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Small Arms Training
Volume V, War Supplement
Small Arms Ranges
Layout, Safety and Equipment

1945

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4th January, 1945.

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By Stationers & Printers, Ltd., London, S.W.2.

2386

DISTRIBUTION

All arms	Scale A
R.E. (Garrison Engineers)	One copy each

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SMALL ARMS TRAINING, VOLUME V WAR SUPPLEMENT

SMALL ARMS RANGES LAYOUT, SAFETY AND EQUIPMENT

PREFACE

1. The object of this War Supplement is to bring together into handy compass the contents of various War Office letters, A.C.I.s. and other recent information and data affecting all aspects of modern small arms ranges.

2. (a) The illustrations are not to scale and in some cases they have been purposely exaggerated in certain particulars to enable dimension figures to be clearly read.

(b) All dimension figures on danger area illustrations are in yards linear.

3. 1/25000 and 6 inches to 1 mile scales have been printed inside the front and rear covers respectively.

4. The following abbreviations have been used:—

A.A.	=	Anti-aircraft.
C.L.	=	Centre line.
D.A.	=	Danger area(s).
D.C.R.E.	=	Deputy Commander Royal Engineers.
D.E.S.	=	Director of Engineer Stores.
D.E.S.C.C.	=	D.E.S. Contract Circular.
F.A.	=	Firing area.
F.F.	=	Field firing.
F.P.	=	Firing point(s).
F.S.S.	=	Fixed Signal Service.
Mk.	=	Mark (in reference to ammunition).
pr.	=	Pounder (in reference to anti-tank guns).
T.A.	=	Target area.
W.T.	=	Wireless telegraphy.

CHAPTER 1

ADMINISTRATIVE PROCEDURE FOR THE
PROVISION OF RANGES

This chapter is in the course of preparation and will be published separately at a later date.

CHAPTER 2

CLASSIFICATION RANGES

1. **Definition.**—An open range normally possessing a danger area, on which firing takes place at fixed pre-determined distances from the targets, with rifles, L.M.G. and M.M.G., and on which the open range classification practices are carried out.

2. **Types.**—Definitions will appear in Chapter 1.

3. **Selection of sites.**—The general principles are laid down in Small Arms Training, Volume V, Chapters 1 and 2. In addition, it must be conveniently possible for firers to advance direct from the 100 yards F.P. to the mantlet to examine targets. Thus a site in which the space between the 100 yards F.P. and the mantlet is bog, would render the site unsuitable.

4. **Danger areas**

- (a) In war time the D.A. of a classification range is subject to the provisions of A.C.I. 76 of 1942, which is quoted here for easy reference:—

"76. *Revised danger area for small arms classification ranges.*—As a war time measure only, the danger area for small arms classification ranges will be reduced from that shown in Small Arms Training, Volume V, 1931, Chapter II, Section 7.

Subject to the conditions laid down in paras. 1 to 7 below, the new danger area will be that illustrated. (Fig. 1.)

1. The width of the D.A. at the targets will extend laterally 60 yards beyond the outer edges of the flank targets, e.g., in an 8-target range with targets at 12 feet centres, the total width of the danger area at the targets will be 150 yards.

2. The length of the danger area behind the targets will be 1,500 yards.

3. At 1,500 yards behind the targets, the total width of the danger area will be 500 yards plus the width between the outer edges of the flank targets (e.g., 530 yards on a normal 8-target range).

DANGER AREA

(WAR)

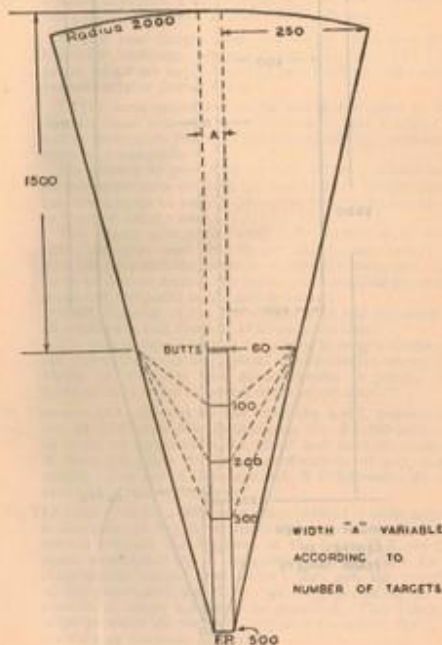
CLASSIFICATION RANGE

FIG. 1

CLASSIFICATION RANGE

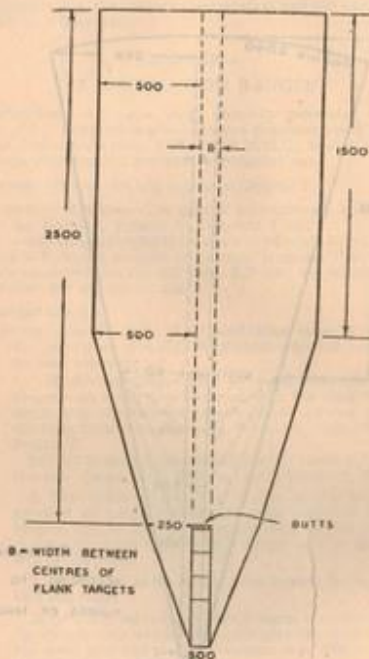


FIG. 2

4. The lateral boundary line of the danger area at 1,500 yards behind the targets will be an arc of a circle of radius 2,000 yards with its centre on the axis of the range at a point 500 yards in front of the targets.

5. The danger area in front of the targets will be obtained by drawing straight lines from the "60 yards" points referred to in para. 1 above to the outer edges of the furthest firing point to be used, as shown in the illustration.

6. The new danger area will be entirely free from habitable buildings, personnel, and also roads and footpaths, which are not, or will not be, closed to traffic either permanently or during firing.

7. The area equivalent to the old danger area as laid down in Small Arms Training, Volume V, 1931, Chapter II, will be reasonably free from inhabited buildings, personnel, roads and footpaths.

The answer to para. 3 (d) on A.F. K1309 (revised) must include comments on both the new and old danger areas, but the answer to para. 3 (e) on the form will be confined to the new danger area.

The plans submitted with A.F. K1309 must show both the new and old danger areas, the former in firm ink lines and the latter in dotted ink lines, and must be up to date as regards the position of habitable buildings, roads and footpaths in the affected areas.

Scale drawings of the new danger area will be issued to all commands and districts at home and abroad.

The new danger area will not apply to ranges already in use unless there are any special circumstances whereby it would be desirable and advantageous, in which case previous War Office approval must be obtained."

- (b) The war D.A. covered by the foregoing A.C.I. permits the use of .303-inch Mk. 7, .303-inch Mk. 8, .308-inch and all types of ammunition for pistol and machine carbine. It does not allow for firing ammunition of any larger calibre. The use of .303-inch Mk. 8 is allowed with the above D.A. *in war time only*.
- (c) The peace D.A. for a 500 yards range of eight or more targets is illustrated in Fig. 2. It should be noted that the A.C.I. quoted requires the inclusion of the peace D.A. on the plans accompanying a completed A.F. K1309 for a classification range. The widths (but not the lengths) of the peace and war D.A. will vary according to the number of target spaces to be provided. The following table provides all the data required to obtain the D.A. for varying numbers of targets.

No. of targets	War danger area (A.C.I. 76 of 1942)		Peace danger area (S.A.T., Vol. V, Sec. 7 (3))	
	Total width at target line	Total width 1,800 yards behind targets	Total width at target line	Total width 1,000 yards behind targets
2	126	508	204	804
4	134	514	312	712
5	138	518	366	816
6	142	522	370	820
8	150	530	528	1,028
12	166	546	544	1,044
18	182	562	560	1,060
20	198	578	576	1,076
24	214	594	592	1,092

- (i) All widths are given in yards linear, and include the width between flank targets.
- (ii) Width of peace danger area at 1,000 yards behind targets is continued to 2,500 yards behind the targets.

5. Application of D.A. data.—Assume that a reconnaissance has been made of a site considered suitable for a classification range. It is desired to apply the foregoing D.A. data to the site to ascertain if it would be safe to build (say) a 500 yards range with 12 targets. Proceed as follows:—

Prepare two talc, celluloid or tracing cloth outlines, to scale, based on the above illustrations and data—one for the war D.A. and one for the peace D.A. These "outlines" are called templates. Mark on each template the correct position of the butts and all F.P., taking care to allow for the length of the F.P. if the templates are being prepared to the 6 inches=1 mile (or any larger) scale. (Smaller scales such as $\frac{1}{2}$ inch and 1 inch to the mile are too small to permit the length of the F.P. to be marked with accuracy.) The length of each F.P. in feet should be taken as 12 times the number of targets.

Assume that the templates have been prepared to the 6 inch scale. Place the 6 inch war D.A. template on a 6 inch map of the selected site, so that the butts as marked on the template are in the position selected for them when carrying out the reconnaissance, and the line of the F.P. as marked on the template is on the general line selected for them on the map. The outlines of the template will now give the war D.A. for the proposed range. The ground inside this outline must be completely clear of all inhabited buildings, public roads, and footpaths; if it is not clear then the position of the template must be moved until the area covered by it is free of these restrictions and if no position can be found for the template to meet this condition, then the area is not safe.

If a suitable position for the template has been found, mark on the map the position of the butts and the 500 yards (or farther) F.P. and also the outline of the war D.A. as given by the template.

Now place the peace D.A. template on the map so that the butts and the F.P. on the template agree with the positions already marked on the map and draw round the outline of this template on the map in dotted lines. The whole of the ground inside this greater area, but outside the war D.A., must be "reasonably free" from buildings, roads, etc., as required by the A.C.I. If this greater area is "reasonably free", then the site from the safety point of view is satisfactory for construction of the range, provided the butts and the F.P. are constructed in the positions now marked on the map.

There can be no precise definition of "reasonably free". Common sense must be invoked but the following examples may assist:—

Case I.—A large farm on the axis of the range 1,600 yards behind the butts is the only building inside the peace D.A. The peace D.A. is not "reasonably free" because the farm is on the axis of the range and very near the war D.A. boundary and there is no hill background.

Case II.—Three cottages 100 yards from one flank of the peace D.A. boundary at approximately 1,750 yards behind the butts, are the only buildings in the peace D.A. The peace D.A. is "reasonably free" because the cottages are located off the general direction, and beyond the range of most (but not quite all) of the ricochets.

Case III.—Twelve cottages exist in groups in various parts of the peace D.A. of an old pre-war range, but none inside the war D.A. This scheme was turned down and a solution found by revolving the range axis about the butts until only two cottages at 1,800 yards behind the butts, and near one flank, remained inside the peace D.A. The range on the revised axis was approved, necessitating only a new gallery not quite parallel to the existing stop butt (a factor immaterial to safety).

6. Adjacent ranges

- (a) If it is desired to build two separate classification ranges alongside each other, sited so that each can be in independent and simultaneous use, follow the instructions given in Small Arms Training, Volume V, Section 7, paras. 4-10. It must be clearly understood that ranges laid out under para. 9 do not permit firing at 100 yards on one range and 500 yards on the adjoining range simultaneously.
- (b) It will be obvious that considerably less combined D.A. will be necessary for converging side-by-side ranges than for parallel ranges.

ADJACENT CLASSIFICATION RANGES

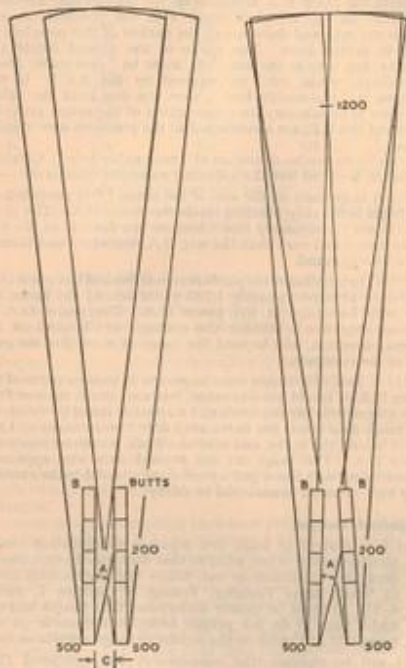


FIG. 3

A = MIN. 11°
C = 59 YDS WHERE A=11°

FIG. 4

The maximum saving of war D.A. will be effected if the axes cross at about 1,200 yards behind the butts.

In either case the 11 degree rule must be invoked to ensure safety.

- (c) For parallel ranges the 11 degree rule merely means that there must be a width of at least 59 yards between the left side of the F.P. of one range and the right side of the F.P. of the other range. (See Fig. 3.)
- (d) With converging ranges the angle A in Fig. 4 must be at least 11 degrees. This angle is formed by one straight line along the right side of the F.P. of the left hand range and another straight line from the right end of the 500 yards F.P. of the left hand range to the left end of the 200 yards F.P. on the right hand range.
- (e) When extensive classification range facilities are required, e.g., 24 targets, a large saving in D.A. acreage may be effected by building two converging 12-target ranges instead of one 24-target range.

Further, if the two ranges conform to the 11 degree rule, they can be in independent and simultaneous use, under the conditions of 8 (a), which is an important factor.

- (f) If side-by-side ranges have, for any reason, to be in echelon, the 11 degree rule will not apply if the F.P. of one range are behind the targets of the other range. In such cases the full danger area for each range must govern the siting of them.

7. Reduction of D.A. in certain cases

- (a) The only circumstance in which a reduction of the war and/or peace D.A. can be considered is when there is a steep hill immediately behind the targets. If the hill rises vertically or "nearly vertically" for 200 feet or more above the line of sight then, provided the gallery can be built close to the foot of the hill, no D.A. is required beyond the top of the hill.
- (b) There is some misapprehension as to the slope of a hill which complies with the description "nearly vertical". Common sense must be invoked but a reasonable guide is that if a man in normal health and without special training, can climb straight up the hill on the range axis, unaided, then the hill is not "nearly vertical" for this purpose.
- (c) A hill complying materially with both the following conditions also requires no D.A. beyond the top :-
- Begins to rise immediately behind the targets, and continues to rise at a general angle greater than 30 degrees to the horizontal.
 - Rises not less than 400 feet above the line of sight.

(d) An opinion as to safety will be given by the Commandant, Hythe Wing, Small Arms School, in any case submitted to him which does not fall into one of the above categories but which, nevertheless, appears to justify some reduction of the full D.A.

8. **Number of targets.**—Classification ranges are usually built with 4, 8, 12, 16, 20 or 24 targets. No range should now be considered for less than four targets and for ranges at the other end of the scale careful attention should be paid to the factors outlined in para. 6 (especially 6 (e)).

Twelve-target ranges have proved the most economical to administer during the present war.

9. Stop butt

(a) A classification range should have a stop butt behind the targets, not only to stop the vast majority of bullets but to enable markers to signal which side of the targets missus have passed. Stop butts may be either artificial or natural.

(b) An artificial stop butt is a bank built close behind the targets (5-30 yards) which must comply with the following conditions:—

(i) *Height.*—When viewed along the line of fire from each F.P., the top of the butt must show at least 4 feet above the top of a 6-foot target in its correct firing position (6 feet in the case of 4-foot targets).

(ii) *Length.*—The length is governed by the length along the crest line, which in war time must extend at least 10 feet beyond the outer edges of the 6-foot flank targets.

(iii) *Thickness.*—At least 5 feet at the top.

