle; for example, 425 meters, 525 meters. A trained gunner, acting as coach, should check each sight picture when in the prone position.

#### b. *Aiming With Leads*.

- (1) The reticle is provided with a horizontal scale, graduated in 5-mil (one lead) units, which furnishes a means of applying leads (para 5).
- (2) To aim with leads, keep the vertical range line ahead of the center of mass of the target. To hit a target which has lateral movement with respect to the direction



*Figure 17. Unlocking and opening the breech.*



*Figure 18. Loading round in the chamber.*



*Figure 18.—Continued.*

of fire, point the axis of the bore ahead of the target. Use leads for firing on moving targets. No leads are used for targets moving directly toward or away from the gun position. Aim at the center of visible mass.

- (3) Exercises are conducted which require setting announced leads on a subcaliber target (1,000-inch) or some other appropriate aiming point. The target remains stationary, but it is assumed to be at any range from 0 to 600 meters and moving from right or left at speeds requiring variation in the number of leads.

*c. Aiming for Range With Leads.* Range and leads are combined on the sight reticle by a series of segmented horizontal lines.

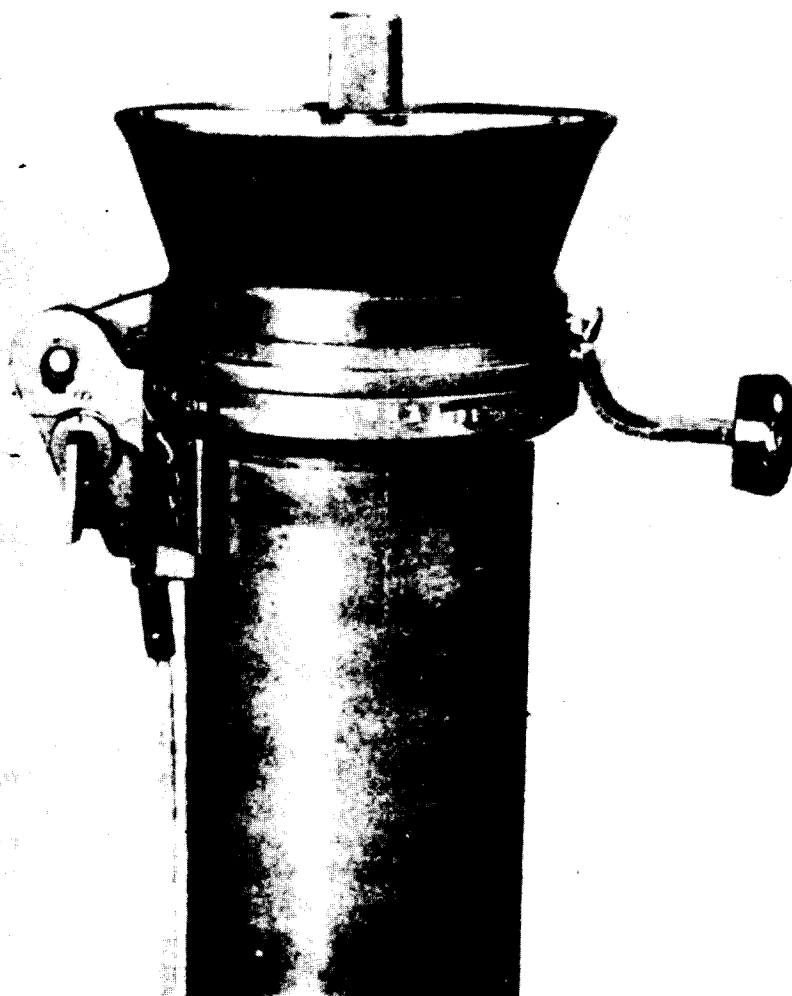
- (1) Lead lines extend right and left of the vertical range line. Interpolate ranges between the 50-meter intervals etched on the sight reticle. Select appropriate range (this will be imaginary if it is interpolated) and lead on the reticle and project them to the point of intersection. Place this point on the center of mass of the target.
- (2) The length of one space or of one line of the horizontal line is equal to one lead. For instance, the point at the end of the

first space represents one lead; the point at the end of the second line, four leads (two spaces and two lines). Count off on this line, to the left or right of the vertical range line, the number of leads needed.

