

(P.B.)



MORTAR

2-INCH

1946
(Provisional)

THIS REPLACES S.A.T., VOL. 1, PAMPHLET No. 8, AND WILL LATER
BE INCORPORATED IN THE NEW WEAPON TRAINING SERIES.

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Introduction

1. Characteristics

The 2-inch mortar is a platoon weapon which enables the Platoon Commander to engage the enemy with his own simple, yet effective, artillery fire. It can be fired either high or low angle. High angle gives the bomb a steep angle of descent, which enables targets to be engaged which are immune from small arms fire, such as transport behind walls or buildings, or enemy positions sited on reverse slopes.

The mortar can also be used effectively to counter enemy light mortar fire. Low angle fire, however, is much less effected by wind and therefore more accurate and should be employed whenever possible.

The maximum range is 500 yards which requires that the mortar be sited well forward. It is a mobile weapon, easily and quickly handled. The overall weight is 12 lbs.

The mortar is a two-man weapon. Observation is maintained and fire controlled by a Detachment Commander. The No. 1 loads and fires the mortar. If available, a third man should be detailed as No. 2, his primary duty being that of bomb carrier. If a high rate of fire is required for a specific task, the No. 2 may assist No. 1 in loading but normally he should be allotted the task of local protection and may also be required to assist in the observation of fire.

The lethal effect of the H.E. bomb is about 8 yards all round from the point burst, but fragments will travel, and may cause casualties, up to 150 yards. It follows that the minimum range at which fire should be opened is 100 yards and then the detachment should be dug in.

The mortar can be used effectively, firing smoke, to screen movement of our own troops, the effectiveness of the screen being governed by availability of bombs and strength and direction of wind. It can also be used effectively for signalling from ground to air or for success signals or calls for defensive fire. In addition, it can provide illumination at night by parachute flares.

2. Object

The object of this pamphlet is to teach the soldier how to handle the 2-inch mortar in the most efficient manner in battle. His object when firing H.E. bombs must be to cause maximum casualties to the enemy in men and equipment, when laying smoke screens to give maximum protection to our own troops and cause confusion to the enemy. Signal and illuminating bombs must similarly be fired to afford the greatest assistance to our own troops in action.

3. Training

The 2-inch mortar is essentially a simple weapon. The training must therefore be kept equally simple. The mortar is aimed directly by eye and not by the use of complicated sights as are required for heavier mortars. As with all weapons, skill will only be attained by practice in firing live ammunition. As soon as the elementary

2. Stripping

The mortar will not be stripped further than this. The breech piece may, on no account, be stripped.

On some mortars the thread in the barrel and on the breech piece is interrupted. This facilitates stripping. Sometimes it will be found necessary to turn the steel pad slightly before this can be lifted off. If the fixings screw is stiff, a screwdriver is necessary to unscrew it. Normally, the point of a bayonet, a pocket knife or a small coin will suffice.

3. Assembling

4. Safety precautions

On the earlier marks of mortar the thread on the barrel and breech piece is fine. Care must be taken to ensure that the threads are not "crossed" when assembling.

4. Cleaning

(a) *Normal maintenance.* In the field, the mortar must be cleaned daily or more often if conditions require it, even if it has not been fired. If stored, it should be cleaned at least once a week.

To clean, strip the mortar. Clean out the barrel with the rod and brush, or cotton waste, using oil if necessary. Dry and inspect the barrel. When clean, oil again. Pay particular attention to the cleaning of the threads of the barrel and also of the breech piece. Clean and oil the steel pad with an oily rag. Clean the firing pin.

Clean the remainder of the mortar externally removing all dirt, especially from the spadebase, and then leave slightly oiled. Reassemble the mortar.

The muzzle cover will always be replaced when the mortar is not in use.

(b) *Before firing.* The barrel, steel pad and firing pin must be dried free from oil. The firing pin and spring should be examined to ensure that they are working freely. A burred firing pin may jam and fire a bomb as it is dropped down the barrel.

- (c) *During firing.* The barrel should be removed at intervals as opportunity offers and all fouling cleaned from the steel pad. This will help to prevent misfires which are otherwise liable to occur. The reason for this is that, when fired, the

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cartridge in the tail unit of the bomb partially disintegrates, leaving small black particles in the barrel which fall back on to the steel pad and may obstruct the firing pin.

- (d) *After firing.* As for normal maintenance except that the barrel and steel pad will require greater attention. If necessary the barrel should be scoured out with boiling water.

5. Practice

The Recruit should be practised in stripping and assembling after demonstration by the Instructor. Cleaning should be demonstrated by the Instructor and will be practised later during normal maintenance and before and after firing.

6. Storing

Finally the Instructor will show how the mortar and cleaning kit are stored in the mortar chest.

LESSON 1

1. Preliminaries:—

- (a) Stores
- (b) Safety precautions
- (c) Introduction
- (d) Use of equipment

2. Stripping

3. Assembling

4. Cleaning:—

- (a) Normal maintenance
- (b) Before firing
- (c) During firing

5. Practice

6. Storing

CHAPTER 2

DESCRIPTION OF BOMBS

The tasks for which the various types of 2-inch mortar bombs are designed are outlined in the Introduction to the pamphlet. In this chapter the individual characteristics of each type of bomb will be discussed in sufficient detail for the Recruit to understand the principle upon which it works. Instructors must guard against any tendency to introduce too much technical detail, such as naming the different types of explosive fillings, tail units or cartridges, which will only confuse the Recruit.

It is necessary that the soldier should understand the characteristics of each type of bomb so that, in action, he may use them to the best effect. Similar knowledge of the elementary principles of the mechanism will do much towards the prevention of accidents.

During this lesson, the distinguishing marks may be shown by means of coloured diagrams. If available, a stripped H.E. bomb will greatly assist the teaching of the fuze mechanism of this bomb; failing this the diagrams shown at Fig. 3 may be reproduced as an enlargement or on a blackboard. Later, when live bombs are fired, the opportunity should be taken to point out the distinguishing marks on the actual bombs.

SEQUENCE OF INSTRUCTION

1. Preliminaries

- (a) *Stores*—Mortar, diagrams vide figs. 2, 3, 4 and 5, drill bombs, stripped bomb and blackboard.
- (b) *Safety precautions*
- (c) *Introduction:—*
 - i. Tasks for which each type is designed.
 - ii. Object: description of bombs and elementary mechanism.

2. The Tail Unit and Cartridge

The tail unit is designed to give regularity of flight to the bomb. It consists of a central tube on to which are cast six vanes. Into the tube is fitted the cartridge. Between the vanes holes are drilled through which the gas from the cartridge, when fired, escapes into the barrel and propels the bomb. At the top the tail unit is screwed into the base of the bomb. At the bottom the cartridge is secured by a screw-on retaining cap. The retaining cap has a central hole through which the firing pin strikes the cartridge when the action of the breech piece is operated.

The functions of the tail unit and cartridge are common to all types of bombs. The whole unit is assembled on manufacture and will not be stripped except on drill bombs.

3. HE Bombs

- (a) *Distinguishing marks.* The bomb is painted brown with a red and green band. The body is of solid drawn steel, varnished and slightly rounded at the base. The head is covered by a screw on safety cap—(see Fig 2).
- (b) *Mechanism.* The fuze is at the head of the bomb and covered by the safety cap which must be removed before firing. The mechanism of the fuze (151 and 152) is shown at Fig. 3 below—(see Fig. 3):—

On firing, the shock of discharge causes the detent to set back and compress its spring. This opens the diagonal channel. The striker also sets back slightly on the shock of discharge and frees the ball which travels outwards and downwards over the detent into a recess. This allows the striker, actuated by its spring, to withdraw until its base meets the brass cap. As the firing pin withdraws, the shutter, under the influence of its spring, pivots until the detonator on it is immediately below the point of the striker and over the exploding composition in the disc above the magazine.

The bomb is now fully "armed".