(iv) *Slope.*—A slope of 2 in 3 is advisable but it will also be satisfactory if the slope is the natural angle of repose of the soil of which the butt is built; this usually facilitates the building of the butt—it being remembered that the time taken to build the butt is generally the governing factor in deciding when the range can be brought into use.

(v) *Position of stop butt in relation to targets.*—If the site is suitable, and it is desired that the range should offer "30 yards range" facilities, the stop butt should be sited so that there is a horizontal distance of 30 yards between the target trench and the foot of the stop butt. This enables "30 yards range" facilities to be provided (firing at 25 yards range).

Otherwise, the foot of the stop butt should be 5-10 yards from the targets. 5 yards is a minimum.

(e) A natural stop butt is a steep hill immediately behind the targets. As the hill should rise very steeply for about 20 feet above gallery floor level, it is usual to cut into the hill to form a nearly vertical "face". The length of the "face" so excavated should be at least the calculated crest length of the artificial stop butt which would otherwise have been necessary.

Para. 9 (b) (v) also applies to natural stop butts.

10. Target numbers

(a) It is customary to number the targets by erecting timber numbers along the top of the stop butt. Permanent numbers are illustrated at Plate II, in Small Arms Training, Volume V. In war time, however, it is not necessary to have elaborate or expensive numbers and it will suffice if this matter is left to the discretion of the R.E. The numbers must be strong enough to withstand severe wind pressure and large enough to be clearly visible from the farthest F.P.

(b) Sheet metal numbers should only be used if shortage of timber compels; in such cases, the frames for supporting them must be of timber, as metal frames, e.g., angle iron, may lead to dangerous ricochets.

(c) Target numbers should not be erected on the forward slope, or at the foot, of the mantlet.

11. **Gallery.**—Care and attention to detail must be given in designing a markers' gallery, especially with regard to levels. A typical cross section is shown in Fig. 5.

The following notes may be of assistance in design:—

(a) It is obviously desirable, but it is not absolutely essential to safety, for the gallery and the stop butt to be parallel.

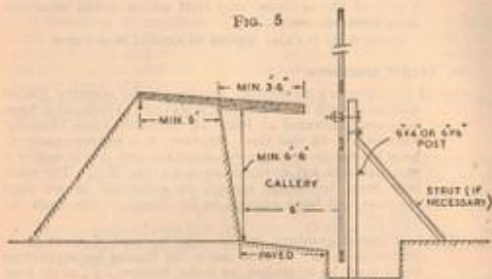
(b) The gallery must be exactly at right angles to the axis of the range.

(c) A level line of sight should be aimed at; therefore, if the ground between the furthest F.P. and the gallery is generally level or is sloping slightly uphill towards the gallery, the latter should be built below ground level, unless the sub-soil or natural water level makes it impracticable.

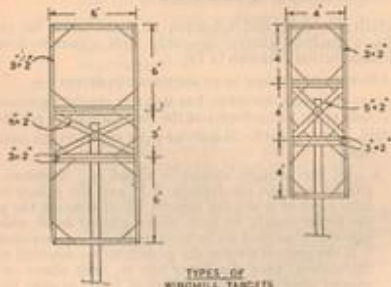
If the general level of the ground slopes downhill towards the gallery, then the latter can be built above or below ground level, or a combination of both, as may be found most convenient. Other considerations permitting, a more level line of sight should be aimed at by building the gallery above ground level.

IMPROVED CLASSIFICATION RANGE
GALLERY WITH WINDMILL TARGET

FIG. 5



SECTIONAL ELEVATION
 GALLERY & TARGET



TYPES OF
 WINDMILL TARGETS

FIG. 6

- (d) The length of the gallery should be based on the target frames being at 12-foot centres. Even if the range is limited to 200 or 300 yards and in consequence 6-foot targets will not be required, the 4-foot targets should still be at 12-foot centres. Any reduction in this dimension can only have an adverse effect on the efficiency of weapon training on the F.P. in addition to producing congestion in the gallery.

Beyond the flank targets, provision should be made for target store and/or workshop at one end of the gallery and latrine accommodation at the other end.

These two factors will determine the total length of gallery.

- (e) Overhead cover for the markers should project at least 3 feet 6 inches and preferably 4 feet, from the face of the gallery wall, and must extend the whole length of the gallery. This cover (usually corrugated iron) must slope slightly down from back to front edge and should be covered with 6 inches of earth and suitably supported.
- (f) A small seat for each marker should be fixed against the gallery wall opposite the centre of each target.
- (g) A shelf (or recess in the gallery wall) should be provided for the telephone. This should be at the target store end of the gallery on ranges with eight or less targets, and in the centre of the gallery if there are more than eight targets. If there are 20 or more targets, it is advisable to provide for two telephone circuits, located so as to divide the gallery into three equal lengths.
- (h) The gallery floor on permanent ranges should be of permanent construction, e.g., concrete, but for temporary ranges should be at least surfaced, e.g., clinker. It is bad policy, for obvious reasons, to let the floor be the material of which the sub-soil is composed (this is especially so in the case of chalk and clay).
- (j) Details sometimes overlooked are drainage of the target trench and provision of a socket or other means of supporting the 4 foot by 3 foot red flag which has to be raised and lowered frequently while the range is in use.
- This flag socket is usually positioned at one end of the gallery, the socket being fixed to the gallery wall at a height which ensures the flag being visible from all F.P.

12. Mantlet

- (a) The mantlet is normally composed of earth and must not be less than 5 feet thick at any point throughout its whole length

- (b) The highest level of the sloping top of the mantlet must be about 3 inches below the bottom of the targets when these are in their correct position for firing. This dimension may require to be increased to 4 or 5 inches if the range has an uphill line of sight, in order to maintain the appearance of a 3-inch gap when viewed from the P.P.

This gap is not a safety precaution, but is provided to ensure that when a target is in position for firing, the whole of it is clearly visible to the firers.

- (c) The top of the mantlet—at least 5 feet thick—should slope upwards from the gallery wall to the outer edge, by about 6 inches. At the forward edge where the mantlet is battered down to ground level, it is usual, though not essential, to provide rough timber posts as illustrated in Fig. 5, in order to maintain a defined edge and ensure the maintenance of the minimum 5 foot width.

13. Target frames

- (a) There are two recognized types of target frame, viz:—

- (i) Hythe pattern, and
- (ii) Windmill.

Hythe pattern frames are of steel, built to a standard War Office design and obtainable as complete units ready for erection. The exact level at which these targets are to be set must be carefully worked out and adhered to. When set to exactly correct level and line, the bases are concreted in, in the bottom of the target trench.

Windmill targets are of timber and are made up locally by the R.E. Works Services. Typical windmill targets are illustrated in Fig. 6. The sizes of the various members as shown in this illustration should be regarded as minima; it is a waste of time and timber to try and economize further as the targets would not then stand up to wind pressure or the "rough and tumble" of everyday use. An important detail when positioning the supporting posts in the target trench, is to stagger the posts by at least one clear foot so as to ensure that targets do not foul each other when being rotated simultaneously, especially in windy weather. (Fig. 7.)

- (b) Hythe pattern frames should be used on permanent ranges and on improvised ranges situated on very exposed sites.

Windmill targets are suitable in war time on all other improvised classification ranges.

STAGGERING OF WINDMILL TARGET POSTS

SUPPORTING POSTS 3'x4 OR 4'x6"



14. Telephones

- (a) It is most important to equip classification ranges with an adequate and efficient telephone system. This fact cannot be stressed too much as such a provision makes a most material difference to the efficiency of weapon training on the range in addition to effecting a marked saving of time.

It is also an important factor in reducing to a minimum, the possibility of accidents, if the officer or N.C.O. in charge of the butts and the officer in charge of the F.P. are in immediate contact by telephone.

- (b) There are three main systems, viz :—
 (i) Underground cable.
 (ii) Overhead line on poles.
 (iii) W.T.

The responsibility for providing the most efficient means of communication rests with the C.S.O. The following notes (c) to (f) may be of assistance in cases where W.T. is not employed.

- (c) On a range of 12 to 16 targets, the cable should be laid on the range axis with terminals in the centre of each F.P. and about 5 yards back from the forward edge. If the overhead system is installed, the poles should be erected along one side of the range, well clear of the F.P. with extensions to the centre of each F.P.
- (d) On a range of eight or less targets, the cable or overhead line, should run down one side of the range with terminals located at one end of each F.P. about 5 yards from the forward edge.
- (e) For ranges of 20 or more targets, it is advisable to have more than one circuit, e.g., on a 24-target range two cables should be laid down the range approximately opposite targets 8 and 16, thus dividing the range into three equal widths.
- (f) F.P. terminals are usually housed in strong wooden or metal boxes, with metal lids; the lids should have four sides about 2 inches deep, which overlap the top edges of the box, to prevent rain penetrating the boxes. The latter should be set so that the tops of the lids are not less than 3 inches below ground.

15. Firing points

- (a) Whatever number of F.P. is provided, they should be uniform in length, width, etc., and, unless there are strong reasons to the contrary, a line from the centre of all F.P. to the centre of the gallery should be one straight line.

- (b) The following constructional details should be noted :—

- (i) Length of each F.P. in feet — 12 times the number of targets.
 (ii) Width of each F.P. — 9 to 10 feet excluding batters.
 (iii) Each F.P. should have a slight grade down from front edge to back edge; a total cross-fall of about 9 inches is sufficient.
 (iv) A satisfactory finish to a F.P. is turf.
 (v) No F.P. is now required to be provided at 400 yards.

16. Danger flags.—Every classification range should be provided with the following red danger flags :—

- (a) A 6 feet square flag on a permanent flag pole at some convenient point near the butts to indicate that the range is in use. This flag is hoisted and lowered in accordance with A.F. B68A.
 (b) 6 feet square flags on permanent flag poles erected in positions shown on the official map or plan of the range and its D.A.
 (c) A 4 feet by 3 feet flag on a portable pole at one end of the gallery. This flag is hoisted or lowered in accordance with the provisions of A.F. B68A. The flag must be at such a height as to be clearly visible from all F.P.
 (d) A 4 feet by 3 feet flag on a portable flag pole for use in similar conditions to (c) but located on the F.P. in use; the pole should stand in a socket provided for the purpose on or near each F.P.
 (e) Any other special flag which may be required to be exhibited.

17. Target store and/or workshop.—The design of these should be left to the discretion of the R.E. but the following points may be noted :—

- (a) The store should be at one end of the gallery, have efficient window lighting, a stove and a flat-topped table at least 8 feet 4 inches by 6 feet 4 inches, on which targets can be prepared; it is an advantage to provide the store with a substantial lock-up cupboard, in which to store small items of range equipment.
 (b) On large ranges it is usual to provide a workshop adjacent to, but separate from, the target store. When a separate workshop is provided, the target store should not contain the table or the stove—these items being transferred to the workshop.
 (c) It may be mentioned that on improvised ranges, very good results can be obtained by the use of tubular scaffolding and corrugated iron in the construction of the workshops and target stores, if these materials are available.

(d) It is not an economy to build the smallest possible workshop and/or target store. When designing these buildings (whether for temporary or permanent use), take into account the size and probable number of targets to be housed and repaired (e.g., a 6 feet "windmill" target is usually 15 feet long by 6 feet wide). Allow reasonable but adequate space for repair work and for manhandling the frames. Allow also for shelving, lock-up cupboard, stove, etc. One side of a target store should be free from windows, and roof truss members should be kept at an adequate height to prevent them from interfering with the storage or manipulation of targets.

(e) When available, water supply should be laid on to range workshops.

(f) If it is essential to locate the workshop elsewhere than in the gallery, it should be outside the D.A. and it is then advisable to extend the telephone system so that the workshop is in telephonic communication with the butts.

18. Danger notice boards

(a) When these are necessary on the D.A. boundary to give warning to the public, they are provided and erected by the R.E. when the range is the subject of a works service.

(b) It is desirable to make it clear that it is not the duty of the R.E. Works Services to decide where the notices are to be erected. This duty devolves on the board of officers reporting on the range, or, where no board has been convened, on the district commander or other senior officer responsible for the provision of the range.

19. Troop shelter.—A troop shelter should form part of the works service for a classification range.

Shelters, whether of permanent or temporary materials, must be enclosed and equipped with at least one window, one stove and fixed bench seating round the sides.

The size of the building will be dependent on the size of the range, but it should not provide less than about 200 square feet floor space.

It should be located in the most appropriate place outside the D.A.

20. Facilities for maintenance.—District H.Q. and other formations or units responsible for the allocation of a range possessing constructional works which require maintenance should ensure that D.Cs.R.E. are afforded proper and reasonable opportunity to carry out maintenance works.

It is not policy to allocate a range for firing for seven days a week, week after week, and expect it to function efficiently indefinitely, without proper maintenance.

21. Early liaison with R.E.—Whenever a new range is to be built or material alterations or extensions are to be made to an existing range, the local R.E. must be consulted in the early stages. This applies not only to classification ranges but to all types of S.A. ranges likely to involve the R.E. in a Works Service.

22. War courses.—G.S. branch of District H.Q. must supply copies of the War Courses and any subsequent amendments to permanent range wardens.

CHAPTER 3

THIRTY YARDS RANGES

1. Definition.—A 30 yards range is an outdoor range, with a full stop butt and no danger area, for firing all calibres of small arms ball ammunition up to, but not exceeding, .55 inch at ranges not exceeding 30 yards.

2. General.—The name "30 yards range" is now a partial misnomer as most firing takes place at 25 yards range. The original name has been retained to prevent confusion with 25 yards miniature ranges.

3. Danger area.—In war time no danger area is required on any 30 yards range which complies with either of the following two sets of conditions—

(a) Ranges with vertical brick or concrete stop butt walls.

(The datum for all \pm heights is the level of the top of the target slot.)

(i) The vertical height of the stop butt wall and of both wing walls must be at least 14 feet.

(ii) The length of each wing wall shall be at least 12 feet.

(iii) A bullet catcher 7 feet 6 inches high and at least 3 feet thick at the top shall be provided for the full firing width.

(iv) The ricochet pit shall be uniformly graded down from ± 0 at 25 yards to -6 feet at 5 yards, from the centre of the target slot. The depth of the ricochet pit at any position on the range axis shall be extended laterally to the full firing width—any slopes or batters being outside this width.

(v) The "firing width" of a normal range shall be 24 feet which will allow for not more than 6 rifles being fired at one time. Variations in the firing width shall be ± 4 feet per rifle.

(vi) No target may be positioned less than 4 feet from either flank of the sand bullet catcher.

- (vii) For ranges required to cater for ammunition exceeding .45 inch but not exceeding .55 inch calibre, the following additional condition shall be complied with:—

A 9-inch brick, or 3-foot revetted earth wall shall be built behind, and 2 feet away from, the main stop butt wall and it shall be the same length and height as the sand bullet catcher.

An earth bank with natural slopes at least 3 feet thick at the top, but otherwise conforming to the foregoing dimensions, will be accepted in lieu of the brick or revetted earth wall.

- (b) *Ranges in sand, gravel or chalk pits* (where the pit face acts as a stop butt).

- (i) The average angle of slope of the face does not exceed 10 degrees from the vertical and the vertical height of the face is at least 14 feet above the bottom of the targets.
- (ii) The average angle of slope of the face does not exceed 30 degrees from the vertical and the vertical height of the face is at least 20 feet above the bottom of the targets.

NOTE.—Conditions (i) and (ii) are complementary.