- (3) Lay the rifle on the target at several different ranges and leads. The target remains stationary, but an assumed range, the direction, and the number of leads are specified in each case. The coach checks each sight picture when in the prone position. Range and leads requiring interpolation are included.
- (4) At least one period of this training is devoted to the use of the illuminated reticle. This accustoms personnel to aiming during periods of limited visibility.

#### **46. Position Exercises**

Position exercises teach the positions used by the gunner and loader when firing from both ground or shoulder mount at stationary and moving targets. Aiming and servicing the weapon can be included in position exercises. Each crew member is taught to fire the rifle from the prone, sitting, kneeling, standing, and foxhole supported positions. By giving close attention to details during all position exercises, the crew should be able to



*Figure 19. Safety arm in safe position.*

assume proper positions automatically. For service of the piece, see paragraph 44.

*a. General Characteristics of Positions.* The following characteristics apply to all firing positions:

- (1) Remain steady in each position with a minimum of muscular effort.
- (2) In each position, there is some point at which the rifle aims naturally and without effort. If this point is not the center of the target, shift the body to bring the rifle into the correct alinement.
- (3) In any firing position except the prone, the gunner may be steadied by the loader.

*b. Prone Position.*

- (1) *Gunner.* Lie on the stomach to the left of

the rifle and at an angle of approximately 90° to the piece (fig. 20). With the left hand, grasp the monopod. Place the right hand on the trigger grips by reaching under the tube. To adjust for elevation, screw the monopod up or down. To track a moving target, raise up on the monopod track right or left, allowing the rifle to pivot on the bipod legs.

- (2) *Loader.* When loading, assume a prone position (fig. 21) opposite the gunner's right shoulder, perpendicular to the weapon, and facing slightly to the rear. The position must be close enough to the gunner to be able to communicate with him and, at the same time, load the rifle. Move about to conform with the gunner's



*Figure 20. Gunner in prone position.*

movements, to avoid the backblast, and to load the rifle.

*c. Sitting Position.*

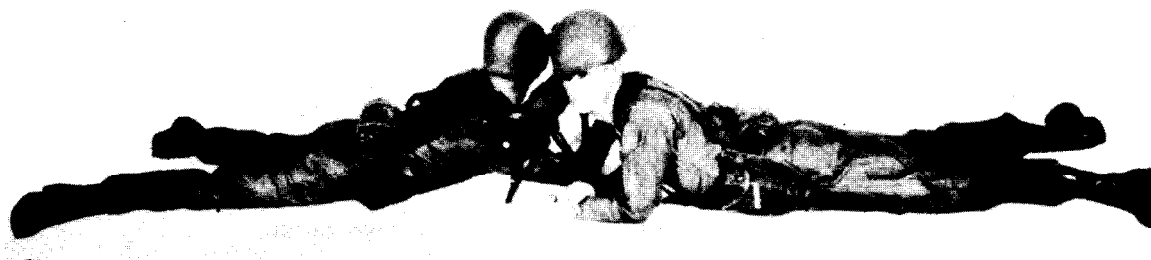
(1) *Gunner.* There are two sitting positions: One for stationary targets and one for moving targets.

(a) To assume the sitting position for moving targets (fig. 22), sit facing the target with legs crossed and feet drawn up under the legs so the outer part of the calf of one leg rests on the inside of the other foot. Bend slightly forward from the hips, and hold the back straight. Grasp the monopod with the left hand. Grasp the trigger handle assembly with the right hand, and hold the right elbow at shoulder level to form a pocket for the bipod shoulder rest.