On impact, the cap is crushed in and forces the point of the striker on to the detonator. The detonator ignites the exploding compound which in turn detonates the high explosive in the magazine.

It will be realised from the above that if bombs fitted with 151 and 152 fuzes receive a severe blow, such as being dropped free from an aircraft, they are liable to become armed. The safety cap in no way prevents this arming. If subsequently fired from the mortar or handled roughly in any way, a "premature" may occur.

To overcome this and to allow bombs to be dropped with safety from aircraft, fuze No 161 is replacing the old type. This has a safety bolt passing through the mechanism of the fuze. When inserted, the pin secures the ball in its seating so that, should the detent momentarily set back, the ball is retained in its position engaging the striker. Bombs fitted with this fuze cannot therefore become armed through shock. However, in addition to removing the safety cap before firing, the loader must not forget to withdraw the safety bolt by means of the wire loop. Failure to do this will cause a "blind".

- (c) *Characteristics.* The bomb weighs approximately 2½ lbs. It bursts immediately on impact so has limited power of penetration. It is most suitably employed against personnel in the open or "soft-skinned" vehicles.

4. Smoke Bombs

- (a) *Distinguishing marks.* The bomb is painted green with a red band. The body is of tinned drawn steel, with a nose-cap secured by three prominent rivets.
- (b) *Mechanism.* On firing, the flash from the cartridge penetrates the closing discs and ignites a small charge of gunpowder, which, in turn, sets off the delay pellet. This ignites the priming composition and thus the smoke composition—(see Fig. 4).

It will be noted that the mechanism for ignition is at the base of the bomb and that the cartridge, in addition to its function as propellant, initiates the ignition.

The delay pellet delays the emission of the smoke for about 5 seconds.

- (c) *Characteristics.* The emission of smoke lasts for about two minutes, forming an effective low cloud. Smoke screens are normally used to screen movement of our own troops from the enemy. The length of time for which the screen is required and the strength of the wind will determine the number of bombs which must be fired. The method of laying smoke screens is described fully in Chapter 7.

5. Illuminating Bombs

- (a) *Distinguishing marks.* The bomb case is black with the words "ILIG WITH PARACHUTE" stencilled upon it. It is capped by a tinned plate lid in the centre of which is embossed the letter "P" for identification by night.

- (b) *Mechanism.* The mechanism for igniting is similar to the smoke bomb. The flash from the cartridge, when fired, penetrates the closing discs and ignites a delay charge which, in turn, ignites and projects the flare. The flare is attached to a small parachute which is packed in the nose of the bomb and opens as the flare is projected from the bomb—(see Fig. 5).

- (c) *Characteristics.* The maximum effect is obtained if the bomb is fired at an angle of 85 degrees, at which it is designed to emit the flare at the top of its trajectory at approximately 500 feet. The flare burns brightly for about two minutes. Being attached to a parachute it drops slowly but it must be realised that it drifts rapidly in a wind and this must be considered if the maximum effect is to be gained from it. Normally, illuminating bombs will be used during darkness to determine enemy movement or other activity.

6. Signal Bombs

- (a) *Distinguishing marks.* The bomb is painted either black or grey, with a coloured band denoting the colour of the star (red or green). Multi-star bombs have the word "MULTI" stencilled on them and a coloured band or bands denoting the colour (red, green, white). To facilitate identification by night, the timed plate lids of bombs recently manufactured are embossed as follows:—

A cross for red	} Multi-star 2 crosses or triangles according to colour.
A triangle for green	
A cross and a triangle for multi-star red and green.	
Two parallel rectangles for multi-star white.	
"S" for success signal bomb.	

- (b) *Mechanism.* The mechanism for igniting is similar to the smoke bomb. The charge emits and lights the star, or stars, which burn from 9 to 14 seconds. Success signal bombs contain red and green pellets which, on ignition, emit smoke which turns from Red to Green. They are attached to a small parachute like the illuminating bomb.
- (c) *Characteristics.* Signal bombs should be fired at an angle of about 80 degrees, at which the bomb is designed to burst at the top of its trajectory at approximately 600 feet. The signals are visible both by day and by night. The Success Signal Bomb, however, is designed for use by day, and is more easily discernable than the stars in a bright light.

7. Preparation before Firing

When preparing 2-inch mortar bombs for firing, the cap on the tail unit must be checked to see that it is screwed fully home. While caps are normally shellacked on and cannot therefore be tightened, occasionally a loose one may be found. This, if not screwed home, will give a misfire as the firing pin will not reach the cartridge cap.

Bombs must also be checked that the complete tail unit is screwed tightly on to the body of the bomb. A loose tail unit will give irregularity of flight.

No definite time can be laid down for doing this checking, but it should be done as soon as possible after the bombs are issued to the detachment and not left to the moment of loading. It is also advisable, particularly if the No. 1 is acting alone, for the adhesive tape to be removed from the safety caps of all HE bombs likely to be used for a specific task, before firing begins. This will allow for a higher rate of firing being maintained. However, bombs so prepared may be affected by damp, so this action should not long precede firing.

8. Method of Packing and Carrying

Bombs are issued in green metal boxes each containing three carriers each of which contain 6 bombs. The boxes are stencilled HE, smoke, etc., according to the type of bomb packed therein.

In action the bombs are most easily carried in the carriers. The latest type of carrier (No. 9) consists of a metal framework which holds in place three rolled paper tubes (containers). Each of these contains two bombs. The containers in the old type carrier are held together with iron bands to which is attached a carrying handle. The end of each tube is provided with a tinned plate cap which is held in position by a cotton webbing strap. Containers are identified as follows:—

Yellow band denotes HE.
Green band denotes Smoke.

Signal and illuminating bombs are identified by a distinguishing label on the centre container.

LESSON 2

DESCRIPTION OF BOMBS

1. Preliminaries:—

- (a) Stores
- (b) Safety precautions
- (c) Introduction

2. The Tail Unit and Cartridge

3. HE Bombs:—

- (a) Distinguishing marks
- (b) Mechanism
- (c) Characteristics

4. Smoke Bombs:—

- (a), (b) and (c) as above

5. Illuminating Bombs:—

- (a), (b) and (c) as above

6. Signal Bombs:—

- (a), (b) and (c) as above

7. Preparation before Firing:—

- (a) Cartridge retaining cap
- (b) Tail unit tight

8. Method of Packing and Carrying:—

- (a) 18 bombs per box
- (b) 6 bombs per carrier
- (c) Distinguishing marks

CHAPTER 3

LOADING, LAYING AND FIRING

This chapter is designed to teach the Recruit how to load, lay and fire the mortar. It should be explained that the mortar is a two-man weapon, that is, it is designed to be fired by the No. 1, fire being controlled and observation maintained by the Detachment Commander. Under certain circumstances, when a high rate of fire is required for a specific task, the No 1 may be assisted by a No 2. In this chapter the Recruit will be taught the duties of both No 1 and No 2 when acting as loader.

As soon as he has reached a reasonable degree of proficiency in loading, laying and firing, using drill bombs, the Recruit should fire with live bombs. His first practice should be fired non-tactically, using direct fire. The second should be fired tactically on a field firing range, using both direct and indirect fire. HE bombs only should be used.

If available, two mortars per squad should be allotted to give greater opportunity for practice.

Throughout the lesson, practice should be given as though HE bombs were being fired. The variations for firing smoke, illuminating and signal bombs are given in Chapter 7.

SEQUENCE OF INSTRUCTION

1. Preliminaries

- (a) *Stores:—Two mortars, at least one container and two drill bombs per mortar, utility pouches.*
- (b) *Safety precautions*
- (c) *Recapitulation.* Practical Chapter 1. Cleaning before firing
- (d) *Introduction:—*
 - i. Strength of detachment
 - ii. Object—Loading, laying and firing.