- (iii) A ricochet pit as in (a) (iv) shall be provided, unless the height in (b) (i) exceeds 35 feet or in (b) (ii) exceeds 40 feet, when it may be omitted.
- (iv) A bullet catcher as in (a) (iii) shall be provided in the case of ranges in gravel or chalk pits.
- (v) Sub-para. (a) (v) and (a) (vi) shall apply.

4. Construction

- (a) Figs. 8 and 9 show a sectional elevation and half plan of a standard 30 yards range, designed for the normal width of 24 feet and with the lying position F.P. at 25 yards.
- (b) Subject to the general design illustrated, constructional detail should be left to the discretion of the R.E., who will be guided by local considerations as to materials, etc. The following additional points may, however, be of assistance in the preparation of working drawings:—
- (i) *Direction of fire*.—The range should, if possible, be sited so that the direction of fire is north.
- (ii) *Target trench*.—The target trench to accommodate the snaphooting apparatus is of brick or concrete and is 2½ feet in width, 9 inches deep and about 4 feet less in length than the width of the bullet catcher. It should be centrally disposed in the width of the range.

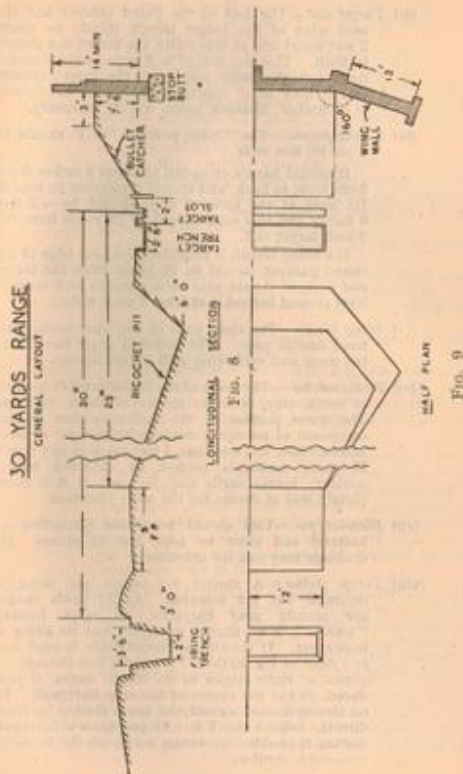


FIG. 9

(iii) *Target slot.*—The foot of the bullet catcher and the near edge of the target trench should be about 2 feet apart and in this width the target slot should be built. This slot should be 3 inches wide, 6 inches deep and the same length as the target trench, and it may be of concrete, timber, or brickwork. If of timber, distance pieces will be necessary.

(iv) *Firing points.*—The "lying position" F.P. should be 9 (or 10) feet wide.

It should have a cross-fall of about 9 inches down from front to back, and should preferably be turfed. Its level at the forward edge should be +2 feet 6 inches and this edge should be 25 yards from the 3-inch target slot.

If a firing trench is provided, the near edge of the raised parapet should be 30 yards from the target slot; there should also be a parados and strip of level ground behind it at least 1 yard wide.

(v) *Wing Walls.*—The open ends of the wing walls must have double piers. The internal angle formed by the main and each wing wall is 160 degrees.

(vi) *Bullet catcher.*—The body of the bullet catcher consists of earth, clay, or other locally available material. The outer portion of the bullet catcher is best composed of an equal mixture by volume of sand and sawdust, not less than 3 feet thick at any point. If these materials cannot be obtained easily, ordinary loamy earth may be used, if it is completely free of stones for the same thickness.

(vii) *Ricochet pit.*—This should be turfed (including all batters) and must be kept free of stones. Its drainage may call for attention.

(viii) *Troop shelter.*—A shelter for troops not firing is desirable but not essential. As 30 yards ranges are usually near barracks, an open fronted "lean-to" is all that is necessary but its siting is important. It should be immediately behind and to a flank of the furthest F.P. and a line through its centre at right angles to its length ought, if produced, to cut the centre of the stop butt wall. In no circumstances should the troop shelter be sited directly behind the F.P. If provided with tiered seating it enables spectators to watch the firing in reasonable comfort.

(ix) *Shelter over F.P.*—It is now permissible to build a shelter over the principal F.P., so that firing can continue in adverse weather conditions.

It should consist of a roof and two sides only.

If the range has to allow for a trench F.P. at 30 yards, the shelter at 25 yards cannot have intermediate roof supports and in general the provision of both a trench F.P. at 30 yards and a shelter at 25 yards on any one range is impracticable and one or other will have to be sacrificed.

Such F.P. shelters were not approved in peace time partly owing to the resultant excessive noise during firing. In war, this is not a very material factor but it is nevertheless advisable to reduce excessive noise to a minimum by:—

Avoiding the use of corrugated iron or any other form of sheet metal roofing.

Pitching the roof down towards the front edge of the F.P. (Rainwater must be carried off by r.w. guttering and not allowed to drip off all along the front edge.)

Ensuring that no "back" is provided to the shelter, in any circumstances.

Keeping the roof fairly high, e.g., 8 feet 6 inches along the forward edge and 9 feet at the rear.

The length of a F.P. shelter should exceed the length of the F.P. by 2 feet at each end and its width should be 13 feet.

(x) *Hank behind stop butt.*—If a hank is provided instead of a wall under item 3 (a) (vii), the width of 2 feet behind the stop butt is measured at datum level. The object of the 2-foot width is to give access to the back of the main wall for repairs, as a minor proportion of bullets exceeding .45 inch may penetrate the main butt and be stopped by the additional wall or hank.

(xi) *Pistol F.P.*—If the range is required to cater for pistol firing, a strip of the ricochet pit should be levelled up for a width of about 6 feet and so that its forward edge is 10 yards from the target slot. If two F.P. for pistol are required, the second is similarly made at 15 yards from the target slot.

(xii) *Slops up to targets.*—The width between the lowest level of the ricochet pit and the target trench will be approximately 15 feet. This should be used to form a turfed path 4 to 5 feet wide in front of, and level

with, the target trench, and the remainder should comprise a turfed slope down to the ricochet pit; on the slope some rough meadow steps (either at intervals or continuous) may be provided to enable firers to advance direct up to examine their targets. In no circumstances may these steps be built of brick, concrete or other similarly hard material.

(xiii) *Targets and target apparatus.*—The usual targets for deliberate firing are:—

Silhouette Fig. No. 2 on veneer, or substitute, fixed on suitable posts.

Representative 4 feet targets OR $1\frac{1}{2}$ inch \times $1\frac{1}{2}$ inch black paper aiming marks for zeroing, pasted on to 8 feet \times 3 feet white papered canvas screens.

4-foot grey papered canvas targets with brown paper Figs. 2, pasted on—2 to each target, for pistol firing.

M.G. targets (see Figs. 37 and 38) on screens 28 inches \times 44 inches.

All targets should have short legs (about 9 inches to 1 foot) to fit 3-inch target slot. Small wood wedges are used to secure legs in target slot.

For operating snaphooting targets, a simple and suitable apparatus is illustrated in S.A.T., Vol. V, Plate 90, and this is fixed in the target trench. The targets are "Figure 4A" representative snaphooting targets (see Chapter 10, para. 6 (c) (v)) with card legs for slipping into clips on the apparatus. Fig. 2 snaphooting targets are also now used (Figs. 33 and 34).

CHAPTER 4

FIELD FIRING RANGES

1. Definition.—A F.P. range is an open range with a full D.A. and no stop butt, on which firing takes place from anywhere inside a defined F.A. and where targets may be set anywhere in the F.A. or within the limits of the range, subject to the limitations described below:—

- (a) The ideal range, known as a "battle area" permits firing within a 360 degrees arc (see para. 13).
- (b) Generally speaking, the ground used as a F.F. range should at least permit of firing to or from the flanks up to 90 degrees, but according to the ground available and the number of troops to be exercised, modification to the arc may be required and oblique limits set to prevent firing in any direction where the available D.A. or the configuration of the ground does not meet the safety requirements.
- (c) Having regard to the necessity of exercising small sub units in frontal attack, ground may be accepted as suitable where the oblique limits are less than 90 degrees or where a defined target area has to be laid down.

Since consideration must be given to the necessity of training troops to fight *through* the objective, it should be the exception rather than the rule to have a defined T.A.

2. General remarks

- (a) The restriction of the F.A. (and, exceptionally, the T.A.) within defined limits is dictated only by the necessity of keeping the D.A. within the limits of the ground available and with due regard to the intended number of troops to be exercised at any one time.
- (b) The more realistic the facilities offered on a F.F. range the greater will be the value of the range to officers conducting exercises and to the troops taking part. Thus, an area comprising various flat fields bounded by hedges is of slight value only; a fairly hilly area with copse, woods, scrub, hedges and a variety of other natural and irregular features would make a good site.

- (c) To assist in attaining realism, every restriction which is not essential to safety should be cut out. Scope for ingenuity and resourcefulness in setting exercises is thus increased. The F.F. range is a good one if officers and O.Rs. go away from an exercise with a picture of how a skilfully prepared fire and movement plan should be carried out.
- (d) Attention is directed to S.A.T., Vol. I, Pamphlet 1, Sec. 17.

3. **Danger areas.**—The assessment of the D.A. of a F.F. range requires to be carefully worked out. There are three official templates for F.F. ranges. These are illustrated in Figs. 10, 11 and 12 and the correct one to use in a given case is decided as follows:—

Fig. 10.—May only be used for the firing of M.M.G. on tripod or bipod and L.M.G. on tripod.

Fig. 11.—The above, plus L.M.G. on bipod and rifles.

Fig. 12.—Both the above, plus firing same from moving vehicles if desired.

If Mk. 8Z ammunition is to be used, the lengths of the D.A. will require amendment as follows:—

Figs. 10 and 11.—Increase from 3,000 to 3,500 for targets at ranges up to 2,000 yards.

Increase from 3,000 to 4,500 for targets up to 4,000 yards.

Fig. 12.—Increase from 3,500 to 6,200 for targets at any range. This latter figure (6,200) may be reduced to 5,000 in war time, provided there are no inhabited buildings or roads in the intervening 1,200 yards.

In general, the template in Fig. 11 will be found most useful for section or company exercises on an average sized range, e.g., a F.A. 800 yards long x 500 yards wide, i.e., troops can advance 800 yards (and fire as ordered) on a 500 yards frontage.

4. **Application of D.A. templates.**—A variety of cases may arise, for example:—

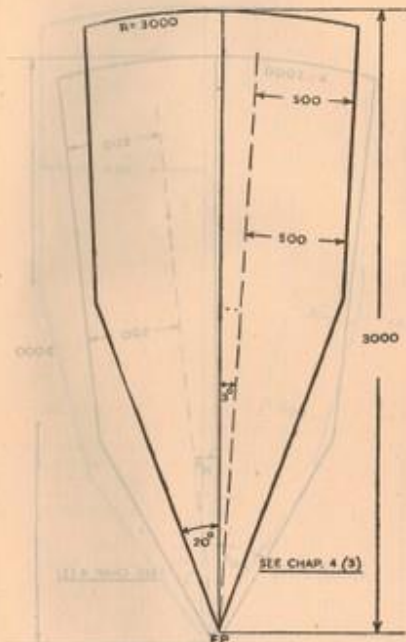
- Defined F.A. with targets wholly within the F.A.
- Defined F.A. with targets both inside and outside the F.A. and no oblique limits of fire.
- Defined F.A. and T.A. separated.
- Defined F.A. and T.A. abutting on each other.
- Defined F.A. with a defined T.A. overlapping the F.A.
- Defined F.A. with oblique limits of fire and no defined T.A.

The method of application of the templates is basically the same in all cases, but for clarity in the illustrations, two cases only will be dealt with in detail, namely (c) and (f).

DANGER AREA

FIELD FIRING

(MK VII AMM)



DANGER AREA
FIELD FIRING
 (MK VII AMM)

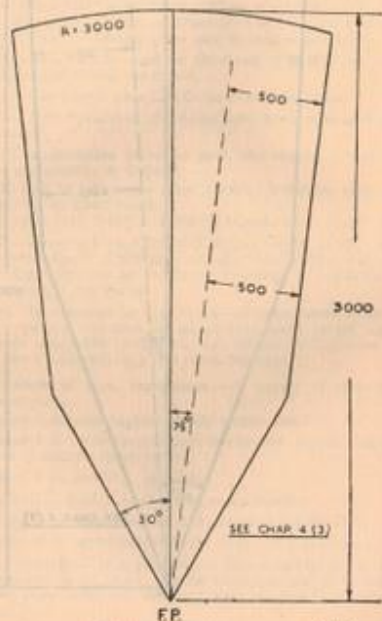


FIG. 11 (corrected)

DANGER AREA
FIELD FIRING
 (MK VII AMM)

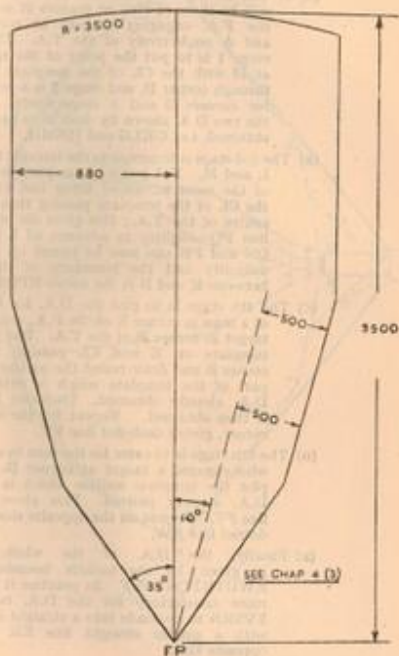


FIG. 12

- (h) Field firing range of limited acreage, having defined and separated F.A. and T.A., as illustrated in Fig. 13. It is required to delineate the total D.A. F.A. is lettered EFGH and the T.A. is lettered ABCD.

- (A) It will be obvious that the two worst cases will be those of men at corners H and G of the F.A. engaging targets at corners B and A respectively of the T.A. Therefore stage 1 is to put the point of the template at H with the CL of the template passing through corner B, and stage 2 is a repetition for corners G and A respectively. So far the two D.A. shown by dash lines have been obtained, *i.e.*, GKLG and HNMH.
- (b) The 3rd stage is to complete the triangle between L and M. Put point of template in centre of the most advanced firing line HG with the CL of the template passing through the centre of the T.A.; this gives the boundary line PQ—slightly in advance of L and M. QN and PK can now be joined up without difficulty and the boundary of the D.A. between K and N is the curve KPQN.
- (c) The 4th stage is to plot the D.A. for the case of a man in corner E of the F.A., engaging a target in corner B of the T.A. Put point of template on E and CL passing through corner B and draw round the outline of that part of the template which is outside the D.A. already obtained. Dash-dot line ES is thus obtained. Repeat for the opposite corner, giving dash-dot line FU.
- (d) The 5th stage is to cater for the man in corner F who engages a target at corner B. Again plot the template outline which is outside D.A. already plotted. This gives dotted line FV. Repeat on the opposite side, giving dotted line EW.
- (e) Finally, the D.A. of the whole range is given by the outside boundary line EWUTKPQNRVSF. In practice it may be more satisfactory for the D.A. boundary FVSRN to be made into a straight line FN, with a similar straight line EK on the opposite side.