(b) The sitting position for the stationary target (fig. 23) is similar to the open

leg sitting position for firing the M14 rifle. In assuming this position, legs are extended and spread a comfortable distance apart. Brace the legs by digging heels into the ground, toes pointing in, and rest the elbows on the inside of the knees.

(2) *Loader.* The loader takes a kneeling position opposite the gunner's right shoulder and faces to the rear of the rifle (figs. 24, 25). He places one or both knees on the ground. If he places one knee on the ground, it must be the left knee which is nearer to the breech. He places himself close enough to the gunner to communicate with him and at the same time load the weapon. As in the other position, the loader moves about while tracking to conform with the movements of the gunner, and to load the weapon.



*Figure 21. Loader in prone position.*



*Figure 22. Gunner in sitting position for moving target.*



*Figure 23. Gunner in sitting position for stationary target.*



*Figure 24. Loader's position, left knee on the ground.*

*d. Kneeling Position.*

(1) *Gunner.* There are two kneeling positions, one for stationary targets and one for moving targets.

(a) To assume the kneeling position for moving targets (fig. 26), the gunner kneels on his right knee with the upper part of the right leg vertical. His buttock does not rest on his right heel. He points his leg toward the target with his left foot at a right angle to the knee and opposite his right knee. His left leg forms a right angle to the ground. Holding his body erect, he places his left elbow under the piece. He grasps the monopod with the left hand, grasping the trigger grips with his right hand. He holds his right elbow high, forming a pocket for the bipod shoulder rest.

(b) The kneeling position for the stationary target (fig. 27) is similar to the kneeling position for firing the M14 rifle. The gunner kneels on his right

knee at a 90° angle with the line of aim, sits so the center of his right buttock rests directly on his right heel, and shifts his weight forward so his heel inclines in the direction of the target. When viewed from the front, his left leg is vertical; however, it need not appear vertical when viewed from the side. The gunner may prefer to draw his left foot back, relaxing his body weight forward so a solid contact is made between his calf and thigh. He points his left foot in the direction which gives him the most comfort, rests his left upper arm or left elbow on his left knee, and places his left and right hands as prescribed for the sitting and standing positions. He raises his right elbow to the height of (or slightly above) his shoulder, forming a pocket for the bipod shoulder rest.

(2) *Loader.* The loader takes the same position as explained in c (2) above.



*Figure 25. Loader's position, both knees on the ground.*

*e. Standing Position.*

- (1) *Gunner.* The standing position is similar to the standing position for firing the M14 rifle (fig. 28). To assume the standing position, the gunner stands half-faced to the right with his feet a comfortable distance apart and his body erect and well balanced. He grasps the monopod with the left hand and the trigger grips with the right hand. He raises his right elbow to the height of (or slightly above) his shoulder, forming a pocket for the bipod shoulder rest. To traverse in this position, he moves his body from the ankles up.
- (2) *Loader.* The loader takes a standing position opposite the gunner's right shoulder. The loader faces the rear of the rifle, close enough to the gunner to communicate with him and, at the same time; load the weapon. As in the other positions, the loader moves about while

tracking to conform with the movements of the gunner, and to load the weapon. The loader may assist in steadying the gunner by grasping him around the chest or waist (fig. 29).

*f. Foxhole Supported Position.*

- (1) *Gunner.* The foxhole supported position is similar to the standing position except that the gunner faces directly to the front, and the monopod rests on the ground (fig. 30).
- (2) *Loader.* The loader faces the rear of the rifle and adjusts his position as the gunner tracks a target or otherwise moves the rifle. The loader must pay particular attention to the backblast area while in this position. **It is extremely important that the breech of the rifle clears the rear edge or parapet of the foxhole.** It may be necessary to use sandbags in front and/or in the bottom of the foxhole to obtain the required breech clearance.