2. Firing Positions

The mortar may be fired either from the lying or kneeling position. In action, the lying position will normally be used because the firer thus presents the smaller target himself. However, if adequate cover is available or sometimes when firing indirect, the kneeling position may be used. It should be noted that the right knee is kept well clear of the spadebase. The positions are shown at Figs 6 and 7.

If acting as loader, the No. 2 will take up position on the right of the No 1, his position conforming to that of the No 1.

3. Loading

To load, the muzzle cover is removed and a bomb is taken from the carrier or utility pouch. The safety cap and safety bolt, if the bomb is filled with fuze No 161, must be removed and the bomb placed

tail first in the barrel, with a sharp downward movement to ensure that it reaches the steel pad. No 1 will listen for the sound of the tail unit on the steel pad. If he hears no click he will raise the barrel and shake it until the bomb reaches the bottom of the barrel.

If a No 2 is acting as loader he will prepare the bomb for firing, load it into the barrel and, whilst the bomb is being fired, prepare another one. Otherwise all actions must be carried out by the No 1 alone.

4. Unloading

The term "unloading" will always be taken to mean unloading without firing.

To unload, the mortar must be turned on its side and the bomb shaken out into the right hand, or into the hands of the No 2 if present. The safety cap and safety bolt, if the bomb is fitted with fuse No 161, will then be replaced and, if firing is finished, the muzzle cover replaced.

Practice in both loading and unloading should be carried out primarily with the No 1 acting alone, which will normally be the case in the field. However, all men must be trained to act as loaders when the circumstances demand and should be practised accordingly.

5. Laying

To lay, the mortar will be held firmly in the left hand, with the fingers as far round the barrel as possible, pointing in the direction of the target.

NOTE:—*The angle, determined by the range required, at which the mortar is laid is immaterial during this lesson. It will be found most convenient if laid at about 45 degrees. Laying for specified ranges is taught in Chapter 4.*

6. Firing

When the aim has been laid, the firer, without looking down, will pull the firing lanyard gently with the right hand. Care must be taken not to jerk the barrel out of alignment. Immediately the bomb is fired, the mortar will be reloaded. This will be done by the No 2 when present.

After each shot the mortar must be re-laid.

The spadebase will "bed in" on firing. Periodically it will be necessary to reposition the spade in order to be able to operate the firing lanyard. On very soft ground this may be necessary after each bomb.

The lanyard should be held well clear of the firing lever to avoid damage to the fingers when the mortar recoils.

The breech piece mechanism will only be operated when there is a drill bomb in the barrel.

7. Action on Misfire

If, on pulling the lanyard, the bomb is not fired, the barrel will be shaken and a lanyard pulled again, if the bomb is still not fired the mortar will be unloaded and loaded with another bomb. If present, the No 2 will examine the cap on the cartridge to see if it has been struck.

If the second bomb fails to fire and if neither of the caps have been struck, the barrel will be removed and the steel plate cleaned free from fouling. The firing pin and spring will also be tested by placing the ball of the thumb over the firing pin hole and operating the lanyard. If the point of the firing pin does not protrude sharply, the steel pad will be removed and, if necessary, the firing pin replaced. A spare firing pin and spring is available for each mortar. These will normally be carried in the holdall which will always be carried with the mortar in the field by the No 1

LESSON 3

LOADING, LAYING AND FIRING

1. Preliminaries:—

- (a) Stores
- (b) Safety precautions
- (c) Recapitulation
- (d) Introduction.

2. Firing Positions:—

- (a) Laying
- (b) Kneeling.

3. Loading

4. Unloading

5. Laying

6. Firing

7. Action on Misfire

CHAPTER 4

ANGLE OF FIRE AND DIRECT AND INDIRECT FIRE

In Chapter 3, the drill movements of loading, laying and firing the mortar were taught. In this chapter the method of laying to the range required under varying conditions, such as will be encountered in the Field, is given. In addition, advice is given regarding the employment of direct or indirect fire, and the method of aiming taught.

SEQUENCE OF INSTRUCTION

1. Preliminaries

- (a) *Stores*—Mortar, containers and drill bombs. Auxiliary aiming marks, utility pouches.
- (b) *Safety precautions*
- (c) *Recapitulation.* Practical Chapter 3—Loading and firing.
- (d) *Introduction:—*
 - i. Aiming at targets in the field
 - ii. Object: Methods of aiming.

2. Low and High Angle Fire

The RANGE is determined by the angle at which the barrel is laid. The maximum range of 500 yards is obtained by laying the barrel at an angle of 45 degrees from the horizontal. Range is reduced either by lowering or raising the barrel and, according to which is done, the fire is termed LOW or HIGH angle respectively. If the barrel is lowered or raised half-way between 45 degrees and horizontal or vertical, an approximate range of 400 yards is obtained. For shorter ranges the barrel must be still further lowered or raised, and practical experience alone will determine the angle required. Care must be taken that the angle is always laid from the horizontal; sloping ground, though it may cause problems of crest clearance, must not be allowed to influence the angle at which the mortar is required to be laid. It must be pointed out that these ranges are only an approximation as the flight of the bomb is affected considerably by head and rear winds, particularly if high angle is used. For this reason, low angle should be used whenever practicable as greater accuracy can be achieved. However, high angle will have to be employed when:—

- (a) The target is behind buildings or a steep hill which requires that the bomb should fall as steeply as possible in order to reach it.
- (b) The mortar position is such that low angle will not give crest clearance. Ensuring that crest clearance is obtained is the responsibility of the No 1.

DIRECTION is obtained by the alignment of the barrel on to the point of aim. To assist alignment a sighting line is painted along the top of the barrel. When laying, the head must be directly behind the barrel so that the eyes are looking in the true line—barrel—point of aim. The further from the mortar the head can be held the greater will be the accuracy for direction.

The bomb is deflected to a greater extent by cross winds than head and rear winds. Considerable lateral allowance must therefore be made which experience alone will determine. When firing direct, the No 1 must judge the necessary wind allowance and select a new aiming mark accordingly. When firing indirect, this will be estimated by the fire controller.

3. Direct and Indirect Fire

Fire is termed direct when the No 1 can see the target and lays the mortar directly at it or at a point of aim selected to allow for wind. Indirect fire is the method employed when the No 1 cannot see the target but aims by means of a subsidiary or auxiliary aiming mark. Tactical considerations regarding the use of direct or indirect fire are discussed in Chapter 5 but it should be stressed that whenever possible direct fire should be employed as it is both quicker and more accurate than indirect fire.

- (a) *Direct fire*—To lay, No 1 will align the sighting line on the target or aiming mark if it necessary to aim off. When the range is ordered, he will lay the barrel at the required angle.

- (b) *Indirect fire*—Direction is obtained by the use of auxiliary aiming marks. If a suitable point at which to aim can be seen behind the target this will be used as an aiming mark. If no suitable point is visible, two auxiliary aiming marks will be required. Sticks or stones will serve the purpose but if none are available, two bayonets may be used. The approximate mortar position must first be selected. An aiming mark will then be placed just below the top of the cover behind which the mortar is to fire and in line with the target, or with the aiming point if allowance for wind is necessary. A second aiming mark must be placed in line with the first mark and the target or aiming point. The mortar position will be then aligned exactly with the two aiming marks.

The further apart the auxiliaries can be placed, and the mortar from them, the greater will be the accuracy in laying. Sometimes, if the ground so necessitates, more than two aiming marks must be used, extending their alignment until the No 1 can see at least two of them.

To lay, the No 1 will align the sighting line on to the aiming marks. Range is obtained in the same way as when firing direct, but corrections must, in this case, be given by the observer, who will normally be the Detachment Commander.

During this lesson the Instructor will place the auxiliary aiming marks, explaining that this is normally the task of the Detachment Commander, and that the Recruit will be practised in these duties in a later lesson.

LESSON 4

ANGLE OF FIRE AND DIRECT AND INDIRECT FIRE

1. Preliminaries:—

- (a) Stores
- (b) Safety precautions
- (c) Recapitulation
- (d) Introduction.