EXAMPLE OF APPLICATION OF
F.F. DANGER AREA TEMPLATE

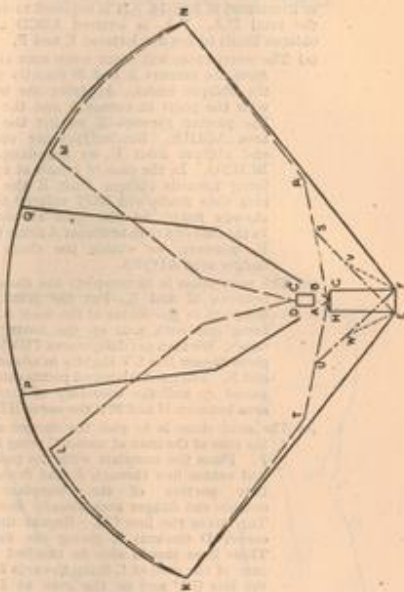


Fig. 13

- (ii) Field firing range of more extensive acreage, having a defined F.A. with oblique limits of fire and no defined T.A., i.e., targets may be placed anywhere within the F.A. or within the limits of the range, as illustrated in Fig. 14. It is required to delineate the total D.A. F.A. is lettered ABCD and the oblique limits of fire are lettered E and F.

(a) The worst cases will occur when men are firing from the corners A and B directly towards the oblique limits. Applying the template with the point at corner A and the centre line passing through E we get the danger area AGHIK. Similarly, using corner B and oblique limit F we get danger area BLMNO. In the case of a man at corner B firing towards oblique limit E the danger area thus made will NOT enlarge the area already found for the man at corner A. In the case of a man at corner A firing towards F, however, we obtain the chain dotted danger area APQRS.

(b) The next stage is to complete the danger area between M and I. Put the point of the template in the centre of the most advanced firing line with axis up the centre of the range. We then get danger area TUVW. This gives danger line UV slightly in advance of M and N. The most advanced points can now be joined up and the boundary of the danger area between H and R is the curve HIUVNR.

(c) The next stage is to plot the danger area for the case of the man at corner C firing towards F. Place the template with the point at C and centre line through F and draw round that portion of the template lying outside the danger area already discovered. This gives the line CY. Repeat this from corner D towards E giving the line DX. These lines should also be checked for the case of the men at C firing towards E giving the line CX' and of the man at D firing towards F which gives the line DY'.

(d) The final DA for the range is therefore given by the line DX'HIUVNRY'C.

(e) It is often more convenient in practice to adopt the straight line DH and CR in place of DX'H and CY'R.

EXAMPLE OF APPLICATION OF
F.F. DANGER AREA TEMPLATE
(NO DEFINED T.A.)

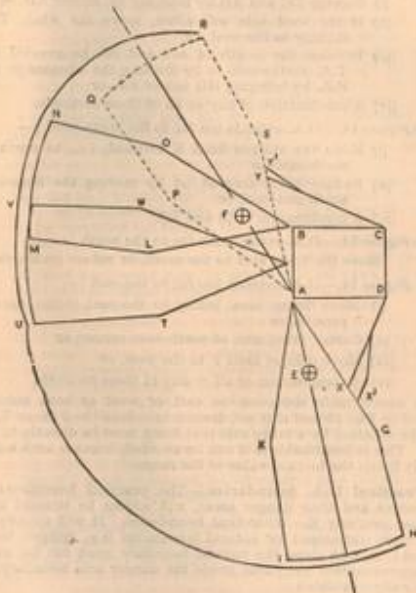


FIG. 14

5. To reduce total D.A.—If the D.A. obtained in Figs. 13 and 14 are greater than the sites permit, they can be reduced in a number of ways, as follows (assuming the figures to be oriented) :—

- (a) *Figure 13*.—D.A. extends too far to the north :—
- (i) Reduce length of EH and FG, or
 - (ii) Reduce HA and GB, or
 - (iii) A combination of (i) and (ii).
- (b) *Figure 13*.—D.A. extends too far to the east :—
- (i) Shorten DC and AB by bringing BC nearer AD, or
 - (ii) If the west side will allow, move the whole T.A. slightly to the west, or
 - (iii) Increase the length of AH and BG by moving the T.A. northwards or by limiting the advance in the F.A. by bringing HG nearer EF, or
 - (iv) A combination of any or all of these methods.
- (c) *Figure 14*.—D.A. extends too far to the south-west :—
- (i) Move the oblique limit E forward, *i.e.*, to north or north-east, or
 - (ii) Reduce firing area at (a) by moving the boundary south and east, or
 - (iii) A combination of (i) and (ii).
- (d) *Figure 14*.—D.A. extends too far to the north :—
- Move the firing area to the south, or reduce its length.
- (e) *Figure 14*.—D.A. extends too far to the east :—
- (i) Move firing area bodily to the east if the ground permits, or
 - (ii) Curtail firing area at north-west corner, or
 - (iii) Move oblique limit F to the west, or
 - (iv) A combination of all or any of these methods.

If a considerable reduction on east or west or both sides is required in Fig. 13 and it is not desired to reduce the F.A. or T.A., it can be obtained by a range rule that firing must be directly to the front. This is inadvisable if it can be avoided, because such a rule severely limits the tactical value of the range.

6. **Practical D.A. boundaries.**—The practical boundaries of F.F. ranges and their danger areas, will seldom be straight lines or follow precisely the theoretical boundaries. It will usually be found more convenient for natural boundaries (*e.g.*, hedges) to be followed; in such cases the natural boundary must not fall more than approximately 100 yards inside the danger area boundary, as theoretically calculated.

7. **Board of officers and D.A. boundaries.**—Every case of intended reduction in the D.A. under the provisions of para. 6 must be brought to the notice of the board of officers reporting on the project.

The board should consider each case on its merits and make recommendations accordingly in their report.

8. **Works services.**—In any exercise it is of the utmost importance for the troops taking part to be informed of the fire effect gained. Targets are, therefore, essential. Permanent markers' pits are desirable in order to save time in checking fire effect and for the protection of men working surprise targets. Although permanent, these pits need not be expensively constructed.

To prevent exercises becoming too stereotyped or limited in scope, sites for targets can be varied by selecting alternative positions for groups of targets—three or four of which could be operated from each permanent pit. All groups of targets to be operated from markers' pits must always be carefully and tactically sited.

As regards markers' pits, the R.E. should be consulted so that engineer technical advice is available at an early stage. A markers' pit must be capable of accommodating two men at least, with reasonable space for them to operate targets. Every pit must be equipped with a 4 feet \times 3 feet red flag whenever firing takes place. Targets can be "brought up" at any distance beyond or to a flank of a pit, up to about 25 yards. Usually, the simpler the arrangements for operating the targets, the better the results.

Markers' pits should be, whenever possible, below ground. If they have to be above ground, they must be bullet proof and bullet proof head-cover must be provided in all cases. If the pits are built of camouflaged sandbag walling, the walls must be at least 5 feet thick in order to be bullet-proof against .303-inch.

It is quite unnecessary to overload a range with targets. A total of 12–15 targets is usually ample. (A group or line of several figure targets counts as one target for this purpose.) A total of 12 targets can generally be satisfactorily operated from three or four markers' pits.

As regards telephones, these should be underground and one circuit passing through all pits should suffice, as the pits can be numbered and No. 4 pit for example, can be called by four rings.

The control point should be carefully selected near the back of the F.A. and a control tower provided, if necessary, for the conducting officer to obtain a full view.

When WT is not employed, an alternative to a telephone circuit (but one which is not so satisfactory), is the use of periscopes in the markers' pits and a system of flag signals from the control point. This system should only be considered for small F.F. ranges.

On larger F.F. ranges, surprise targets operated from pits are sometimes omitted altogether and static figure targets, locally improvised targets and natural targets used. This simplifies construction work and reduces range maintenance costs.

9. **General.**—It must be realized that the foregoing remarks are in the nature of a general guide to field firing ranges. So much depends on the extent and nature of the terrain selected that it is impossible to be precise on what should or should not be provided when laying out such a range.

Overriding factors at all stages must be :—

- (a) The safety of the troops taking part and the personnel operating surprise targets (if any).
- (b) To ensure that ammunition does not fall outside the D.A. To this end also it is most important (and should form part of the Range Rules) that officers conducting exercises shall have *previously* made themselves thoroughly conversant, by personal inspection, with the whole of the F.A. and the T.A., and they must always be in possession of a fully detailed map of the range and a copy of the Range Rules, when an exercise is in progress.

10. **Cease fire signal.**—Before an exercise is carried out, all troops must be informed of the pre-arranged signal to be given in the event of an accident or if for any other reason it is necessary for all firing to cease immediately.

11. **Medical.**—A medical orderly, with suitable equipment, should always be in attendance during exercises and his location should be known to all officers and N.C.Os. taking part.

12. **Obsolete plates.**—Plates 21 and 25, S.A.T., Vol. V, are obsolete.

13. **Battle areas.**—A very large F.F. range, without defined T.A. and F.A. and in which all types of small arms and also larger weapons of A.P.V. and R.A. can be fired, is known as a "Battle Area." Such areas should be large enough to permit a brigade exercise with live ammunition—hence an area of at least 8-10 square miles is advisable.

It is unnecessary in this supplement to deal in detail with "battle areas" as they are so large that few can be obtained and in any case each requires special investigation by various branches of the Service; the following notes may, however, assist in the preliminary investigation of an area :—

- (a) It is an advantage if the flank boundaries taper outwards (in the general direction of fire). If this advantage is unattainable, roughly parallel flank boundaries are better than converging flank boundaries.
- (b) A brigade commander should be able to attack in a battle area range from any one of two or more general directions, according to his tactical choice—hence an area of a generally square shape or (if rectangular) having little disparity in lengths of sides, is to be preferred to a long and narrow area.

- (c) An area near the coast should only be considered if it can extend at least three miles inland, because such an area naturally envisages firing in the general direction of the sea, i.e., the attack will be in that direction and so unless a good depth of land is available, the attack may well reach the physical barrier of the sea before it has fully developed.
- (d) Battle areas must have Standing Orders. Such orders normally include one placing responsibility on the officer in command of all troops taking part in an exercise, of ensuring that no ammunition falls outside the land boundaries of the area, and one directive that no weapon shall be so positioned and aimed that the danger area as shown by the appropriate template, falls outside the land boundaries. To assist him the Standing Orders also include all relevant data re danger areas of all weapons permitted to be fired in the "area."

These two orders must be incorporated in the Standing Orders of every Battle Area range because it is obviously impossible to treat Battle Areas as ordinary ranges on which specified danger areas can be laid down.

- (e) Experience has shown the necessity of taking the following further safety precautions for Battle Areas by inclusion of suitable paragraphs in the Standing Orders :—

- (i) An experienced officer must be detailed as Fire Control Officer.
He must have a knowledge of the use of safety traces (templates) and a thorough knowledge of the battle area.
- (ii) All officers must have maps of the area with them during exercises.
- (iii) Adequate steps must be taken to prevent unauthorized persons entering a battle area during exercises.
- (iv) Adequate steps must be taken to deal with "blinds".
- (v) Posting of sea look-outs if a sea D.A. is involved.
- (vi) Ensuring attendance of a M.O. and adequate medical equipment on all exercises. A medical orderly is not considered sufficient for large-scale exercises on a battle area.

14. **Oblique limits of fire.**—It is generally necessary on F.F. ranges, and may occasionally be necessary on battle areas, to provide tall posts to delineate oblique limits of fire and so ensure that firing only takes place in directions for which the D.A. caters. In Fig. 13 these posts would be located in corners A and B of the T.A. and in Fig. 14 they would obviously be at E and F, and the range rules would require that no man must fire to the right of the right-hand post or to the left of the left-hand post at any stage of the advance.

These posts should be painted in a colour or colours which contrast with the background so that they are quite conspicuous and it is an advantage to fix a timber X or O at the top for the same purpose.

15. **Manoeuvre area.**—In the case of both F.F. ranges and battle areas it is an advantage if the F.A. can be sited so as to have a manoeuvre area leading up to it. For example, in Fig. 13 (assuming it to be oriented) the manoeuvre area would extend south of line EF fanning out south-east and south-west from F and E respectively, as far as is desired or can be arranged. No firing would, of course, be allowed in the manoeuvre area. Line EF would be delineated on the ground to indicate where firing can begin.

CHAPTER 5

ANTI-AIRCRAFT RANGES

1. **Definition.**—An anti-aircraft range is one on which firing takes place at targets moving through the air to represent enemy aircraft.

2. **Danger area**

(a) It will be obvious that whatever ammunition is used, the length of the D.A. must cater for the maximum range of the projectile under normal atmospheric conditions.

Fig. 15 illustrates a typical D.A. for such a range. The arc of fire should not subtend an angle of less than about 30 degrees and, though there is no maximum, it will usually be found impracticable to exceed 60 degrees on inland ranges, owing to the large area of terrain involved. In any case, there must be a safety angle of 10 degrees on each side of the angle subtended by the arc of fire. In practice it is best to ascertain from a map the greatest available angle and to let this decide the D.A. arc. The arc of fire will then subtend 10 degrees less on each side.

(b) In selecting a site for an A.A. range every effort must be made to site the F.P. so that the arc of the D.A. from the table at (3) below is not within 550 yards of habitable buildings or main roads.

The reasons for this are directly due to variations in the maximum range of projectiles under varying atmospheric conditions such as temperature, barometric pressure, following wind, etc. It is not considered necessary to discuss here the technicalities of this complex subject. It is sufficient to add that if there is no alternative to the range being so sited as to have buildings or main roads within 550 yards of the D.A. arc, then the range rules must provide for firing to cease when a strong following wind (approaching gale force) is blowing.

3. **Length of D.A. for various weapons.**—The following table gives the length of D.A. required for various weapons fired in an A.A. role under normal atmospheric conditions.

Weapon	Length of D.A. from F.P. (yards)	Remarks
Rifle and L.M.G. (204 or 300)	2,500	Subject to para. 2 (b)
7.92 mm. Ross	3,000	
M.M.G. (Spring Mk. 8 Z)	2,000	A common length of D.A. has been fixed at 7,000 yards.
15 mm. Ross	2,500	
20 " Hispano	3,500	
20 " Oerlikon	3,200	
20 " Polsten	3,200	

4. Works.—The only works necessary are :—

- (a) Delineation of oblique limits of fire.
- (b) Erection of danger notices.

As regards (a) at least one conspicuous post must be erected on each oblique limit of fire (set on the flanks of the D.A.)

These posts must be visible from the F.P. A timber X or O at the top is advisable so as to render the posts clearly distinguishable. The distance of the posts from the F.P. is immaterial but usually 200–400 yards is convenient (c in Fig. 15).

As regards (b) suitable danger notice boards are erected on the D.A. boundary as may be locally ordered.

It is advisable to make it quite clear that it is the duty of the board of officers to advise where these posts and notice boards are to be erected. If no board has been held then the district commander, or other senior officer responsible for the provision of the range, must decide the positions for them. It is the duty of the R.E. Works Services to provide and erect them if asked to do so, but it is not their duty to decide the positions.

It is the duty of the officer in charge of the firing to see that no firing takes place outside the arc defined by the "oblique limits of fire" posts.

5. Ground to air signal.—In peace-time these ranges were required to exhibit a large letter "A" to inform aircraft that the range was in use. The exhibit of this letter "A" is temporarily discontinued and it is the duty of the officer in charge of the firing to order the "cease fire" on the approach of aircraft considered by him to be flying too low for safety. At Appendix B will be found a table of heights over ranges for various types of weapons and ammunition, and above which it is considered safe for aircraft to fly.

6. Targets

(a) Two types of target are used :—

- (i) Toy balloons filled with hydrogen.
- (ii) Sleeve targets towed by aircraft.