*Figure 26. Gunner's kneeling position, moving target.*

#### **47. Adjustment of Fire**

*a. General.* After crew members are familiar with the use of the sight and have had training in techniques of fire, they are ready for simple exercises in adjustment of fire. Each should practice the method described below.

##### *b. Burst-On-Target.*

- (1) Use a 1,000-inch target and announce a range to use for the initial lay of the weapon. Show the burst of a round on the face of the target, using a burst marker on a pointer. Location of the burst should be over or short.
- (2) Have students and coaches mentally note the location of the burst on the sight reticle. Remove the burst marker from the face of the target and have students move the "remembered" burst to the center of mass of the target.

#### **48. Breathing**

*a.* Accurate fire requires proper breathing. If the gunner's chest and back are moving, he does

not keep his eye in the same position with reference to the sight, and the sight picture seems to move. Constant practice in proper breathing is necessary until the gunner automatically holds his breath correctly when firing the weapon.

*b.* To prevent breathing from interfering with his sight picture, the gunner initially takes a breath of air, lets out a portion of it, then holds the remainder naturally. If the gunner does not fire within a reasonable length of time (8 or 9 seconds), he does not attempt to fire, but relaxes, takes several breaths, and again attempts to fire. Constant practice is necessary to control breathing without discomfort.

*c.* To check the gunner for proper breathing, watch his back. If it rises and falls as he aims, he is not breathing properly. If the rifle is being fired from the shoulder and the muzzle of the rifle seesaws, the gunner is breathing improperly.

#### **49. Trigger Manipulation**

*a.* One of the most important elements of marksmanship training is manipulation. Everything



*Figure 27. Gunner's kneeling position, stationary target.*

about the position and aiming may be perfect, but unless the trigger is manipulated properly, the weapon will be pulled to the left or right. Although jerking the trigger may appear to disturb the sight only slightly, the slightest movement spoils a good shot. A more extensive movement, made in anticipation of firing, is called flinching. It occurs only if the gunner knows the exact moment when the rifle will fire. The gunner should manipulate the trigger so he does not know the exact moment the 90mm rifle will fire.

*b.* The gunner takes a breath, expels part of it, and locks in the rest with his throat muscles. He then aligns the sight on the target and depresses the trigger safety with the crotch of the hand between the thumb and index finger. He exerts a slight initial pressure on the trigger, then continues to squeeze with a steady, smooth pressure to the rear. He holds the correct sight picture, squeezes the trigger, and continues to hold the trigger briefly after the round is fired. If this procedure is followed, each round fired comes as a surprise to the gunner, thereby eliminating flinching. Con-

stant practice of trigger manipulation under the observation and supervision of a good coach greatly improves accuracy.

*c.* Important points about trigger manipulation:

- (1) Depress the trigger safety before putting any initial pressure on the trigger.
- (2) Apply smooth, steady pressure on the trigger straight to the rear.
- (3) Do not wait too long to fire a round.
- (4) Concentrate on the sight picture rather than the right hand.
- (5) Every shot must come as a surprise to the gunner.
- (6) Do not "snap shoot" because it will exaggerate flinching.

## **50. Tracking**

When proficiency is obtained in sighting and aiming, positions and trigger manipulation training in tracking a moving target begins. This training progresses from simple tracking to moving objects at 25 meters to more difficult exercises of tracking moving targets under field conditions.



*Figure 28. Gunner in standing position.*



*Figure 29. Gunner in standing position and supported.*



**Figure 30. Foxhole supported position.**

Any expedient can be utilized in the preliminary phases. When tracking under field conditions, combat vehicles such as tanks or trucks are used.

## **51. Examination**

*a. General.* Before commencing range firing, examine personnel to determine whether they have achieved the desired standard of proficiency. Correct deficiencies, as determined by the examination, with additional training. Use either written, oral, or proficiency-type examination. The proficiency-type examination should be used whenever possible.

*b. Written Examination.* Use the objective-type written examination and include questions concerning all the steps of marksmanship.