2. Low and High Angle Fire 3. Direct and Indirect Fire

CHAPTER 5

ADVANCED HANDLING

In Chapter 3, the Recruit is taught the duties of No 1 and No 2 when the latter is used as a loader. During this chapter he will learn the duties of the mortar detachment as a whole, with particular reference to those of the Detachment Commander. It must be understood that any trained soldier must be capable of performing these

duties in the field, though normally a senior soldier of the platoon should be so detailed. However, casualties may necessitate that any member of the detachment acts as Detachment Commander at short notice.

Considerations are also discussed regarding the selection of mortar positions, the use of low and high angle and direct and indirect fire, the selection of alternative positions and method of fire control, all of which are primarily the responsibility of the Detachment Commander.

For this lesson, the squad should be grouped as detachments of three, and each member practised as Detachment Commander in turn. If the strength of the squad is not divisible by three, one or more detachments may be of two men, thus demonstrating that the mortar detachment can function as well with two men as with three.

This chapter contains a great many facts and some tactical considerations. It is advisable that these should be given in the form of a short lecture so that the majority of the outdoor lesson may be devoted to practice as outlined in para. 7.

Once this lesson has been thoroughly assimilated and consolidated by means of progressive mortar training, the Recruit will be ready to carry out tactical live firing.

SEQUENCE OF INSTRUCTION

NOTE—*This lesson should be carried out on ground which will afford opportunity for use of both low and high angle, direct and indirect fire. Suitable auxiliary aiming marks, such as sticks or stones, will usually be readily available, but if not, must be added to the list of stores.*

1. Preliminaries

- (a) *Stores*—Mortar, two containers and at least two drill bombs per mortar, spare parts holdall complete.
- (b) *Safety precautions*
- (c) *Introduction*:—
 - i. The mortar detachment
 - ii. Object: Duties of the detachment and advanced handling.

2. The Detachment

Considerations regarding the strength of the detachment and the fact that duties must be interchangeable should be included in the introduction to the lesson. It is now necessary to teach and practise the Recruit in the detailed duties of each member.

- (a) *The Detachment Commander*—He is responsible for selecting the position for the mortar in accordance with the orders he has received and the task he has to perform. He must also select one or more alternative positions and decide on the best routes to them. On arrival at the position, he will point out the target to the No 1, tell him the range to it and the point of aim, allowing for wind, and whether low or high angle fire to be used. If auxiliary aiming marks are required,

he will place them. He will decide upon and inform the No 2, if present, of his task. He will then take up a concealed position from which he can direct and control the fire of the mortar.

- (b) *No 1*—He is responsible for mounting, loading, laying and firing the mortar, as taught in Chapters 3 and 4, under the orders of the Detachment Commander. In addition, he will ensure that both crest and local clearance is obtained and will immediately notify the Detachment Commander if this is not ensured.
- (c) *No 2*—The primary duty of No 2 is that of ammunition link. In action, mortar fire is limited mainly by the availability of bombs. Four bombs can be carried per utility pouch which allows a maximum of 24 if the Detachment Commander also carries bombs. In addition, No 2 will normally carry two containers, raising the number of bombs to a maximum total of 36. If more bombs are required for a specific task, additional porters must be detailed from the platoon, or ammunition must be dumped. When dumped it should be kept well spaced out to avoid total loss by enemy action. During the shoot, the No 2 will then be required to carry bombs to the mortar from the dumps. When not required as ammunition link, the No 2 may be detailed to assist observation of fire or for local flank protection. When a high rate of fire is required, No 2 may be used as loader, but should not otherwise lie alongside the No 1.

3. Selection of Mortar Position

Due to its comparatively short range, the mortar must be sited well forward. It is a weapon of opportunity, so that, whenever possible, direct fire positions should be selected in preference to indirect, because direct fire is the more accurate and can be opened at fleeting targets with much greater speed. However, it should be realised that when a bomb is fired, a distinctive plume of smoke is emitted several feet into the air from the mortar which, under certain conditions, may enable the enemy to locate the position and retaliate accordingly.

Examples of situations in which indirect fire may have to be employed are:—

- (a) In static warfare, when fleeting targets are less likely to appear.
- (b) When enemy counter fire is likely to be quick and accurate.
- (c) From reverse slope positions from which the target cannot be seen.
- (d) When intensive mortar fire is required as part of a pre-arranged plan to "soften-up" an enemy position prior to an attack. It may then be advisable to fire indirect so that fire can be maintained for the time specified without the interruption caused if it were necessary to move to an alternative position. It should be noted that once the attack has

been launched the attention of the enemy will be mainly engaged upon repelling that attack. It will then usually be advisable for the mortar to move to a direct fire position to continue giving supporting fire for which greater accuracy will be required, due to the proximity of our own troops.

The Detachment Commander will always select the mortar position. Although it is ultimately the responsibility of No 1 that crest and local clearance is ensured before fire is opened, the Detachment Commander must always consider this when selecting a position.

The latter is of particular importance in wooded country. If the branch of a tree should be in the line of flight just over the mortar, the bomb, when fired, will be exploded by this, and will almost certainly cause casualties to the detachment.

4. Low and High Angle Fire

As already stated in Chapter 4, low angle fire should be employed whenever possible, because the effect of wind upon the bomb will thus be minimised and accuracy will therefore be greater. However, high angle fire will be required under the following circumstances:—

- (a) When the target is behind high cover or a steep hill which requires that the bomb falls at a steep angle to obtain fire effect.
- (b) When the mortar position selected is behind high cover and low angle would not give crest clearance. It follows that high angle fire will often be required when indirect fire is employed.
- (c) Sometimes it will be difficult to position the spadebase firmly when firing low angle at short ranges, particularly if the ground is hard. High angle may then be used but the effect of head winds must be carefully considered.

The Detachment Commander will always decide whether low or high angle is to be used and will include this in his orders to the No 1.

5. Alternative Positions

When making his initial reconnaissance for the mortar position, the Detachment Commander will always select one or more alternative positions. Time will not always permit of an individual reconnaissance of each position but the approximate position and route to be taken to each will be noted and included in the orders to the detachment. Alternative positions should be selected not less than fifty yards from the original position and with due regard to the fire task. Thus, they will normally be to a flank and not in rear of the original position. Movement to an alternative position should be made under the following circumstances:—

- (a) After a few bombs have been fired, particularly when direct fire is used, in anticipation of enemy counter mortar fire.
- (b) If it is required to engage fresh targets to a flank to which the range is too great from the original position, or if better observation can be obtained therefrom.

Regarding the evasion of enemy counter mortar fire, movement to an alternative position must not be allowed to interfere with an important fire task. The Detachment Commander must weigh up the respective considerations as to whether to continue his fire task from the original position or whether, by moving, he will have a better chance of completing the task. Moreover, it must be remembered that once enemy fire starts to fall, fewer casualties will be incurred by remaining under cover than trying to move to an alternative position whilst it lasts.

When selecting mortar positions the Detachment Commander must give due consideration to the position of other troops. If a task can be as well engaged from a position in which no other troops are located as from one containing other troops, he will naturally select the former. However, primary consideration must always be given to the most efficient completion of his fire task, and he should not allow himself to be unduly influenced by the advice offered by other troops.

6. Fire Control

The Detachment Commander will take up a position from which he can see the target. His position should not be easily located by the enemy; it must also be within easy voice control of the mortar. It should not be directly in the line of fire, yet must not be too widely to a flank which would result in wrong connections being given.

The Detachment Commander will order fire to be opened and will correct, if necessary, on the fall of each bomb. From experience he should know the approximate effective beaten zone of the weapon and capacity for accuracy of his No 1. He must guard against "chasing errors" as with other weapons.