(b) Toy balloons and hydrogen gas are obtainable by indent on R.A.O.C. Hydrogen cylinders are operated by a special key, application for which should be made to the local D.C.R.E. This key is not always issued with the cylinder and has then to be obtained from other sources.

Towed sleeve targets must be arranged for by local liaison with the R.A.F.

DANGER AREA

ANTI—AIRCRAFT FIRING.

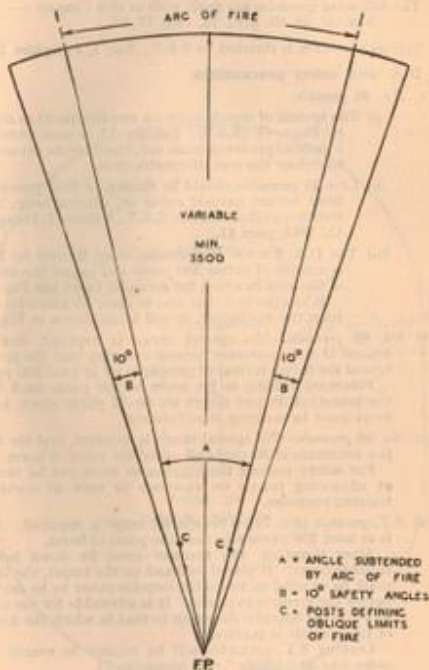


FIG. 15

CHAPTER 6
GRENADES

1. The following grenades are dealt with in this Chapter —
Nos. 36, 68, 69, S.T., 75, 75A, 77, 82.

2. Special attention is directed to S.A.T., Vol. I, Pamphlet 13.

3. D.A. and safety precautions

(a) No. 36 grenade

(i) The system of trench work (or emplacement) as shown in Plate 45 (S.A.T., Volume V) is now obsolete. Financial provision must not, therefore, be demanded to defray the cost of construction.

(ii) Live 36 grenades should be thrown or fired preferably from behind natural cover or, alternatively, from trenches as illustrated in S.A.T., Volume I, Pamphlet 13, 1942, page 41.

(iii) The D.A. for No. 36 grenades when thrown by hand is a circle of radius 300 yards and centre the middle of the area in which the grenades burst (*see* Fig. 16).

When the D.A. has also to cater for grenades fired from the discharger, it will be as shown in Fig. 16.

(b) No. 68 grenade.—No special range is required, and no defined D.A. is necessary beyond ensuring that the ground beyond the target is clear of personnel for at least 200 yards.

Personnel waiting to fire must be 200 yards back from the target. F.P. and target are 50-75 yards apart, hence firers must be wearing steel helmets.

(c) No. 69 grenade.—No special range is required, and the D.A. is a minimum of 30 yards all round the point of burst.

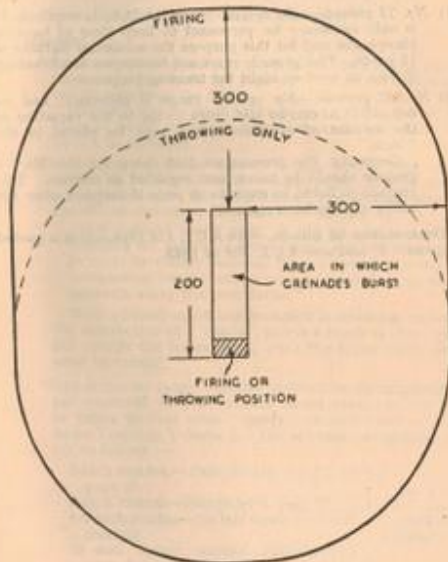
For safety reasons these grenades must not be thrown at advancing troops on exercises or used at night for training purposes.

(d) S.T. grenade (No. 74).—No special range is required. D.A. is at least 100 yards all round the point of burst.

After throwing, the thrower must lie down behind suitable cover. If placed by hand on the target, the latter must be so sited as to enable suitable cover to be reached before the grenade explodes. It is advisable for the cover to be in the opposite direction to that in which the handle of the grenade is pointing.

Leaking S.T. grenades will be treated in exactly the same way as "blinds" (*see* Appendix F).

No. 36 GRENADE
(FIRING OR THROWING)



- (e) *No. 75 grenade and No. 75A grenade.*—No special range is required, but the D.A. is a minimum of 200 yards all round the point of burst.

When this grenade is used to demolish any metal such as a length of old tank track, it should be exploded in a pit or trench. This stipulation accords with the safety regulations governing R.E. demolitions. See Military Engineering, Volume IV, Part I, 1942, Appendix VI (4 (v)).

When this grenade is used as a portable demolition charge, or for battle noises, the No. 75 grenade igniter (Mk. 1) must never be used.

- (f) *No. 77 grenade.*—No special range or D.A. is required. It is only necessary for personnel to keep clear of burning phosphorus and for this purpose the minimum distance is 15 yards. This grenade must not be thrown at advancing troops, or used at night for training purposes.

- (g) *No. 82 grenade.*—No special range is necessary, and no defined D.A. can be laid down owing to the variation in the amount of explosive which may be placed in the "sack."

Generally, the precautions laid down for the No. 74 grenade should be taken, and regarded as minima. This grenade is liable to explode at once if dropped after the safety cap has been removed.

4. **Destruction of blinds.**—See A.C.I. 1 of 1944, which is quoted at Appendix F, and also A.C.I. 599 of 1943.

CHAPTER 7

MORTAR RANGES

1. Ranges for the following mortars are dealt with in this chapter:—

- (a) 2-inch mortar.
- (b) 3-inch mortar.
- (c) 4-2-inch mortar.
- (d) 29 mm. Spigot mortar (Blacker Bombard).

2. General

- (a) Whenever possible, mortar ranges should be sited on ground reasonably free from fire risks and where the target area can be seen from the F.P.

Mortar positions must never be within 100 yards of any place to which the public has access and from which they cannot be excluded.

- (b) The fencing in of the area in which bombs may fall is applicable to 2-inch mortar ranges only. If such area is properly fenced in, it is known as a "closed target area"—the official definition of which is as follows:—

"A 'closed target area' is the area of ground surrounding the target, in which bombs are intended to fall. It must be totally enclosed by a substantial fence and conspicuous danger notices must be erected at reasonable intervals along the boundaries."

With a closed target area no action is necessary regarding the destruction of "blinds" unless a bomb is observed to fall outside the fenced area, when the action in (c) below must be taken.

- (c) When a mortar range, whether permanent or temporary, is not provided with a "closed target area," action must be taken to deal with "blinds" as laid down in Small Arms Training, Volume I. The relevant paragraphs, etc., are as follows:—

- | | |
|---|--|
| 2-inch mortar.—Pamphlet 8, para. 5, on page 16. | } See also A.C.I. 1 of 1944 at Appendix F. |
| 3-inch mortar.—Pamphlet 9, page 87 | |
| 4-2-inch mortar.—(as laid down for 3-inch mortar). | |
| 29 mm. Spigot mortar.—Pamphlet 23, para. 6, on page 33. | |

d) A fence comprising strong wooden posts and at least 3 strands of barbed wire, and erected in a substantial and workmanlike manner, satisfies the term "substantial fence" in the definition of a closed target area.

The maintenance of such fences, and also the notice boards, calls for periodical inspections in view of the damage that can be, and in fact is, done by bombs bursting close to them.

If such a fence is the subject of a R.E. works service, then it is the duty of the G.E. to make these periodical inspections and effect repairs. If a unit observes damage, a report should be sent at once to the local G.E. In other cases, the unit responsible for the range, must see that repairs are effected.

3. Danger areas

(a) 2-inch mortar (H.E.)

- (i) Two illustrations of D.A. are given in Figs. 17 and 18 for a single line of fire and for an arc of fire, respectively.
- (ii) A single line of fire offers little scope and it is better to use the D.A. for an arc of fire even if the ground available only permits a small arc. An arc DE subtending 60 degrees at the F.P. (commonly called a 60 degrees arc), is desirable if it can be obtained and it will generally be found unnecessary to exceed 60 degrees.
- (iii) The lines enclosing the angle of 60 degrees in Fig. 18 are not the oblique limits of fire, but they constitute the flanks of the area in which bombs may fall. The oblique limits of fire are 10 degrees less on each side, thus giving a "40 degrees arc of fire." This 40 degrees is delineated on the site by the erection of one post on each oblique line of fire at a convenient distance from the F.P. (e.g., 200-300 yards). These points should be made conspicuous by, e.g., an "X" in timber at the top and by painting them black and white.
- (iv) The D.A. is 250 yards in width measured from all flanks of the area in which bombs may fall but it extends 100 yards only behind the F.P.
- (v) The D.A. boundary should be marked by suitable notices where tracks or other likely points of public entry necessitate them, and at such other points as may be ordered. (See Chapter 2, para. 18 (b).)

2 IN. MORTAR

SINGLE LINE OF FIRE

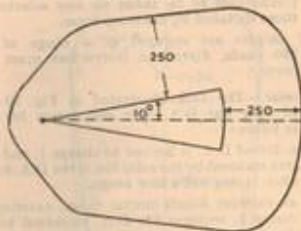


FIG. 17

ARC OF FIRE

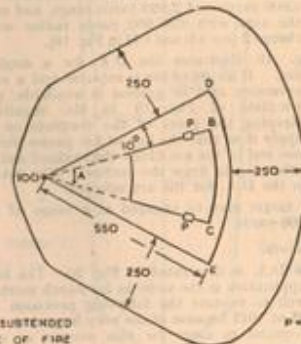


FIG. 18

A = ANGLE SUBTENDED
BY ARC OF FIRE

P = POSTS DEFINING
ARC OF FIRE

- (vi) All notices should be in red lettering on a white ground, or *vice versa*, and should face outwards away from the D.A.
- (vii) 2-inch mortar (smoke) does not require a special range. It may be fired on any piece of ground reasonably free from risks of fire. The target area should be visible from the F.P. The precautions to be taken on any selected site are those dictated by common sense.
- (viii) If targets are engaged at a range of less than 250 yards, firers and instructors must be under cover.

(b) 3-inch mortar.—The D.A. illustrated in Fig. 19 has been approved as a war D.A. only and caters for charges 1 and 2, as follows:—

- (i) The dotted D.A. is limited to charge 1, and the whole area enclosed by the solid line is the D.A. for charge 2 when laying out a new range.
- (ii) If an existing 3-inch mortar range, catering only for charge 1, requires the D.A. increased to cater for charge 2, the increase is obtained by using the charge 1 area up to 1,600 yards range, tapering the flank boundaries uniformly outwards between 1,600 yards and 2,900 yards range, and completing the area with the 500 yards radius arc as for charge 2 (see AB and CD in Fig. 19).
- (iii) Fig. 19 illustrates the D.A. for a single line of fire. If an arc of fire is required and a sufficiently extensive area of ground is available, prepare a template of Fig. 19 to the required scale. Keeping the point of the template on the F.P., apply it so that the line of fire passes through first one end of the arc (draw the outline) and then the other (again draw the outline). The total outline is the D.A. for the arc selected.

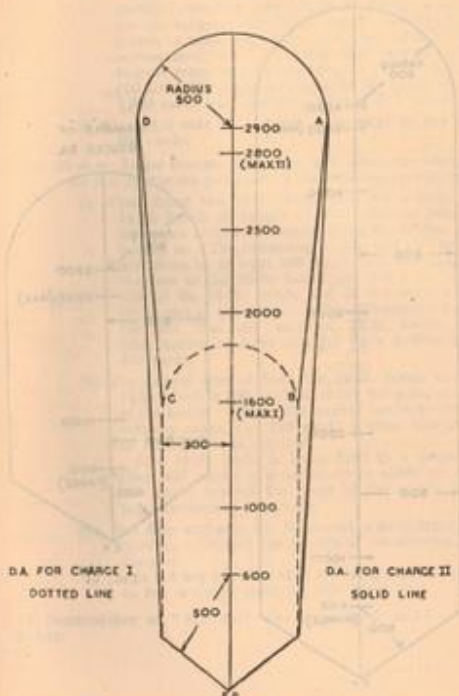
(iv) No target may be engaged at a range of less than 600 yards.

(c) 4.2-inch mortar

- (i) The D.A. is illustrated in Fig. 20. The method of application is the same as for 3-inch mortar. It is well to re-state the following provision in A.C.I. 35 of 1943 because of the very large area of ground required to cater for this weapon at maximum range:—

DANGER AREA

3 IN MORTAR CHARGES I & II



4.2 IN. MORTAR

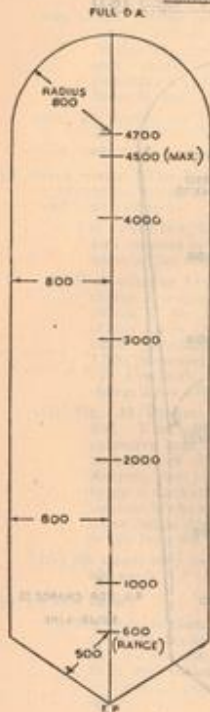


FIG. 20

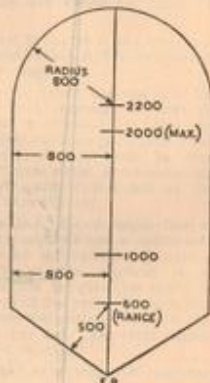
EXAMPLE OF
REDUCED D.A.

FIG. 21

"If the full length of 5,500 yards as shown in Fig. 20 is not available for the D.A., firing must be restricted to ranges at least 1,000 yards short of the total length of D.A. on the site."

Fig. 21 illustrates the reduced D.A. for this mortar when, e.g., the length of ground available for the range is only 3,000 yards; the important points to note are, firstly, that the width of D.A. is unaltered, viz., 800 yards, and, secondly, that targets may only be engaged at ranges between 600 and 2,000 yards (i.e., between the minimum and 1,000 yards less than the length of D.A. available).

(ii) No target may be engaged at a range of less than 600 yards.

(d) *29 m.m. Spigot mortar.*—The D.A. and safety requirements for this mortar are governed by the following provisions:—

(i) When firing the 20-lb. bomb and when firing the 14-lb. bomb at ranges of 400 yards or less, the instructor and the personnel firing the mortar must be dug in. The remaining details and any spectators must be at least 500 yards from the target in the case of the 20-lb. bomb and 300 yards in the case of the 14-lb. bomb, and on the same side of the target as the mortar. This difference is due to the fact that tail units of 20-lb. bombs have been known to come straight back a distance of 450 yards.

(ii) The danger area of both the 20-lb. bomb and the 14-lb. bomb is 300 yards all round the point of burst of the bomb. Thus, if the mortar has to be fired at extreme range, i.e., 785 yards, a clear field of fire of 1,085 yards is required.

If a 14-lb. bomb is being fired at a range less than 400 yards, it is necessary to allow an extra 100 yards beyond the burst of the bomb, i.e., a total distance of 400 yards.

(iii) Red flags and men will be posted in accordance with existing rules and the particular circumstances of the site.

A red flag will be used at the firing point according to the ordinary rules for rifle firing.

4. Destruction of "Blinds."—See Appendix F and A.C.I. 599 of 1943.

CHAPTER 8

MINIATURE RANGES

1. **Definition.**—A range for use with .22 inch ammunition. Usually indoors to enable training to proceed regardless of weather conditions.

2. **Safety precautions.**—The safety precautions for miniature ranges, whether outdoor or indoor, are fully dealt with in Small Arms Training, Volume V, Chapter 5, and as these provisions are still up-to-date, it is unnecessary to repeat them in this supplement, except as noted at 6 below.