*c. Oral Examination.* An oral examination, conducted as a question and answer period, consists of objective-type questions. These questions should be broad in scope, requiring some explanation and discussion by the soldier.

*d. Proficiency Examination.* Conduct a proficiency examination using the "county fair" method (AR 320-5). Setup various stations with specific requirements at each station.

- (1) *Sighting and aiming station.* At this station, an assistant instructor gives the students various sight picture situations and then checks each sight picture for accuracy. He also gives the students a problem that requires a change from the initial sight picture to simulate adjusting fire and the receipt of a subsequent fire command.
- (2) *Position station.* An assistant instructor requires the students to assume the various positions acceptable for the gunner and loader for firing the 90mm rifle.
- (3) *Safety station.* An assistant instructor requires the student to explain the mechanical safety features of the weapon and the range and safety regulations (90mm backblast).
- (4) *Other stations.* Stations for examining trigger manipulation and breathing may also be conducted. Any other stations desired may be used, but definite requirements must be established at each station.

## Section V. RANGE PROCEDURES AND SAFETY

### 52. Training Procedure

a. During all instructional firing, emphasis should be placed on rapid adjustment of fire and a target hit with the second round as a minimum goal.

b. During the initial phases of instruction firing, the officer conducting the firing may, at his discretion, reduce the speed of the target and the number of cartridges fired in each run. The object of this is to increase the man's confidence and place emphasis on manipulation and accuracy.

c. All exercises are fired in the order listed in the tables (chap. 4) and are controlled by appropriate fire commands.

d. Moving target firing is preceded by one or more dry runs during instruction firing.

e. All 90mm rifles are inspected by a qualified individual before and after each firing to make sure the rifle has the correct adjustment, is clean and free from excessive wear, and operates properly.

f. Instructor insure that no part of any person's body is behind the breech of the rifle when a live cartridge is in the 90mm chamber. The loaders, in particular, are cautioned to keep their arms from moving behind the breech during firing.

g. Extreme caution must be exercised in opening the breech of any rifle which fails to fire. Danger of accidents is greatest at this time. After the rifle is cleared, it will be inspected by a qualified individual to determine the cause of the failure. *Do not use a rifle that has failed to fire until it has been examined and approved by a qualified individual.*

### 53. Officer in Charge

The officer in charge—

a. Assigns, coordinates, and supervises the firing line.

b. Organizes the range.

c. Determines which position is to be used in firing each table.

d. Issues fire commands and general instructions to the firing line.

e. Enforces safety precautions prescribed in AR 385-63.

f. Decides whether an alibi run should be authorized in the event of breakage or stoppage in the range apparatus.

### 54. Scoring Personnel

Scoring personnel detailed to supervise record firing are normally from organizations other than the one firing. Before record firing, they familiarize themselves thoroughly with firing procedures and the following specific duties:

a. Issue scorecards.

b. Check scoring spaces.

c. Inspect each target before firing to insure that it contains no unpasted shot holes.

d. Count number of rounds of ammunition fired by the gunner for each exercise.

e. See that firing is conducted in accordance with prescribed procedure.

f. Decide whether misfires and malfunctions of the rifle are the fault of the firer.

g. Score the targets on each exercise fired and record the score.

### 55. Coaches

During all instruction firing, a coach is at each rifle to instruct and assist the gunner; however, no coach is present at the rifle for the record firing. The loader is present at all firings. The coaches—

a. Require each gunner and loader to observe all safety precautions and see that they comply with instructions pertaining to the service of the weapon.

b. Supervise the work at the weapon and make sure the commands are executed properly. Repeat orders and instructions when necessary to insure correct understanding and timely execution.

c. Report all misfires, malfunctions, or discrepancies to the officer conducting the firing.

d. Critique the firing.