Corrections will be given as follows:—

- (a) *Range*—When a bomb falls short he will order "ADD—hundred". When he requires to decrease the range he will order "LESS—hundred". Bold alterations will attain fire effect most quickly. Corrections will not be given in multiples of less than 50 yards.
- (b) *Direction*—When a bomb falls to the left of the target, the Detachment Commander will order "Go right" or "Go Slightly Right" according to the degree of lateral error. Similarly, an error to the right will be corrected by "Go Left", etc.
- (c) When the bomb falls within the estimated effective beaten zone the Detachment Commander will notify as "Range".

It must be remembered that the mortar has a smooth bore barrel and that changes in cartridges are apt to vary slightly. Added to this is the human element and varying effects of cross and head winds and it will be appreciated that it is not a weapon of precision and cannot be expected to pin point a small target with every bomb fired. If in doubt as to whether a correction should be made, a second bomb should be fired and the correction given according to the mean point of burst.

FIRING LIVE HE BOMBS

7. Practice

Once the drill for the occupation of a position and method of fire control has been taught, practice should always be given by means of a tactical picture. Simple situations requiring realistic action should be given in the form of orders by a Platoon Commander to his mortar Detachment Commander thus:

"About ten of the enemy have come out of that wood and are hiding behind those farm buildings. I want you to shift them out with your mortar. I have the LMGs waiting for them. There may be more enemy in the wood so be prepared to engage them afterwards".

The Detachment Commander will then make a quick reconnaissance, give the necessary orders to his detachment and control the fire. Methods of depicting the fall of bombs are given in progressive mortar training (P.M.T. 3). According to the location of the subsidiary target, or on account of possible enemy counter mortar fire (to be depicted if necessary) the detachment may move to an alternative position.

Points to note during training are:—

- (a) Speed in getting into action
- (b) Suitability of the position selected and correct use of low and high angle, direct or indirect fire
- (c) Fire effect and number of bombs used to obtain it
- (d) Movement as observed from enemy position including moves to alternative positions.

LESSON 5

ADVANCED HANDLING

(NOTE—To be carried out on ground affording opportunity for low and high angle, and direct and indirect fire).

- | | |
|--|--|
| 1. Preliminaries:—
(a) Stores
(b) Safety precautions
(c) Introduction

2. The Detachment:—
(a) Detachment Commander
(b) No 1
(c) No 2.

3. Selection of Mortar Position | 4. Low and High Angle Fire

5. Alternative Position

6. Fire Control:—
(a) Range
(b) Direction.

7. Practice:—
(a) Tactical pictures
(b) Points to note. |
|--|--|

Direct or indirect fire.

1. The majority of bombs fired in action will be HE. The mortar is primarily an offensive weapon and only by using HE will casualties be inflicted directly upon the enemy. The sooner therefore that the Recruit becomes inured to handling and firing live HE bombs, the sooner will he reach the standard of confidence in the weapon required in the field.

It is important that confidence should not be shaken during early practice. Firing should therefore first be demonstrated by fully trained men which in itself will increase the desire to fire the weapon. It is probable that future issues of 2-inch mortars will be made with a hand-guard already fitted to ensure that no discomfort is caused by hot barrels. If not so fitted, guards can be improvised within the unit either by binding with pull-through cord or by using a 6 inch strip of an old bomb container, tied firmly with twine at either end.

Purely technical firing should be carried out as soon as a reasonable proficiency has been attained in loading, laying to the range required and firing (Chapters 3 and 4). Tactical firing should be practised as soon as the Recruit has reached similar proficiency in advanced handling (Chapter 5). Once accuracy has been obtained by experience, and thereby confidence in the weapon, practices should be fired giving overhead and flanking fire problems. For these advanced practices troops will often be within the danger area of the bomb and must therefore be dug in. A generous safety margin should be allowed in early stages which should be decreased as proficiency increases. In action a fully trained mortar man should be able to give overhead fire support to within 100 yards of his own troops and flanking fire to within 10 degrees, provided always that they are dug in. Conditions of wind, and whether high or low angle fire is used will, however, determine whether greater or lesser safety margins are required.

During training, however, wider safety margins should normally be allowed and officers controlling shoots must use their own common-sense in this matter, and must not allow any firing to take place until they are satisfied that everyone is sufficiently safe.

The foregoing is summarised at Lesson 6 and should be given in the form of a short lecture before the first practice with live bombs is fired. This should be followed by a demonstration after which the Recruit should fire a repetition of the practice demonstrated.

The ensuing paragraphs give details of the safety precautions to be taken when HE bombs are fired on training under varying circumstances. These should not be taught as given to the Recruit but opportunity should be taken to impress upon him, during firing, the precautions taken, noting those which may be relaxed under conditions of active service.

2. Safety Precautions

All personnel undergoing training in live firing will wear steel helmets and suitable ear protectors, as laid down in AC1, 30/1947. Spectators should also wear steel helmets if they are within the danger area. A medical orderly should always be in attendance. SAT Vol V (War Supplement) 1945, Chapter 7, gives full details of the specifications required for mortar ranges and Appendix "F" thereto lays down the method of destruction of blinds. For convenience the main points are summarized below, but officers in charge of firing must nevertheless ensure that they are fully conversant with the above references.

- (a) *Danger Areas*—Full details with diagrams may be found in SAT Vol V, Chapter 7, para. 3. In effect, the danger area is to be taken as 250 yards from both flanks of, and beyond, the area in which bombs may fall though it is reduced to 100 yards behind the firing point. When more than one mortar is firing the mortar positions should be sited at least 20 yards apart so as to reduce the risk of casualties in the event of a premature.

(b) *Blinds*

- i. On a range with a closed target area blinds will be left in situ provided that they fall within the closed area.
- ii. On a range with no closed target area all blinds must be destroyed. Great care must be taken that all blinds are noted and afterwards located. For this reason practices with HE bombs should not be fired on ground covered with thick vegetation. Soft ground should also be avoided, as blinds which have sunk below the surface are more difficult to locate and to destroy.
- iii. All Instructors required to supervise live firing will be taught the preparation of a demolition set and the destruction of blinds as laid down in SAT Vol I, pamphlet No. 13 (Grenade), 1942, Lesson 10. For the destruction of mortar blinds a 1 lb. guncotton slab must be used in addition to the normal set to ensure destruction. For a blind on the surface the slab is placed against the side of the bomb. For a blind below the surface it is necessary to dig down very carefully, without touching the bomb, until a portion of its surface is exposed and there is room to insert the guncotton slab.

A demolition box will always be available during HE firing. The officer in charge of firing will normally destroy the bomb. Should he be unable to locate any blinds he will report the occurrence to higher authority.

- iv. It must be remembered that bombs fitted with Nos 151 and 152 fuzes are "armed" on firing whether or not the safety cap has been removed. Bombs fired with the safety cap on should therefore be treated as "blinds".

- (c) *Misfired Cartridges*—A cartridge that has been struck but not fired is liable to be sensitive to shock. A bomb containing a misfired cartridge will be destroyed in situ as though a blind. Under no circumstances will it be transported by road or rail or returned to store with unfired bombs.

3. Technical Firing

Whenever purely technical firing is taking place a qualified officer will always be in charge and no firing will take place without his order. A NCO will also be detailed to supervise each mortar. He will be responsible:—

- (a) That the safety cap (and in the case of 161 and 162 fuzes, the safety bolt) is removed from each bomb before loading
- (b) That each bomb is loaded tail first into the mortar
- (c) That both crest and local clearance is assured
- (d) As each bomb is fired, for following its flight so that, if it be a blind, he can note its position
- (e) For reporting all blinds as they occur, to the officer in charge.

4. Tactical Firing

When tactical exercises are carried out involving the firing of HE bombs, the responsibility for locating and destroying blinds will devolve primarily upon the Detachment Commander. The degree of responsibility must in no way be relaxed. During early stages of training, to ensure that these precautions are taken and that the lives of other troops are not endangered, it is advisable that a responsible NCO be detailed to each detachment who will combine the duties detailed above of both the officer and NCO.