3. **Outdoor ranges.**—So many 30 yards ranges now exist that there should be very little need to build outdoor miniature ranges, apart from the disadvantages inherent in all outdoor miniature ranges detailed in Secs. 28 and 29 (Volume V).

4. **Lighting.**—The amount of artificial light, usually electric, is governed by the Barrack Synopsis (War) and the following details are quoted from Chapter 1 of the Synopsis (Amendment No. 2) for ready reference :—

“Miniature rifle ranges

At target end, when full width of range is used for classification targets OR landscape only.	300 watts for every 24 feet width of range in "floodlight" or similar fittings.
At target end when half width of range is used for classification targets and half width for landscape.	300 watts for every 12 feet width of range in "floodlight" or similar fittings. Switching to be arranged so that only one-half the range can be illuminated at any one time.
Firing point.	One 40-watt lamp.
Spectators.	One 60-watt lamp."

The bulbs and fittings for lighting the targets must be protected by steel plate housing at least $\frac{3}{8}$ inch thick, and it is recommended that such lighting should be suspended about 3 feet above and 6 feet in front of the targets.

5. **General layout.**—The width of the normal range is 24 feet and this width should, if possible, be divided to give 10-12 feet for classification firing at representative targets and 12-14 feet for a model landscape.

The landscape side offers considerable scope for improvisation and ingenuity (see also Volume V, Sec. 49, where constructional details are fully described and illustrated). Simplicity should be the keynote in equipping a landscape.

It has been found from experience that the use of more elaborate apparatus such as is illustrated in Volume V at plates 100 and 101 is unnecessary in war time.

6. **Amendment to Vol. V, Chap. V.**—Small Arms Training, Volume V, Sec. 30 (3) and Sec. 37 (7) have been amended to read :—
Sec. 30 (3).—*Width of Building.*

For Regular Army units the width should normally be 24 feet and should not be less than 18 feet.

For civilian clubs and schools this width may be reduced to the minimum required for one target, i.e., 5 feet, see table below.

The number of targets provided should be in accordance with the following table :—

For a range — 24 feet wide	7 targets can be provided
For a range between 21 feet and 24 feet wide	6 targets can be provided
For a range between 18 feet and 21 feet wide	5 targets can be provided
For a range between 15 feet and 18 feet wide	4 targets can be provided
For a range between 12 feet and 15 feet wide	3 targets can be provided
For a range between 9 feet and 12 feet wide	2 targets can be provided
For a range between 6 feet and 9 feet wide	1 target can be provided

The above table has been drawn up on a basis of allowing 3 feet in lateral space per firer. This has been found sufficient for firing in the standing position and is considered the minimum width necessary for safety. When the lying position is adopted at least 3 feet 6 inches should be allowed for each firer when it is desired that he should adopt the correct prone position.

It will often be found convenient and economical to space the targets closer together (e.g., 2 feet centre to centre) thus reducing the size of the steel plate referred to in Sec. 30 (9).

Sec. 30 (7).—*Side and End Wall.*

When the end wall does not provide the full dimensions required for the stop batt, then the side walls and roof must be protected so that they fall within the 5 degrees and 7 degrees lines referred to in Sec. 30 (10 and 12), but only in exceptional cases should the average height of the end wall be less than 10 feet in the case of 25 yards range or 8 feet in the case of a 15 yards range, and similarly the lateral overlaps provided by the end wall beyond the flank lines of fire should not be less than 3 feet.

DANGER AREAS OF VARIOUS WEAPONS

1. Machine Carbines

- (a) Machine carbines (e.g., Thompson and Sten) are normally fired on classification and 30 yards ranges.
- (b) Fig. 24 illustrates the D.A. required for Thompson and Sten machine carbines when these are fired in the open elsewhere.

2. Besa

- (a) 7.92 mm. The D.A. for this weapon is, in war time, reduced to that for .303 inch Mk. 8Z, when fired under similar firing conditions. See Chapter 2, para. 4 (b) and Chapter 5, para. 3.
- (b) 15 mm. The D.A. is the same as that shown in Fig. 27 for the anti-tank rifle fired on soft ground, but with a length of 7,500 yards from the F.P.

3. **Polsten, Oerlikon and Hispano.**—When these weapons are fired in a ground role, the D.A. is as follows:—

Shape.—As shown in Fig. 27.

Length from F.P.—4,000 yards.

Width on each side of the line of fire.—500 yards on soft ground; 1,000 yards on hard ground (see definitions of hard and soft ground under anti-tank gun).

4. Projector, Infantry, Anti-tank (P.I.A.T.)

- (a) *General.*—Any reasonably level ground, at least 500 yards \times 300 yards is suitable as a P.I.A.T. range.
- (b) *Danger area.*—Fig. 25 illustrates the layout of the above-mentioned area—I representing the position of the target (e.g., a thick steel plate erected preferably at right angles to the line of fire) and F.P. the firing position, where a slit trench is dug at right angles to the line of fire. The D.A. must extend 250 yards in front of, and behind the target, and 150 yards laterally each side of the line of fire.

Spectators may be anywhere outside the D.A. boundary except directly behind the line of fire, but the best positions are at either of the areas marked A in Fig. 25. The safety of the firers is safeguarded in accordance with instructions in Small Arms Training Volume I, Pamphlet 24.

The boundary of the D.A. is best delineated by posts or substantial pegs (especially round the area allotted for spectators) and augmented by red flags as necessary. It is advisable that the whole of the D.A. be visible from the F.P.

MACHINE CARBINES

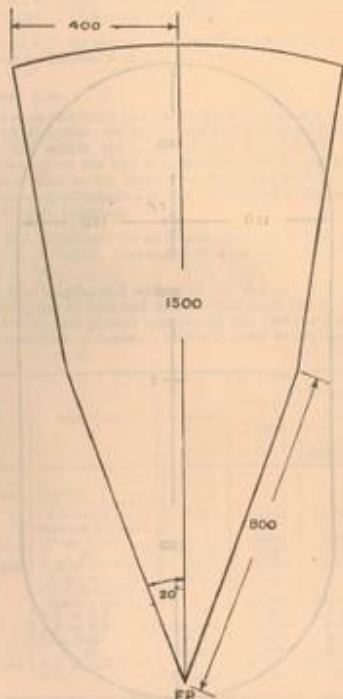


FIG. 24

P.I.A.T.

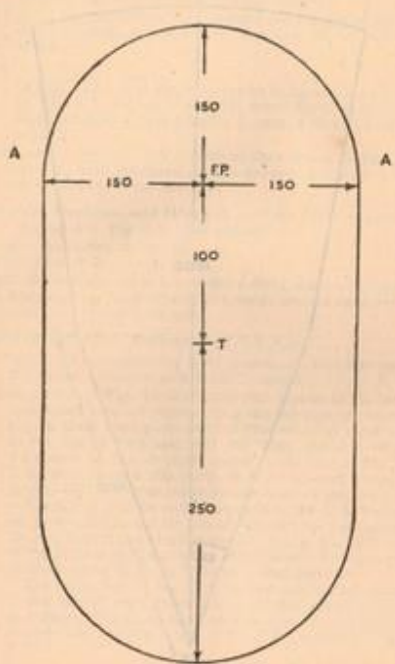


FIG. 25

5. Pistol

- (a) The pistol is now almost invariably fired on 30 yards ranges. D.A. data for firing in the open are laid down in Small Arms Training Volume V, and are still up to date. (Length of D.A. — 1,000 yards.)
- (b) Special F.P. for pistol shooting on 30 yards ranges are dealt with in Chapter 3 (4 (xi)).

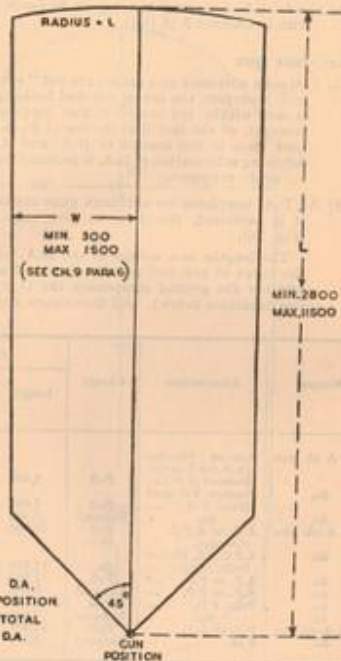
6. Anti-tank gun

- (a) Full scale anti-tank gun ranges are not "small arms ranges" and, therefore, the laying out and building of such ranges is not within the scope of this supplement. In view, however, of the fact that the use of 2-, 6- and 17-pr. anti-tank guns is not limited to R.A. and A.F.V. units, the following information re D.A. is included in this supplement for ready reference.
- (b) All D.A. templates for anti-tank guns are the same shape — it is sufficient, therefore, to give only one illustration (Fig. 26).

The lengths and widths of the D.A. vary according to the types of gun and ammunition used and according to whether the ground comprising the D.A. is hard or soft (see definition below). All dimensions are in yards linear.

Weapon	Ammunition	Charge	D.A. data		
			Length	Total width	
				Soft ground	Hard ground
2-pr. A.-tk. gun	Armour piercing (A.P.) or Practise Pointed (P.P.) ...	Full	7,500	1,200	1,500
do.	Practise Flathead (Prac. F.H.) ...	Full	5,600	800	1,000
do.	do. ...	Reduced	5,100	800	800
6-pr. A.-tk. gun	A.P. or A.P.C. (C=expl.)	Full	10,000	2,400	5,000
do.	A.P.C.B.C. (B.C.=Ballistic cap) ...	do.	11,500	3,000	5,000
do.	A.P. or P.P. ...	Full	7,500	1,500	1,500
do.	A.P. or P.P. ...	Reduced	6,000	800	1,500
do.	Prac. F.H. ...	Full	3,500	800	1,000
do.	do. ...	Reduced	2,800	800	800
17-pr. A.-tk. gun	P.P. or A.P. ...	Full	10,000	2,200	4,500
do.	F.H. ...	Reduced	3,800	750	1,500

DANGER AREA

A.T.K. GUN2 & 6 POUNDER
(SOFT GROUND)

L = LENGTH OF D.A.
FROM GUN POSITION
W = HALF THE TOTAL
WIDTH OF D.A.

FIG. 26

(c) *Definition of hard ground.*—Ground which is :—

- (i) Strewn with rocks or boulders over the greater part of the area.
- (ii) Has an appreciable part of the area covered by rock outcrop.

Any area to which the above definition is inapplicable is regarded as soft ground for D.A. purposes.

(d) *Application of D.A. data.*—Prepare a template to the scale of the map in use. If a single F.P. and a tank target run are to be used, place point of template on F.P. and centre line of template so that it passes through one end of the target run.

Mark the template outline on the map and repeat at opposite end of run. Join the two outlines at the far end of the D.A. and the total D.A. of the range is now available.

If a long F.P. is to be used, carry out the foregoing procedure at both ends of the F.P. to give the total D.A.

If the resultant D.A. goes outside the total available width of ground, it can be adjusted as follows :—

Reduce the length of the run or the F.P. or both, remembering that a reduction of D.A. on the left side necessitates adjustment at the left end of the target run, and/or the right end of the F.P.

For all practical purposes, a single F.P. on a 6-inch map or plan can be up to 20 yards in length. If the F.P. is more than 20 yards long it should be treated for D.A. purposes as a long F.P. and the template applied at both ends. Suitable variations in the 20 yards length should be made for smaller or larger scale maps.

(e) *Sub-calibre firing*

(i) The D.A. required when firing .300 or .303 sub-calibre attachments to A.-tk. guns on a range without a regulation stop butt, is as illustrated in Fig. 10, for a single line of fire. For firing over an arc, whether at stationary or moving targets, the template in Fig. 10 is applied as described in (d) above.

(ii) Rifle classification ranges of 8 or more targets, with regulation stop butts, may also be used for .300 or .303 sub-calibre firing over an arc at stationary or moving targets, provided the oblique limits of fire cut the mantlet at least 10 feet in from the end of it (excluding end slopes or batters).

If there is no mantlet, the "10 feet" must be measured from the inner edge of the flank target frames.

(iii) Any rifle classification range with a regulation stop butt may be used for .300 or .303 sub-calibre firing at stationary targets, provided all firing is on, or parallel to, the range axis.

(iv) Targets for sub-calibre firing under (ii) or (iii) above must be within 25 yards of the line of classification target frames.

(f) See also "Safety of Tank and Anti-tank Ranges, 1943," notified under A.C.I. 1442 of 1943.

7. Anti-tank rifle

(a) The War Office laid down in 1942 that no further full scale anti-tank rifle ranges are to be built during the war.

(b) The D.A. data in Fig. 27 are included for reference purposes and in case it is desired to improvise a range under A.C.I. 1315 of 1942.

The dimensions given permit firing on soft ground under all atmospheric conditions and this accounts for the variation between these figures and those quoted in "The Safety of Tank and Anti-tank Ranges" as referred to in A.C.I. 1442 of 1943.

(c) The method of application of a D.A. template prepared on the basis of Fig. 27 is the same as is described for anti-tank guns at para. 6.

(d) The anti-tank rifle using service ammunition may be fired on adapted 30 yards ranges (see Chapter 3).

(e) Anti-tank rifle ammunition must not be fired on any S.A. classification range, as the ammunition is liable to penetrate through the mantlet into the gallery, especially on war time ranges with c.i. revetments to the gallery wall. Also on the vast majority of classification ranges, the D.A. is totally inadequate for .55 anti-tank rifle ammunition.

8. 3-inch O.S.B. gun (Smith gun).—The D.A. for this weapon firing anti-tank shell is shown in Fig. 28 for a single line of fire. If firing over an arc is required the full D.A. is obtained by using a template prepared to the dimensions in Fig. 28 and applying it as follows:—

Place point of template on F.P. and align it so that the centre line of template passes first through one flank of the target area and then through the other flank. In each case draw round the outline of the template—join up these two figures and the total area so obtained is the full D.A.

The D.A. when firing A-per. shell is 100 yards all round the point of burst.

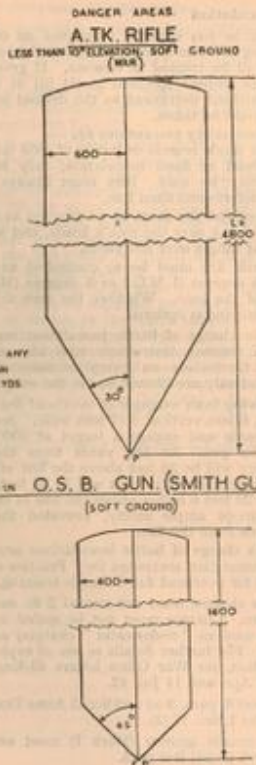


FIG. 27

FIG. 28

9. Battle inoculation

- (a) It cannot be too strongly impressed on officers that the following notes on safety precautions for battle inoculation should all be treated as *minima*. If greater precautions than the *minima* specified in (b) (ii) or (b) (iii), can be taken without detriment to the desired inoculation, then they should be taken.
- (b) The *minima* safety precautions are :—
- (i) For single rounds or bursts of .303 inch fire for overhead or flank inoculation, only M.Gs. on tripod may be used. Fire must always be on a pre-determined fixed line.
 - (ii) Overhead fire must be so directed as to pass at least 15 feet over the men's heads, and will not be used at ranges over 500 yards.
 - (iii) Flank fire must be so controlled as to be at least 5 degrees (L.M.G.) or 3 degrees (M.M.G.), in front of the men. Whether the men are stationary or moving is optional.
- (c) Officers in charge of battle inoculation must be qualified weapon training instructors who also must personally satisfy themselves on every occasion that competent personnel only are allowed to fire the weapons.
- (d) The following is an example of overhead fire :—
Cone, 9 feet vertical \times 7 feet wide. Set gun sights at 1,200 yards and engage a target at 500 yards distance from the gun. At 500 yards from the weapon, the trajectory will be 28 feet above the line of sight. With a 9 foot cone, the centre of it will be 28 feet and the lowest portion 23 feet 6 inches above the line of sight, which thus gives troops ample safety, provided they are 400 to 500 yards from the firer.
- (e) Officers in charge of battle inoculations are reminded that S.A. ammunition sentenced for "Practice only" must not be used for overhead fire in battle training.
- (f) Explosive charges must not exceed 2 lb. each in weight of explosive. Charges must not be sealed up in containers (unless used as "underwater" charges) and may not be buried. For further details re use of explosives on battle inoculation, see War Office letters 43/Eng./1421 (M.T.2) dated 7 Apr. and 14 Jul. 42.
- (g) See Chapter 6, para. 3 (c) and Small Arms Training Volume I, Pamphlet 1, Soc. 17 (2).
- (h) No. 75 grenade igniters (Mark I) must not be used—see Chapter 6 (3 (e)) last para.