### 56. Loader

The primary duty of the loader is to service the 90mm rifle during all firing exercises. During record firing, the loader does not coach or instruct the gunner in any way. He—

a. Loads the 90mm rifle in accordance with the commands of the officer conducting the firing.

b. Taps the gunner and reports UP when the weapon is loaded and he is clear of the breech, and the backblast area is clear.

c. Signals READY to the officer conducting the firing.

d. Repeats all orders to unload, cease fire, and clear the weapon.

e. Announces to the gunner the number of rounds to be fired in each exercise, and sees that the correct number of rounds are available.

## 57. Organization

a. See figure 31 for organization of the firing line.

b. See paragraphs 53 through 56 for duties of personnel.

c. No personnel except those actually required on the firing line are allowed to enter the fenced or roped-off inclosure at any time.

d. Before firing, each 90mm rifle is checked by a qualified individual to insure that it is in firing condition.

## 58. InstructionFiring

a. Before firing, the officer in charge of firing gives a description of the range and announces specific instructions pertaining to firing procedure.

b. Rifles are numbered from right to left.

c. The coach, loader, and gunner take positions at the rifle. The gunner tests the firing mechanism, bipod legs, and monopod; the loader obtains necessary ammunition.

d. When all rifles are prepared for firing and the observance of safety regulations is checked, the officer conducting firing gives the fire command.

e. At the completion of an exercise the officer conducting the firing commands CEASE FIRING. The loader rapidly unloads the rifle and makes certain that all personnel are standing clear of the rifle, and then raises his arm to signal the officer in charge that the position is clear.

## 59. Stationary and Moving Target Exercises

a. An example of the sequence of the fire command for stationary target firing is as follows: FIRE MISSION, FRONT, TARGET, HUNDRED. When all rifle positions have signaled READY, the officer conducting the firing commands FIRE. Each gunner fires as directed until his ammunition is expended or until the command CEASE FIRING is given.

b. An example of the sequence of a fire command for moving target firing is as follows: LAY ON AIMING STAKE. When all rifles are laid on the aiming stake, the fire command continues as follows: MOVING TARGET, LEFT FRONT, TANK, \_\_\_\_\_ HUNDRED, TWO LEADS, FIRE. The loader loads on the ammunition element of the fire command. When the target completes its run, the command CEASE FIRING is given.

## 60. Record Firing

The same procedure as that prescribed for instruction firing is employed for record firing, except as noted below:

a. Each man completes the prescribed instruction firing for the course specified before record firing.

b. Unless the allotted time for firing is limited, record firing does not occur the same day that any portion of instruction firing occurs.

c. Before firing any exercise for record, the gunner is given a reasonable length of time to check the condition of the weapon, sights, and ammunition.

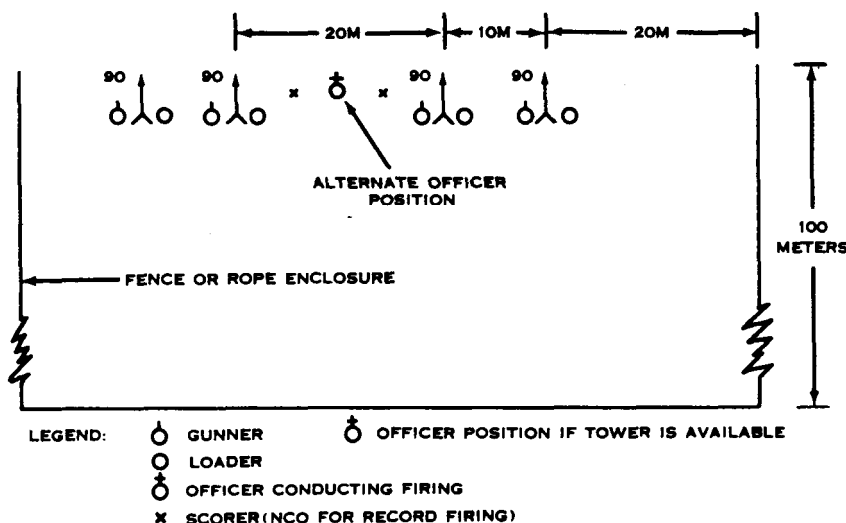


Figure 31. Range organization.