LESSON 6

FIRING LIVE HE BOMBS

1. The Importance of HE

2. Types of Practices to be Fired in due course:—

- (a) Technical
- (b) Tactical (without other troops).
- (c) Advanced Tactical giving overhead and flanking fire support to other troops.

3. Safety Margins:—

- (a) In action
- (b) On training

4. Demonstration

5. Practice

THE EMPLOYMENT OF SMOKE, ILLUMINATING AND SIGNAL BOMBS

Practical experience alone will enable the firer to obtain the best effect when laying smoke screens and firing illuminating and signal bombs. Because casualties are not directly inflicted upon the enemy, the importance of laying the mortar to obtain the burst exactly as required is not always fully realised.

It must be impressed upon the Recruit that an incorrectly laid smoke screen or badly positioned flare may lead to casualties to our own troops as great, if not greater, than those which may be caused by a carelessly fired HE bomb.

During this lesson advice is given regarding the employment of smoke, illuminating and signal bombs, which should be consolidated as soon as possible by means of a demonstration followed by practice with live bombs. For each practice a simple tactical picture should be given from which the fire controller must work out his requirements to obtain the maximum effect according to the existing conditions.

If facilities do not exist for firing smoke bombs, or should the latter be in short supply, both demonstration and practice can be given using smoke candles in the method suggested for progressive mortar training (P.M.T.4).

SEQUENCE OF INSTRUCTION

1. Preliminaries

- (a) *Stores:—Diagrams and blackboard (for lecture). Mortar, smoke, illuminating and signal bombs (for demonstration and practice).*
- (b) *Safety precautions* (see para 8 below)
- (c) *Recapitulation—Q. and A. Chapter 2. Characteristics: smoke, illuminating and signal bombs*
- (d) *Introduction:—*
 - i. Importance of accuracy
 - ii. Object: method of employment.

2. Smoke

The object of using smoke is to screen movement of our troops from aimed fire or observation. It may also be used to distract the attention of the enemy. Smoke screens will usually be laid only on the orders of the Platoon Commander who must include the following in his orders to his Detachment Commander:—

- (a) The position of our own troops and detail of their intended movement
- (b) Exact location of enemy position to be screened
- (c) The number of bombs allotted for the task

- (d) Exact time the screen must become effective and the length of time it must last.

The fire controller will then carefully consider the strength and direction of the wind so as to know where to drop his bombs for the task required.

If uncontrolled, the employment of smoke may cause confusion and mask the fire of the artillery or of neighbouring sub-units. However, once the decision has been taken to lay a screen, which will frequently form part of a company of higher formation plan, sufficient bombs must be fired to ensure that it is effective.

As smoke starts to be emitted after 5 seconds, it is advisable to use low angle fire to obtain the maximum effect. However, against this, if the ground is hard, bombs may ricochet and so cause the screen to form in the wrong place.

3. Cross Winds

The bombs should fall up-wind of the target and slightly in front of it. As soon as the firer has found his correct point of burst, he should fire another bomb immediately to obtain the necessary density. Thereafter he must feed the screen as and when necessary by observation, watching for any change of wind which may require the selection of a new point of burst. Feeding must always be in anticipation; the firer must not wait until the screen has thinned.

It is important that the screen be formed as close up to the enemy position as possible. If there is a gap, our own troops will be silhouetted against the smoke before they reach the objective and will thereby become an easy target for enemy fire—(see Fig. 9).

4. Following and Head Winds

When it is necessary to lay a screen in a following wind, at least two points of burst will be required, which will necessitate the expenditure of a considerable number of bombs. The method of initiating and feeding the screen is the same as in the case of a cross wind—(see Fig. 10).

If the movement to be screened is to a flank of the enemy position, the point of burst must always be up-wind of the enemy position and on the required flank. This applies to both following and head winds, and is the only instance in which it is advisable to use smoke in a head wind—(see Fig. 11).

From the above it will be seen that, if an attack is to be carried out under cover of smoke, the direction of the wind will often dictate whether a frontal or flank attack is to be made.

5. Illuminating Bombs

Illuminating bombs should be fired when enemy movement in the open under cover of darkness is suspected. However, uncontrolled

THE EMPLOYMENT OF SMOKE, ILLUMINATING AND SIGNAL BOMBS

NOTE: This lesson should be carried out in the form of a lecture (about 30 minutes) followed by a demonstration.

1. Preliminaries:—

- (a) Stores
- (b) Safety precautions (before firing)
- (c) Recapitulation
- (d) Introduction.

2. Smoke

Considerations and data required

3. Cross Winds

4. Following and Head Winds

5. Illuminating Bombs

6. Signal Bombs

7. Practice:—

- (a) Smoke
- (b) Illuminating bombs
- (c) Signal bombs.

8. Safety Precautions.

use of flares by night may endanger our own troops, if they are laying wire, etc., in the open. The mortar detachment must therefore always be warned when NOT to use illuminating bombs.

In addition to the fact that the bomb will burst at the top of its trajectory if fired at an angle of 85 degrees, the range to the suspected enemy movement must also be considered. Bombs should never be fired at an angle greater than 85 degrees or the flare is likely to be of greater assistance to the enemy than to our own troops. To obtain maximum effect, the flare should burst slightly in front of the enemy and as high as possible. Being suspended on a parachute, the flare will drift considerably in a wind, and this factor must also be taken into account.

6. Signal Bombs

Signal bombs will be fired only as part of a pre-arranged plan. When firing, consideration must be given to the direction from which it is required that the signal be seen. If signals are being made to aircraft, the bomb should be fired parallel to the line of flight of the aircraft and at an angle of about 45 degrees.

7. Practice

Practice in laying smoke screens should always be given in the form of a simple tactical exercise. Illuminating bombs may be fired in connection with night firing exercises with other weapons.

Extensive practice in firing signal bombs should not be necessary. After initial demonstration, practice should be given as part of a tactical exercise, normally using stars by night and success signal bombs by day.

8. Safety Precaution

No special range is required for firing smoke, illuminating or signal bombs, but it must be realised that the cannisters will fall and may cause injury to persons if hit by these. Smoke Bombs will also cause fires among dry vegetation. The following precautions will therefore be taken:—

- (a) The line of fire up to 550 yards, with a reasonable safety area either side for possible errors in line, must be clear of any person, animal or object that might sustain damage from a direct hit. If, however, overhead fire or laying a smoke screen close in to a flank is to be practised, men will wear steel helmets and be warned not to look upwards.
- (b) Precautions must be taken to see that all fires are extinguished before the area is vacated.
- (c) Should a blind occur, the metal sealing discs should be pierced and the composition lighted using about 4 inches of No 11 safety fuze. Personnel will keep well clear of the bomb when the fuze ignites the composition.

APPENDIX "A"

PROGRESSIVE MORTAR TRAINING

The outline of periods shown below is designed to give opportunity for consolidation of the lessons given in the body of the pamphlet. The Recruit will seldom master a lesson in one period but to repeat the same lesson again will only breed boredom. What is required is practice under close supervision, all mistakes being checked as they occur, finishing with a short summary of both good and bad points noted during the lesson. Only by this method can progression be maintained and the necessary standard finally achieved.

The progressive training periods shown below are by no means comprehensive; many variations can be introduced on the initiative of the Instructor. The individual rate of progress will dictate the number of times each period should be carried out, but variation must always be made and can be achieved by the use of different ground and types of cover and by constantly depicting fresh targets. To ensure progression the problems set should be simple at first, gradually increasing in difficulty. Whenever possible they should be carried out in the form of competitions, points being allotted to the individual or team and the results prominently displayed on a blackboard.