10. "Blitz" courses—Danger areas

- (a) If L.M.G. and rifles (.303 or .300 inch) are used the D.A. will be obtained by using the template in Fig. 11 and applying it at all the extreme positions from which weapons may be fired.
If the above D.A. is not available, a smaller D.A., catering for machine carbines only, can be adopted, using the template in Fig. 24.
- (b) On a blitz course targets are usually at short ranges and troops pass one set of targets before the next set appears. Hence the 1st stage is to apply the template with the point on the extremes of the general line at which firing at the 1st set of targets can begin and the C.L. passing through the flank targets of the 1st group only. The 2nd stage is to repeat stage 1 from the general line at which the 2nd group of targets can first be engaged and so on for all stages (see Fig. 13).
If the resultant D.A. goes outside the available width of D.A. it can be adjusted by reducing the width of the course or closing in the width between flank targets. If the resultant D.A. goes beyond the available length of D.A. it can obviously be adjusted by omitting the last stage (or last 2 stages if necessary) or by retaining the same number of stages and closing them together so that the last stage brings the D.A. within the available length.
The templates in Figs. 1 and 2 must not be used for blitz courses.
For pistol shooting on a blitz course the length of D.A. is 1,000 yards.

TARGETS AND TARGET MATERIALS

1. The details of targets for small arms ranges, which are set out in the following paragraphs, include all targets and target papers which have been approved to date, except those which are discontinued and which have been, or will be deleted from the relevant D.E.S. Contract Circulars.

2. It is the duty of every D.C.R.E. to ensure that the S.A. ranges in his area are supplied with targets and target materials. D.C.R.E. must issue to any army unit stationed in the area the targets for which they indent. The unit's indent is the authority for the issue, subject only to each item indented for being an official issue. When range wardens have been appointed, targets are issued direct to them.

3. The following brief particulars are included for the benefit of the R.E. Works Services:—

- D.E.S.C.C. 124. Veneer, and veneer substitute, figure targets.
 D.E.S.C.C. 932. Patching books, target papers, facings for figure targets, and targets for 30 yards and miniature ranges except those in C.C. 967.
 D.E.S.C.C. 948. Landscape targets (Items 6 (f) and 6 (j) in this Chapter).
 D.E.S.C.C. 967. M.G. targets, A.A. silhouettes, and R.A.F. pattern targets.

4. Scoring details are contained in S.A.T. Volume I, Pamphlet 18 (1942) as amended by Amendment No. 2 dated March, 1944 and also in A.B.142.

5. Targets for open ranges

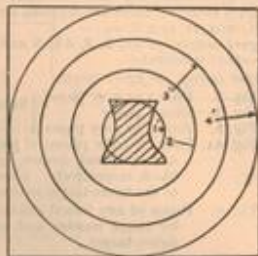
(a) Classification targets (see Figs. 29 and 30).

(i) 4-foot target.—An all-grey paper facing, pasted on to a canvas backing 4 feet square. Concentric 1 foot, 2 feet, 3 feet and 4 feet diameter circles are drawn on the grey paper and a brown paper silhouette figure No. 5 is pasted on the grey paper, exactly in the centre of the 2-foot circle. The 1-foot circle is then completed on the Fig. No. 5.

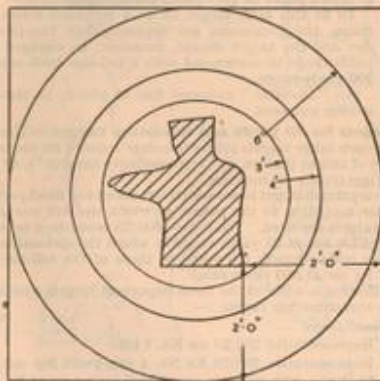
(ii) 6-foot target.—An all-grey paper facing, pasted on to a canvas backing 6 feet square. Concentric 3 feet, 4 feet and 6 feet diameter circles are drawn on the grey paper and a brown paper silhouette figure No. 3 is pasted on the grey paper as shown in illustration (Fig. 30), i.e., the bottom of the silhouette figure is horizontal and its bottom right corner is 2 feet from both the bottom and the right edges of the 6-foot target.

CLASSIFICATION TARGETS

Fig. 29



4 FT



6 FT

(b) *M.G. targets*.—A large screen, 6 feet by 24 feet, divided into three panels each 8 feet wide; outer panels white paper—centre panel grey paper. Target made up locally.

(c) *Field firing targets* (see Fig. 31).—These are silhouettes of various shapes, consisting of coloured paper facings, pasted on to figure targets; these are supplied cut to shape under D.E.S. Contracts, as follows:—

(i) *Figure targets*.—Figs. 2, 3, 4A, 5 and 6 (in veneer or veneer substitute).

(ii) *Paper facings for figure targets*

Fig. 2. Brown or grey paper } Supplied cut to
Fig. 3. Brown paper } shape.
Fig. 5. Brown or grey paper }

Fig. 4A. Four separate pieces of paper cut to shape and coloured brown, grey, flesh, and black respectively. These are pasted on to the figure target as illustrated (Fig. 31).

Fig. 6. Paper of any issued colour is cut to shape by range warden and pasted on to the figure target.

(d) *Tank target*.—This head-on target is illustrated in Fig. 32 and is made up locally, according to the dimensions shown, in brown paper on grey paper background.

To fit this tank target on to a standard 6-foot target frame, the dimensions are approximately two-thirds full size and the target should, therefore, be engaged at 200 yards range to correspond with a full-size tank seen from 300 yards range.

An "invisible" coloured line is added, as shown, for scoring purposes.

6. *Targets for 30 yards and miniature ranges*.—These may be either open range targets proportionately reduced for use on these two types of ranges (known as "representative targets"), or targets designed specifically for such use.

A representative target is one which is reduced to a fixed proportion of full size according to the ranges at which the full size and the reduced targets are fired. Example—500/25 refers to a representative target for use at 25 yards range in which the dimensions of all details are one-twentieth, ($25 \div 500$) of those of the full-size target designed for use at 500 yards range.

The following is a list of the more important targets available for 30 yards and miniature ranges:—

(a) *Small target*

Representative 200/25 for No. 1 rifle.

Representative 200/25 for No. 4 rifle (with flip sight only) or Bren; with separate unengaged brown paper Fig. No. 5.

FIGURE TARGETS

(SILHOUETTES)

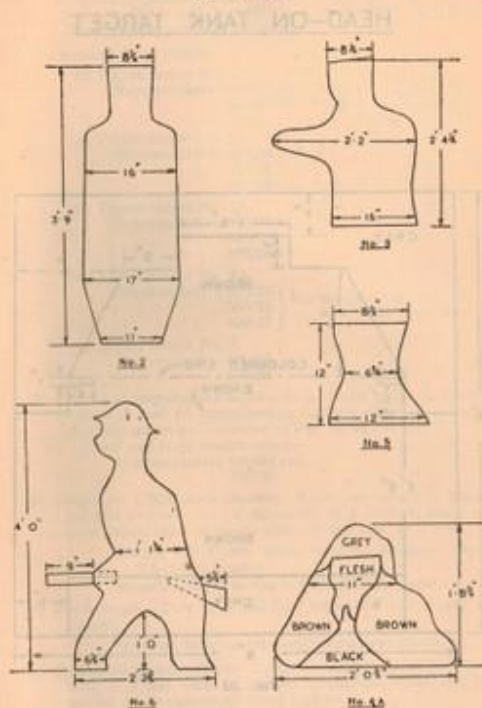


FIG. 31

HEAD-ON TANK TARGET

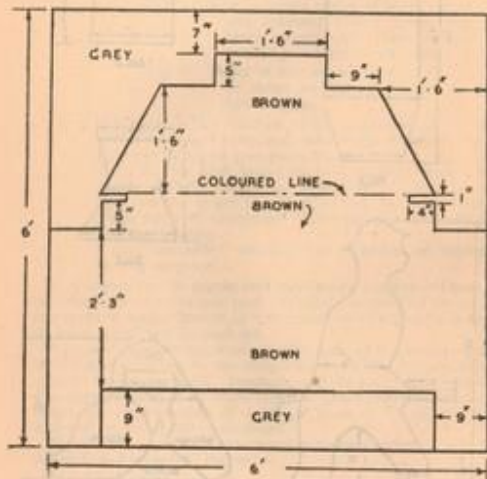


FIG. 32

(b) *Large target*

Representative 500/25 for Bren.

NOTE.—Current War Courses do not provide for rifle firing at 500 yards, but 500/25 representative targets for No. 1 rifle are available if required.

(c) *Silhouette figure targets*

(i) Figure target No. 2.

Representative 200/25 No. 1 rifle	} Snapshooting (see Figs. 33 and 34.)
200/25 No. 4 rifle	

(ii) Figure target No. 3.

Representative 200/25
300/25
400/25

(iii) Figure target No. 4A.

Representative 200/25
300/25
400/25

(iv) Figure target No. 4A.

Representative 200/25 300/25 400/25	} For snaphooting. (see Fig. 36.)
(v) Figure target No. 6.	
Representative 400/25 500/25	

(d) *Additional snaphooting target.*—In addition to the foregoing figures 2 and 4A snaphooting targets, there is a snaphooting target as illustrated in Fig. 35, as follows:—

Small and large snaphooting—
Representative 100/20 and
200/20.

(e) *Target for 1/30th scale shooting.*—Only one target is issued for this purpose, viz., a silhouette of a tank in black on grey paper, reduced to one-thirtieth full size, as follows:—

Target for 1/30th scale shooting on grey paper
(2.5 inches long).

Strawboard (10 inches \times 18 inches) for same.

(f) *Tank target.*—This is a head-on representative target as follows:—

Head-on tank target—representative 300/25.

(g) *Landscape targets.*—These are paper landscapes each 5 feet long \times 2 feet wide, in various colourings, which can be pasted on to canvas or wood frames.

SNAPSHOTTING TARGETS

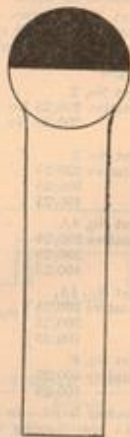


FIG. No 2

FOR USE WITH
No. 1 RIFLE

FIG. 33

SMALL & LARGE
100/20 200/20.

FIG. 35

200/26 300/25.
400/25.

FIG. 36

FOR USE WITH
No. 4 RIFLE

FIG. 34

The landscapes are in six series, each series comprising three scenes as follows:—

- (i) English.
- (ii) Continental.
- (iii) N.W. Frontier.
- (iv) Middle East.
- (v) Mediterranean.
- (vi) Street Scenes.

Miniature reproductions for reference and instructors' use are issued on one sheet, containing the full series of 18 landscapes.

- (A) *A.A. indoor instruction targets.*—These are miniature paper silhouettes of planes for use indoors and comprise the following four items:—
 - Monoplane climbing.
 - Monoplane diving.
 - Biplane climbing.
 - Biplane diving.
- (j) *Harmonized L.M.G. target.*—This is a strip of white paper 60 inches by 18 inches on which are a series of four separate small landscapes with correctly positioned silhouettes above. A set of four strips of paper on which the silhouettes only are printed, are available for pasting over silhouettes which have been fired at. Two items, therefore, comprise the target:—
 - (i) Harmonized L.M.G. landscape target (for use on 30 yards ranges).
 - (ii) Sets of four figure targets for same (silhouettes only on strips of white paper).
- (k) *M.G. targets*
 - (i) A 30-inch by 42-inch white paper screen with a 1-inch diameter black aiming mark in the centre. This target is made up locally.
 - (ii) A white screen 28 inches by 44 inches, having oblique black lines and one horizontal black line (Fig. 37).
 - (iii) An instructional target as illustrated in Fig. 38.
- (m) *6-pr. anti-tank gun sub-caliber targets.*—The $\frac{1}{16}$ th scale target (see 6 (e)) is used. If the scale of this target is unsuitable for a particular range, a target of similar design made to the required scale, is prepared locally.

M.G. TARGETS

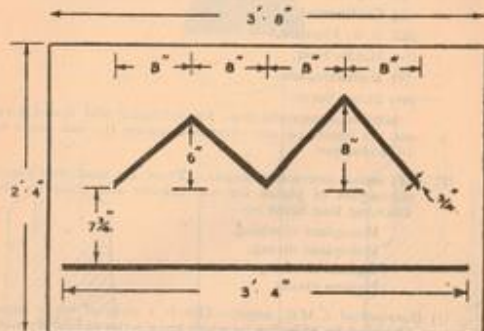


FIG. 37

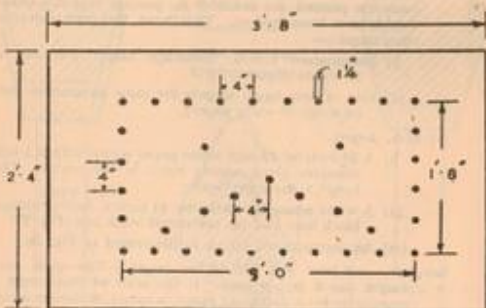


FIG. 38

7. The following additional targets are in D.E.S. Contracts, and are obtainable in the normal way, if required:—

For 30 yards and miniature ranges

- (a) Large classification target (6 foot)—representative 500/25.
- (b) Figure, cardboard, crossing man.
- (c) Figure, cardboard, disappearing man.
- (d) No. 3 figure target—representative 600/25.
- (e) No. 1 figure target—representative 400/25, 500/25, 600/25, 800/25, and 1,000/25.
- (f) Mounted man crossing—representative 600/25.
- (g) Mounted man advancing—representative 600/25.
- (h) Machine gun in action—representative 300/25 and 500/25.
- (j) Infantry in line extended (four figures per target) 1,500/25.
- (k) Pistol target (R.A.F. pattern)—10 inches by 10 inches with 3-inch ball, etc.
- (m) Pistol target (R.A.F. pattern)—32 inches by 36 inches.
- (n) M.G. target (R.A.F. pattern)—32 inches by 36 inches.
- (o) Miniature targets for R.A.C. size $4\frac{1}{2}$ inches by $4\frac{1}{2}$ inches.
- (p) A.A. silhouettes patches (RH and LH)—black silhouette of plane on white paper $8\frac{1}{2}$ inches by 4 inches (S.A.T. Vol. V, Plate 63).
- (q) Silhouette tank target (made of cardboard)—representative 300/10.