d. The gunner boresights or zeros his own weapon before record firing.

e. The target speed and the allotted time are designated to each gunner before firing.

f. In record firing, when a misfire, stoppage, or malfunction occurs, the gunner or loader holds up his hand and calls MISFIRE. Thereafter neither the loader nor gunner touches the rifle until the scorer examines it.

g. If a misfire, stoppage, or malfunction occurs through no fault of the gunner, the score is disregarded and the gunner is permitted to refire the exercise.

h. Decisions to disregard scores or to authorize refiring of portions of the course rest with the officer in charge.

i. If a misfire or malfunction is clearly the fault of the gunner, he is not permitted to refire that portion of the course.

## 61. Scoring an Individual for Qualification

a. A departure from the mandatory provisions of this course disqualifies the firer involved.

b. After a man has started an exercise, all rounds fired by him count as part of the exercise.

c. A gunner is given credit for only those hits that strike the correct target or scoring space.

d. A hit is scored for each bullet hole found in a target or scoring space, except that no more than the prescribed number of shots are counted. In field service firing, observation of the strike on the target counts as a hit. The target does not have to be marked.

e. For 25-meter firing, the name of the gunner is placed on each target before firing. Except under the supervision of the scorer, no person handles any target until it has been scored.

f. A bullet hole that touches the outer line of a scoring space is classed as a hit. A bullet hole cutting or touching the line between two scoring spaces receives credit for the higher value score.

g. For moving target firing, ammunition not fired during the exposure time of this target is forfeited.

h. Holes made by ricocheting bullets, rocks, or other foreign matter are not counted.

i. Each individual entry for record practice is made on the scorecard in ink or indelible pencil and is authenticated by the scorer. Erasures are not permitted; only the scorer can make alterations and these must be initialed by him.

## 62. Safety Precautions

a. Because of the danger to personnel from the backblast of recoilless weapon, exercise extreme care in all phases of instruction. Emphasize this danger during the earliest stages of training. Conduct all crew drills, position exercises, tracking exercises, and subcaliber firing as though service ammunition is being fired.

b. The backblast area is pentagonal in shape (fig. 32) with the apex at the breech. It extends 140 feet to the rear and has a 180-foot base, 90 feet on either side of the bore axis extended. It is divided into two areas: A danger area and a caution area. In the danger area, which extends 90 feet to the rear of the breech, serious casualties or fatalities are likely to occur due to blast and flying debris. In the caution area an individual is relatively safe providing he does not face the breech. This area extends an additional 50 feet to the rear of the danger area. It is habitually kept clear during training situations.

c. Do not fire the 90mm rifle from confined spaces such as dugouts or rooms. Structural damage to the inclosure may occur and occupants might be injured by falling debris. Severe concussion and concentration of toxic gases may result. There is also danger of starting a fire.

d. Most conventional weapon emplacements are unsuitable for this weapon. Any emplacement where there is an obstruction too near the breech is unsuitable since the obstruction may deflect the concussion toward the crew. The most suitable emplacements are those which leave the rear of the rifle exposed (or semiexposed) with no obstruction behind the breech, and which provide cover for operating personnel on either side of the rifle.

e. If the 90mm rifle has been subjected to continuous firing for a considerable length of time, the tube and chamber will become overheated. The heat of the rifle could possibly cause the propellant to ignite. An ignition under such circumstances is called a cookoff. Cookoffs normally occur between 10 to 30 seconds after a cartridge has been loaded into a hot chamber. If a misfire occurs while the tube is hot, all personnel must stay clear of the muzzle and backblast danger area until the rifle is cool, after which the cartridge will be removed.