MANUAL 204
MORTAR 2 INCH
(PMT 1)

PMT 1

CHAPTERS 1 AND 2—THE 2-INCH MORTAR AND ITS BOMBS

Stores—Mortar mounted on rest, mortar chest and set of cleaning kit in holdall, diagrams of each type of bomb and drill bombs

Chapters 1 and 2 contain mainly facts. To ensure that these facts have been absorbed, questions should be given in the form of a quiz. Two or more squads may be exercised together in teams, each team being of about 4 men. If carried out indoors, live bombs will on no account be used; coloured diagrams will suffice to aid memory. The names of the bombs and of component parts of the bombs and mortar can be printed on separate strips of paper and pinned close to the appropriate part of the diagram when the answer is given. Care must be taken that the individual members of the teams are questioned in rotation. A specimen list of questionnaire is attached at Annexure 1 under main headings. Questions should be selected from each main heading, choosing easy ones for the first period and more difficult ones subsequently.

It is not intended that the questionnaire at Annexure 1 be reproduced on paper and used for examination purposes. Training tests are given in Appendix "B" and are as far as possible practical as opposed to oral.

PMT 2

CHAPTERS 3 AND 4—LOADING, LAYING AND FIRING

(Direct and Indirect)

(To be practised mainly without No 2 acting as loader)

1. Direct Fire

Stores—Two mortars, at least one container and two drill bombs per mortar

NOTE—All targets chosen must be visible from the mortar position

- Give short tactical picture
- Order:—"Action"
"HE—Load"
"Low/high angle—hundred"
"—bombs—Fire".
- Question No 1 on point of aim according to actual wind or wind depicted. Discuss
- Practise action on misfire
- After several bombs have been fired, order "Unload"

- Remainder of squad to watch actions of No 1 (and No 2 when acting as loader). Questions squad on whether all points of training correctly carried out. Discuss use of low or high angle, giving reasons for whichever employed. If necessary, check laying of mortar according to range given
- Change round, giving fresh target.

2. Indirect Fire

Stores—As for 1 above, add auxiliary aiming marks

NOTE—Mortar positions to be chosen so that targets are not visible from them

Sequence of practice as for 1 above, giving short tactical picture entailing the use of indirect fire. Choose some mortar positions which will require the adoption of the kneeling position.

Until Chapter 5 has been taught, the Instructor will act as Detachment Commander, placing the auxiliary aiming marks if required.

PMT 3

CHAPTER 5—ADVANCED HANDLING

Stores—One or two mortars, at least one container and two drill bombs per mortar

NOTE—To be carried out on varying types of ground necessitating use of both direct and indirect and low and high angle fire

Detail squad into detachments. Nominate Detachment Commander and Nos 1 and 2. Give short tactical picture to Detachment Commander, requiring that the enemy be engaged with HE and leave him to carry on. Criticisms should be reserved until after the practice is finished, unless prompting is required.

Practise movement to alternative positions giving new tactical picture which would necessitate this.

Detachments not being exercised can be employed usefully as enemy, thus giving reality to targets. "Enemy" should observe movement of detachment, if visible, and discuss after practice.

To give practice in fire control and corrections, the Instructor can depict the fall of bombs. This is most easily done if a replica sand model of the target area is constructed. Small pieces of cotton wool can be dropped at required point, being removed progressively after shorter intervals. Alternatively, a large scale map or hand sketch can be used, pointing with a pencil to the point of burst. The model or map must be "set" with the actual ground. Another method is for the "enemy" to ignite thunder flashes on pre-arranged signals. Blast effect can be aided by placing dry leaves, sand or sticks on top of the thunder flash.

Practice for both PMT 2 and PMT 3 should be confined to HE (imaginary). Smoke is practised in PMT 4.

CHAPTER 7—THE EMPLOYMENT OF SMOKE

Stores—Blackboard, mortar, drill smoke bombs, smoke candles, rifles and aiming rests

During early training it is advisable to devote 15 minutes to theoretical problems on laying smoke screens. The picture should be painted, after which individuals should point out the correct point of burst on a blackboard according to the conditions of wind, etc., given. This form of recapitulation will produce better results during the ensuing practice and will conserve smoke candles.

The laying of smoke screens is best practised by firing live smoke bombs for which no mortar range is required. The safety precautions required are given in Chapter 7. However, if facilities do not exist or if smoke bombs are not available, useful practice may be given as under.

Detail squad into detachments. Nominate Detachment Commander and Nos 1 and 2. No 2 should frequently be given the task of flank protection to the detachment or made a casualty.

The Instructor will assume the role of Platoon Commander and will give orders for the laying of a smoke screen. In addition to painting the tactical picture in sufficient detail to give realism, the following points will be included:—

- Time before which ranging must not start. (If our own troops are about to attack, ranging should never precede the time for starting the screen by more than two minutes. This will avoid giving undue warning to the enemy).
- Time at which smoke screen is required to start
- Movement of own troops for whom screen is required
- Exact location of enemy position required to be screened
- Estimated length of time for which screen required
- Bombs allotted.

The Detachment Commander will make a reconnaissance for the mortar position and give the necessary orders to his detachment. The Instructor will note whether direct or indirect and low or high angle fire is used, discussing when the practice is finished.

After giving his fire order, the Detachment Commander can best point out his selected point or burst by means of a rifle and aiming rest. The Instructor, by signals to a fatigeman will then cause a smoke candle to be lighted at the point at which the rifle was aimed. According to the success of the smoke, corrections can then be made. Feeding should not be practised with smoke candles.

Alternative methods of depicting the fall of the bomb are for the Instructor to show the point of burst, taking into account both the fire order and the laying of the mortar, upon a sand model or large scale map.

Each man should be detailed in turn as Detachment Commander and each detachment practised. To practise the whole squad, more than one period will be required.

SPECIMEN QUESTIONNAIRE FOR PMT 1

1. The Mortar

- What size is the bore of the barrel of this mortar?
- (Point to barrel catch). What is this called and what function does it perform?
- (Strip the mortar and hold up the steel pad). What is this called?
- (Hold up the firing pin and spring). What are these called?
- What form of maintenance must be carried out periodically during firing? Why?
- (Point to firing lever). What is the name of this, and what is its function?

2. HE Bomb (Point to drill bomb or diagram throughout).

- What is this bomb called?
- What is its weight?
- Before loading, what must be removed from the bomb?
 - If fitted with 151 or 152 fuze
 - If fitted with 161.
- When does the bomb become "armed"?
- What is the 100 % lethal radius of the bomb and at what extreme range may it be expected to inflict casualties?
- As soon as possible after being issued with mortar bombs in the field, what points on them would you check? Why?

3. Smoke Bomb (Point to drill bomb or diagram throughout).

- What is this bomb called?
- For what purpose are smoke screens normally laid?
- When the action of the breech piece is operated, what causes the bomb to leave the barrel of the mortar? How is the smoke composition ignited?
- For how long does the delay pellet delay the emission of smoke after the bomb has left the barrel?
- For about how long does the emission of smoke last?
- What factors will determine the number of bombs required for a smoke screen for one particular task?

4. Illuminating Bomb (Point to diagram throughout).

- What is this bomb called?
- How would you identify it by night?
- Which of the following is stowed in the nose of the bomb:—

The fuze mechanism?
A parachute?
- For about how long does the flare burn?
- At about what height is the flare ignited and emitted from the canister if the mortar is laid at an angle of 85 degrees?

5. Signal Bombs (Point to diagram which must depict either red or green star bomb).

- (a) When fired, what coloured star would you expect to see? Why?
- (b) How would you identify by night:—
 - i. A red star bomb?
 - ii. A green star bomb?
 - iii. A success signal bomb?
- (c) For about how long do the star or stars burn when ignited?
- (d) At about what height will the stars ignite if the mortar is laid at 80 degrees?
- (e) What is stowed in the nose of:—
 - i. A signal bomb.
 - ii. A success signal bomb

A parachute?
The fuze mechanism?
The star/smoke composition?