8. **Target papers.**—For range wardens to prepare target backgrounds, sheets and rolls of coloured papers are available as follows:—

White	} In two sizes:—	White	} In rolls 26 inches		
Black		26 inches by 37 inches.		Black	by 12 yards.
Grey		26 inches by 50 inches.			
Green					
Brown					

9. **Patching papers.**—This material is supplied as follows:—

- (a) Books containing 600 patches, each $1\frac{1}{2}$ inches square in the following colours, viz. white, black, grey, green, brown, and flesh.
- (b) Books containing 100 patches, each 4 inches by 3 inches in white and black only.
- (c) Strips of white paper 44 inches by 3 inches, containing 10 black bullseyes each; to patch item 6 (A) (iii).

10. **Miscellaneous range stores.**—With the few exceptions listed below, miscellaneous range stores such as brushes, aiming discs, target frames, timber, hessian canvas, steel falling plates, etc., are an R.E. supply and are included in the Vocabulary of Engineer Stores.

The principal exceptions are :—

R.A.S.C. Supply.	Straw for bayonet fighting sacks.
Obtained locally.	Ash sticks for bayonet training.
R.A.O.C. supply.	Aiming rests.
	Aim corrector.
	Hydrogen cylinders.
	Legs, telescopic, for L.M.G.
	Needles, packing.
	Spun yarn.
	Telephones and telephone equipment (per F.S.S.).
	Toy balloons.
	Tripod rests.

APPENDIX A

BAYONET TRAINING COURSE

1. It is a material advantage if a bayonet assault course can be sited so that troops on finishing a course can at once fire ball ammunition on a 30-yards range. Hence every effort should be made to site such a course immediately in rear of the F.P. of a 30-yards range.

2. A fairly level site should be selected about 150 yards long by a width dependent on the number of dummies required, allowing 3-4 yards between them.

3. The equipment required for a course is fully described and illustrated in Small Arms Training, Volume V, Chapter VIII and Appendices VI and VII, but this should be augmented, as locally required, by improvisation. In this connection a longer assault course is illustrated in Small Arms Training, Volume I, Pamphlet 12, p. 15.

4. Annual grants are available for the provision and maintenance of bayonet assault courses under the provisions of Regulations for the Allowances of the Army, para. 753.

DUMMY GRENADE TRAINING

A reasonably level site should be selected and the equipment and layout illustrated in Small Arms Training, Volume V, Plates 41, 42, and 43 adopted. The stores required are also listed in Volume V at Appendix VIII.

**APPENDIX B
DANGER AREA HEIGHTS**

Type of range	Description of weapon used	Height of warrantie Danger area	Remarks
1. Anti-tank.	Anti-tank gun, anti-tank rifle, field and A.A. gun in an anti-tank role, small arms.	3,000 feet	This allows for ricochets which are frequent below this height. Above it there is serious risk but not a considerable one. When secondary L.A.A. weapons are provided, the height will be as at Serial 3 below.
2. A.F.V.	3-inch 20 cwt. gun, 6 in., 2 in., 3-inch Howitzer, 75 mm. gun, 37 mm. gun, 15 mm. Bren, 7-92 B.S.A.	3,000 feet	
3. L.A.A. Emplacements.	15 mm. B.S.A., 20 mm. Ovilasto, 20 mm. Hispano, 20 mm. Polden, 303 mm. M.M.G., Rifle, L.M.G.	10,000 feet 10,000 feet 10,000 feet	Maximum height of direct shots at all normal ricochets.
4. Rifle classifications	Rifle, L.M.G., M.M.G.	300 feet	
5. Field firing.	Rifle, L.M.G., M.M.G.	1,000 feet	This higher figure is necessitated by the greater risks on those ranges than under Serial 4; also nearly every shot fired will ricochet.
6. Battle area.	All weapons listed.	10,000 feet	
7. Mortar.	2-inch (including P.L.A.T. in mortar role), 3-inch Charge I and Charge II, 4-2-inch.	1,000 feet 5,000 feet 6,700 feet	
8. Grenade.	36, 69, 73, 74 and 75 grenades.	800 feet	
9. Machine Cartridges	A. For shell—in mortar role Anti-tank shell.	300 feet 300 feet 600 feet 50 feet	

General Note.—On all S.A. Ranges situated in localities where low flying aircraft are frequent a special aircraft lock-out will be provided, and arrangements made to ensure an immediate cessation of fire as necessary.

**APPENDIX C
PART I
MILLIMETRE—INCH CONVERSION TABLES**

mm.	Inches	Inches Fraction	Inches Decimals	mm.
1	·03937	1/25	·0025	1-5875
2	·07874	1/12 1/2	·125	3-1749
3	·11811	1/8 1/2	·1875	4-7624
4	·15748	1/6 1/4	·22	5-588
5	·19685	1/5	·250	6-3499
7-92	·31181	1/3 1/4	·300	7-6189
9	·35433	1/3	·303	7-8961
10	·39370	1/2 1/4	·3125	7-8974
13	·51182	1/2	·375	9-8218
15	·59356	1/2 1/8	·380	9-6510
16	·62993	1/2	·4375	11-112
18	·70741	1/2 1/4	·450	11-4298
25	·98428	1	·455	11-5568
25	1-14174	1 1/8	·50	12-700
33	1-37797	1 1/4	·53	13-9698
37	1-45671	1 1/2	·6025	14-287
40	1-57482	1 3/8	·625	15-875
50	1-96852	1 3/4	·6875	17-402
60	2-36223	2 1/8	·75	18-656
75	2-95278	2 3/8	·9125	20-837
80	3-14963	2 1/2	·875	22-225
81	3-18900	2 5/8	·9375	23-812
100	3-93704	3 1/4	1-00	25-400
120	4-72443	3 3/4		

PART II

1. Table of maximum heights of cover over which weapons can be fired (e.g., parapets).

2. Table of thickness of various materials which should be provided to give protection against bursts up to 20 rounds from M.G.s. up to 7-92 mm.

The above tables will be found on p. 54 in F.S.P.B. Part I, Pamphlet 7, Field Engineering, dated 5 Feb. 44.

APPENDIX D

UNITED STATES ARMY SMALL ARMS AND MORTARS

Danger Area data condensed from Army Regulations 750-10 and from Technical Manual TM9-2200.

Weapon	Max. range	May be used on British targets catering for
Rifle, U.S., .22 (all models) ...	1,500	.22-inch rifle.
Carbine, .30, M1 or M1A1 ...	2,700	3 mm. carbines.
Rifle, U.S., .30, M1 ...	3,500	} 303-inch rifle.
Rifle, U.S., .30, M1 1902 ...	3,500	
Rifle, Browning Auto., .30, M1928 A2	2,500	} 38 inch pistol.
Pistol, auto., .45, M1911 and M1911 A1	1,500	
Gun, sub-machine, .45 (all models)	1,700	9 mm. S&W.
Gun, machine, .30, M1919 A4-5-6 ...	3,500	} 303 inch L.M.G.
Gun, machine, .30, M1917 A1 ...	3,500	
Gun, machine, .30, M1918 M2	7,500	A. G. rifle or A. G. gun.
Grenade, hand fragm.	Dependent on	30 grenades thrown
Grenade, hand offensive	thrower	by hand.
Grenade, rifle, M9A1 ...	357	} 36 grenades fired from rifle.
Grenade, rifle, fragm. ...	255	
Mortar, 60 mm. ...	200	} 3-inch mortar.
Mortar, 81 mm. (light) ...	1,365	
Mortar, 81 mm. (light)	Min. 100 yds.	} 4 1/2-inch mortar where length of D.A. available is not less than 4,000 yards.
	Max. 3,290 yds.	
Mortar, 81 mm. (heavy)	Min. 300 yds.	} 3-inch mortar charge II or 4 1/2-inch mortar, where length of D.A. available is not less than 3,300 yards.
	Max. 2,635 yds.	
Launcher rocket, 2-36 inches	700	4 1/2-inch mortar

NOTES

1. D.A. for mortars and grenades:—

(a) 60 mm. mortar and all grenades: 300 yards to right, to left, and beyond, the area in which H.E. may burst.

(b) 81 mm. mortar 600 yards ditto.

2. When firing ground M.G. at moving ground targets, the length and width of D.A. is determined as follows:—

Length: For ranges equal to or greater than a range represented by an elevation of 15 degrees, add 1,000 yards to the range from weapon to target.

Width: 300 mils* to the right and to the left of the arc of fire.

* A mil is 1/4000 of a circle.

3. *Ground targets.*—The width of D.A. in all cases is the sum of the following sectors of circles:—

(a) 5 degrees on each side of the line of fire (vertex at F.P. and radius of sector the length of D.A.).

(b) The area necessary to provide safety from ricochets is determined by actual examination of the terrain—vertex and radius as in (a).

The army manuals do not specify item (b) above more closely.

4. *Aerial targets.*—Shape of D.A. is as in Fig. 15, but safety angle on the left is 5 degrees and on the right 10 degrees. Also length of D.A. is maximum range plus 500 yards.

5. *Grenades*

(a) The grenade (hand or rifle frag.) has a maximum dispersion of fragments of 200 yards and a bursting radius of 30 yards.

(b) Grenade, rifle M9A1—dispersion of frag. 80 yards to rear and bursting radius 11-3 yards.

APPENDIX E

PART I

RECENT A.C.Is. AFFECTING RANGES AND
SAFETY PRECAUTIONS IN TRAINING

Danger areas for ranges	A.C.I.
Classification	76/42
	(See Chap. 2)
3-inch mortar	660/43
4-2-inch mortar	35/43
Grenade	1169/41
Machine carbine	1736/43
Safety precautions	
Grenades and mortars	599/43
75 grenade igniter, Mark I	1147/44
Amn. sentenced "Practice only"	342/43
Blank amn.	1006/44
Targets	
Supply of representative targets	1113/41
Addition of inscribed 1 foot circle on 4 foot targets	182/44
New targets to be used on classification ranges ...	1440/43
Demolition stores	
List of demolition stores for small arms ranges ...	1/44
	(See Appx. F)
Miscellaneous	
Training in weapons and for battle	1315/42
	1559/43
	and 683/44
Anti-tank training devices	204/43
Authority to issue range regulations (A.F. B68A)	1099/43
Use of live ammunition in demonstrations of war weapons	1789/42
Procedure for obtaining War Office approval to construction of ranges	684/44

PART II

ARMY FORMS FOR RANGES

Regulations for the use of 30 yards ranges	A.F. B68
*Range regulations for small arms ranges	A.F. B68A
Miniature ranges	A.F. K1311
	and A.F. K1314

For a board of officers to report on ranges the following forms should be used :-

A proposed classification range	A.F. K1309
A newly completed classification range	A.F. A2
Alterations to an existing classification range ...	A.F. K1309
30 yards ranges, grenade ranges and mortar ranges	A.F. K1309
Anti-aircraft hosepipe range	A.F. A2
2-pr. and 6-pr. anti-tank gun ranges (for infantry use)	A.F. A2
Field firing ranges	A.F. K1309
Battle area	A.F. A2
Ranges on which major works have just been com- pleted (except 30 yards and miniature ranges) ...	A.F. A2

* This form is used in wartime in lieu of bye-laws.

APPENDIX F

DEMOLITION STORES AND DESTRUCTION
OF "BLINDS"

The following is the text of A.C.I. 1 of 1944 :—

"All units of the Regular Army and Home Guard battalions armed with grenades and mortars (including the 29 mm. spigot mortar and 3-inch ordnance smooth bore gun (Smith gun)), and schools which give training in the use of these grenades and weapons will indent through the usual channels for the following demolition stores.

Indents will be met from Command stocks :—

1. (a) Units armed with grenades only

Cat. No.	Item	Quantity	
		Units other than Home Guard	Each Home Guard company
<i>Section Q.2</i>			
Q.B.2090	Luting, lead free, thick, Mark IV, lb	10	5
<i>Section T.3</i>			
G.A.1860	Matches, fuzee, safety, boxes	6	3
T.A.0390	Detonators, No. 27	50	25
T.A.0504	Fuze, safety, No. II, Mark II, feet	144	48
T.A.0724	Guncotton, dry, primers, field, 1 oz., Mark II	50	20

(b) Units armed with mortars (including 29 mm. spigot mortar and 3-inch ordnance smooth bore gun (Smith gun))

All the stores detailed in (a) and in addition :—

<i>Section T.3</i>			
T.A.0070	Guncotton, wet, slabs, field, 1 lb., Mark I	14.	(All Regular Army and Home Guard units.)

NOTES

(i) Demands for guncotton, wet, slabs, will specify "Packed in case".

(ii) The slabs will be kept and transported in this case until required for use.

(iii) In storage, the lid of the case must be securely closed.

2. These stores (other than guncotton, wet, slabs) will be kept in a box which will be provided locally. A scale will be painted on or incised on the box to ensure that the correct length of fuze is cut. The box will be painted red and suitably labelled.

3. Small Arms Training, Volume I, Pamphlet No. 13, 1942, will be amended in due course.

4. Instructions for the disposal of "blinds" :—

(a) *Grenades*.—Full instructions are contained in Small Arms Training, Volume I, Pamphlet No. 13, 1942, Lesson 10, and Appendix II, para. 5.

(b) *Mortar bombs (including 29-mm. spigot mortar and 3-inch smooth bore gun (Smith gun))*.—These bombs will be dealt with by the officer supervising the firing in the same way as laid down for grenades, but in addition the following must be carried out :—

- (i) A 1-lb. slab of guncotton must be used in conjunction with primer and detonator.
- (ii) The safety fuze must be of sufficient length to allow the officer destroying the blind to reach cover, or, when cover is not available, to proceed on his feet at least 250 yards from the bomb before it explodes.
- (iii) H.E., powder filled and smoke will all be dealt with in this way.
- (iv) Blind bombs may be found on the surface or embedded in the ground below the surface. The procedure will be :—

(1) For those on the surface, place the guncotton slab, with the primer and detonator inserted, against the side of, and as close to the fuze of the bomb as possible. When available, place two or three sandbags around to cover the bomb.

(2) For those below the surface, dig down carefully without striking the bomb until a part of the surface of the bomb is exposed and the hole is large enough to insert the guncotton, primer and detonator. Place these so that the guncotton is in contact with the surface of the bomb.

NOTE.—On no account should any attempt be made to interfere with or move a blind bomb, and it must on no account be fired from the mortar a second time.

- (v) On a range with a closed target area, blinds will be left *in situ* and no attempt made to destroy them. Should a bomb be observed to fall outside the enclosed target area, however, the officer in charge of the firing will act as in paras. (i) to (iv).

A "closed target area" is the area of the ground surrounding the target, in which bombs are intended to fall. It must be totally enclosed by a substantial fence and conspicuous danger notices must be erected at reasonable intervals along the boundaries.

5. A.C.I.s. 247, 1266 and 2672 of 1942 and 1478 of 1943 are hereby *cancelled*."

Footnote

The above A.C.I. is reproduced in full in order that users of this Supplement may have available for immediate reference, the action that must be taken to deal with grenade and mortar "blinds". Closed target areas only apply to 2-inch mortar ranges (see Chapter 7, 2 (b)).

Attention is also drawn to A.C.I. 399 of 1943.

EACH MAIN DIVISION = 0.001 IN.
SCALE - 1/8 IN. = 1 MILS.