f. Because of the possibility of a hangfire or a

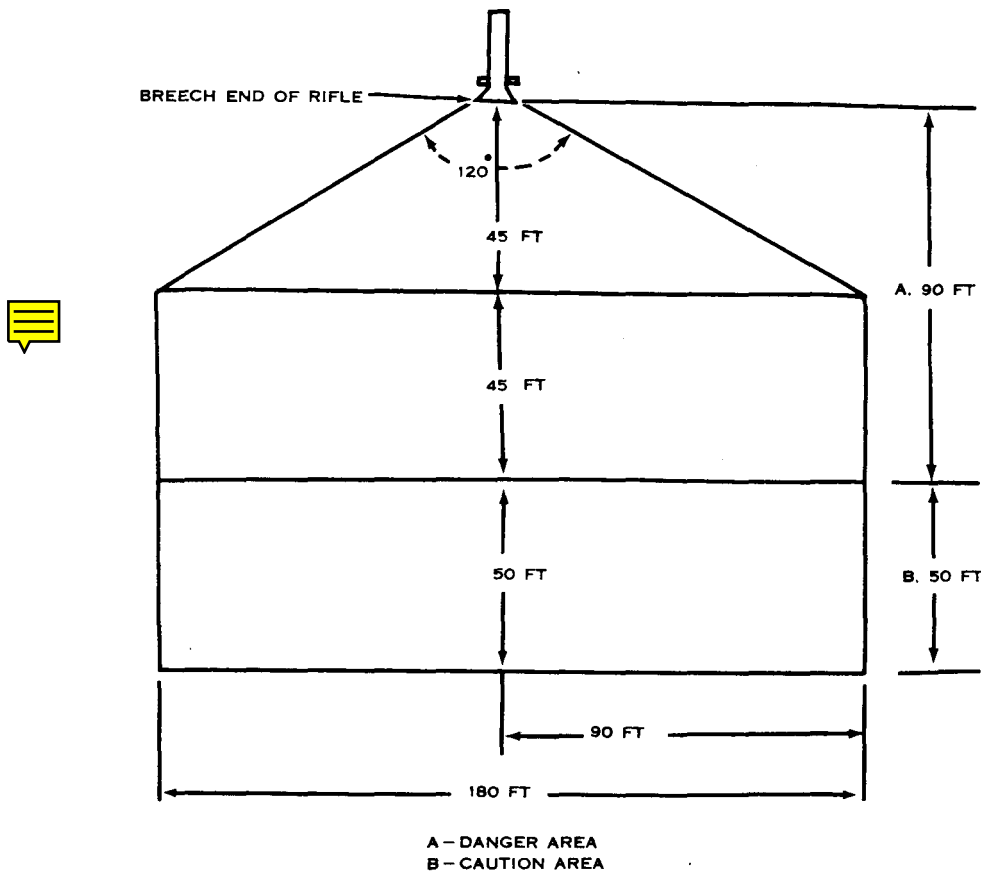


Figure 32. Backblast area.

cookoff, the following immediate action procedures will be observed when a misfire occurs with the 90mm rifle:

- (1) Keep the weapon aimed at the target and keep all personnel clear.
- (2) Wait 1 minute and recock the weapon and attempt to fire again.
- (3) If the rifle does not fire a second time, wait one more minute and remove the round. Check the primer for an indent from the firing pin; however, if an indent is present the cause of the malfunction is in the round and it must be destroyed according to unit SOP. If the primer is not indented, examine the rifle to deter-

mine the cause of the malfunction. Be careful that the round does not drop on the ground.

g. Do not disassemble ammunition at any time.  
h. Comply with safety instructions in AR 385-83.

i. When firing service ammunition, the weapon may become dangerous to touch because of heat after two or three rounds. Be careful not to touch the tube.

j. When firing from the prone position, the crew should have their shirt or jacket collars turned up and the top buttons fastened. This will afford protection to the neck from foreign material thrown up by the backblast.