APPENDIX "B"

TRAINING TESTS

As stated in the Introduction to the pamphlet, live firing, and only live firing, will attain the necessary confidence and proficiency required of the mortar detachment in the field. However, to ensure that training has been thoroughly absorbed and thus obviate waste of live bombs and time spent on the ranges, the following training tests should be carried out after the lesson to which they refer has been consolidated thoroughly during progressive mortar training periods.

Test No. 1

Chapter 2. Identification of Bombs

- (a) *By Day*—One of each type of bomb to be shown. Recruit to identify by markings.
Time Limit per bomb—3 seconds.
- (b) *By Night*—This test can be carried out most conveniently if the Recruit wears night glasses. Otherwise by night.
One of each type of bomb to be handed to the Recruit who must identify by feel.
Time Limit per bomb—5 seconds.

Note.—If possible this test should be carried out using actual bombs, for which an opportunity will often offer during field firing practices. The safety precautions given in Chapter 6 (HE bombs) must then be observed.

If the test is carried out from diagrams, (b) above will be omitted.

Test No. 2

Chapter 3. Action on Misfire

On the command "Action—hundred", the Recruit will mount the mortar, load and lay to the correct range, without the assistance of a No 2.

Subsequent commands will be:—

"5 bombs—fire
Bomb won't fire
Cartridge is not struck
Bomb won't fire
Cartridge is not struck."

The Recruit will then strip the mortar and examine the firing pin and spring.

Order—"New firing pin required".

The Recruit will replace the firing pin, re-assemble the mortar and fire again.

Order—"Bomb fired".

The limit (from second order "Cartridge is not struck" until the bomb is fired):

- (a) If the mortar has an interrupted thread—55 seconds.
- (b) If the thread is continuous—65 seconds.

Failure to carry out correctly any major points of training throughout the test will disqualify.

Note.—It is not advisable to carry out this test with the early Marks of mortar which have a fine thread. When carried out as a timed test such threads are liable to become damaged.

Test No. 3

Chapter 4. Indirect Fire (auxiliary aiming marks)

This test will be carried out on ground from which the target is not visible from the mortar position.

The Recruit will be told that he is the Detachment Commander, shown the target and ordered to engage it using indirect fire. He will be shown the approximate mortar position.

The Recruit will place two auxiliary aiming marks and show the No. 1 the exact position for the mortar.

Provided that the fire order would obtain fire effect, taking into account real or imaginary wind as depicted, the test is passed. Undue exposure to the enemy may disqualify.

Note.—The ground should be such that from the mortar position no existing remote aiming point can be used.

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Test No. 4

Chapter 7. Smoke Screens

The Recruit will be given a tactical picture for which a smoke screen is required:—

- (a) In a cross wind (direction to be given)
- (b) In a following wind
- (c) In a headwind when a flank attack is to be launched (direction of attack to be pointed out).

The Recruit will then lay an aim with a rifle in a rest at the point of burst selected for each problem. Provided that fire effect would have been gained, the test is passed.

APPENDIX "C"

MECHANISM OF THE BREECH PIECE

1. General

It is desirable that all officers and NCOs should know the action of the breech piece mechanism. By so doing they will appreciate the fact that the breech piece requires to be handled with the normal care required for an instrument operating by means of springs. Although well capable of withstanding the normal conditions of war, undue shock such as free dropping from aircraft or lengthy immersion in water is likely to cause mechanical failure. In particular it will be appreciated why the Recruit is warned against indiscriminate operation of the breech mechanism.

The mechanism shown at Fig 12 is that of the Mk 7 and 8 mortars (including Mk 7 (airborne), Mk 7, Mk 8 (airborne) and Mk 8). The earlier Mk 1 to 4 had a slightly different breech mechanism though the principle was the same.

2. The Action of the Firing Mechanism

On the firing lever being operated in an anti-clockwise direction, the sear rotates, compressing its spring, and bears against the hammer catch, causing the hammer to move on its pivot away from the firing pin. The lower part of the hammer, engaging the lower horn of the tumbler, forces the tumbler to the rear and compresses the mainspring, while the upper horn is free of the hammer (See Fig 13).

Further movement of the sear causes it to ride over the hammer catch and release the hammer. The tumbler mainspring then reasserts itself, causing the hammer to rotate on its pivot and the lower part of the hammer to strike the firing pin a violent blow, driving it on to and detonating the cartridge cap and at the same time compressing the firing pin spring (See Fig 14).

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On releasing the firing lever, the sear spring reasserts itself and allows the sear to return to its normal position. The toe of the sear rides over the hammer catch, compressing its spring. As soon as the sear is clear of the hammer catch, the spring of the latter returns it to its normal position. The hammer, actuated by the upper horn of the tumbler, moves clear of the firing pin, its movement to the rear being limited by the lower horn of the tumbler. At the same time the firing pin spring reasserts itself and withdraws the firing pin.

3. Conclusions

It will now be realised why:—

- (a) Indiscriminate operation of the mechanism will cause springs to weaken and will also cause unnecessary wear to such parts as the noses of the sear and hammer catch and to the firing pin.
- (b) A burred firing pin may cause it to jam in the firing pin hole in the steel pad (firing hole bush) after the hammer has returned to its normal position. This may cause a bomb to fire immediately it strikes the steel pad.
- (c) A very severe blow may break or dislodge a spring, causing the breech mechanism to fail.

APPENDIX "D"

VARIATIONS FOR THE BASEPLATE

1. Characteristics

The 2-inch mortar, fitted with the baseplate, is intended for use only with universal carriers. Its overall weight (22 lbs) as compared with the 12 lb overall weight of the spadebase mortar renders it unsuitable for manhandling for long distances. Mechanically, it is more accurate than the spadebase mortar and, having a larger base, is less liable to dig in on soft ground. However, the lesser weight and simplicity of the spadebase far outweigh the minor mechanical advantages of the baseplate in the role for which the 2-inch mortar is normally required.

To take full advantage of the additional mechanical accuracy, open sights are normally used with the baseplate mortar.

2. Mechanism

The firing mechanism does not differ from that of the spadebase mortar, except that in some early makes a firing grip is fitted instead of the firing lever and lanyard.

- (a) *Traversing mechanism*—The breech piece is secured to a traversing bracket let in to the baseplate. To the rear of the bracket the baseplate is sometimes marked with a degree scale, usually in 5 degree measurements up to 20 degrees

on either side from the centre. The bracket is clamped by means of a traversing clamp fitted to the baseplate in rear of the bracket.

- (b) *Elevating mechanism*—Elevation is obtained by means of a bracket on the left side of the breech piece. An elevating clamp is affixed to the breech piece which, when tightened, clamps the mortar at the angle of elevation required.
- (c) *Sights*—The sights are fitted to the base of the barrel by means of a bracket and, for use, must be screwed tightly to the barrel with the line of sight true to the axis of the barrel. To the left rear of the sight is a "T" spirit bubble and on the right a range scale is marked for both low and high angle fire, the index being clamped to the range required by a clamping screw. If binding or a handguard is fitted to the barrel, care must be taken that sufficient space is left above the wide part at the base for the sights to be fitted between this and the binding.

3. Handling

- (a) *Mounting*—Undo the barrel securing strap and loosen both clamps. Raise the barrel slightly and swing it round so that it is pointing in the direction of the target. Clamp up.
- (b) *Laying*—Set the range on the sight using low or high angle as required. Loosen the elevating clamp, level the elevating bubble and clamp up. Centralise the traversing bubble in rear of the elevating bubble. Loosen the traversing clamp, align the sights on to the point of aim by swinging the barrel and then clamp up. Centralise both bubbles again if necessary. The mortar is now laid ready for firing.

4. Storing

To store the mortar in its chest, loosen both clamping screws and lay the barrel on top of the baseplate. Secure it by means of the barrel securing strap. To place in the chest, the sight bracket must be loosened.

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Mortar 2-inch.
1946 (provisional)

G253t
1948

④ 22762



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