

FIELD ARTILLERY

VOLUME 4

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

(ENGLISH)

Issued on Authority of the Chief of the Defence Staff

Publiée avec l'autorisation du Chef d'état-major de la Défense

Canada 

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(ENGLISH)

(Supersedes all previous versions of FAS 004 and B-GL-306-004/FP-001)

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Designated Command: DAD 7

1998-12-30

Canada 

DUTIES AT THE REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

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DUTIES AT REGIMENTAL HEADQUARTERS
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FOREWORD

1. B-GL-371-004/FP-001, Field Artillery, Volume 4, Duties at Regimental Headquarters and the Gun Position, is issued on authority of the Chief of the Defence Staff.
2. This manual is effective upon receipt and supersedes all previous versions of FAS 004 and B-GL-306-004/FP-001.
3. Suggestions for amendments should be forwarded through normal channels to the Royal Canadian Artillery School, Attention, CSO.
4. The French version of this manual is published under NDID B-GL-371-004/FP-002, *Tâches au poste de commandement régimentaire et à la position des pièces*.

DUTIES AT REGIMENTAL HEADQUARTERS
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CHAPTER 1
INTRODUCTION TO THE FIELD ARTILLERY

SECTION 1
GENERAL

SCOPE

1. The material in this volume provides direction on the duties of personnel and those aspects of gunnery which are carried out at Regimental Headquarters (RHQ) and the gun position of close support artillery regiments. Gunnery is the practical application of the science of ballistics to the engagement of targets and includes the procedures essential for the timely delivery of effective artillery fire.
2. Detailed direction on Artillery Staff Duties is given in B-GL-306-002/FP-001; detailed duties of the Battery Commander (BC) and forward observation parties are given in B-GL-306-003/FP-001.

DOCTRINE

3. The data in this manual is based on the doctrine set forth in B-GL-306-001/FP-001, Field Artillery, Volume 1, *Command, Control, Employment and Deployment* which stems from experience gained in operations and training, as well as the way the Canadian Forces are organized and equipped. The material is applicable, without modification, to both nuclear and non-nuclear war.
4. Local situations may dictate minor variations from the methods and techniques described herein; however, care must be taken to ensure that principles are not violated as a result of these modifications.

DUTIES AT REGIMENTAL HEADQUARTERS
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SECTION 2
TACTICAL FUNCTIONS

ROLE OF ARTILLERY

5. The role of field artillery is to destroy or neutralize the enemy with indirect fire as part of the all-arms battle.
6. The role of air defence artillery is to prevent the enemy from interfering from the air with our operations. For further information see B-GL-308-001/FT-001, Air Defence Artillery, Volume 1, *Command, Control and Employment*.
7. The means by which the artillery executes its role is expressed in terms of tactical functions. Each tactical function has a specific purpose which contributes to the overall accomplishment of the role of the field artillery. In operations, the artillery commander directs the interplay of these tactical functions to best support the operational plan. Consequently, specific tactical functions may receive priority of effort during particular stages of an operation. The tactical functions of the artillery are as follows:
 - a. direct support;
 - b. attrition;
 - c. interdiction;
 - d. counterbattery fire;
 - e. coordination; and
 - f. target acquisition.
8. For further information see B-GL-306-001/FT-001, Field Artillery, Volume 1, *Command, Control and Employment*.

EFFECTIVENESS OF ARTILLERY FIRE

9. For maximum effectiveness, artillery fire of suitable density must strike the target at the most opportune moment with the appropriate combination of fuze and projectile.
10. The basis for achieving effectiveness are:
 - a. **Accuracy.** The locations of gun positions and targets are determined as precisely as time will allow and whenever possible, corrections are applied to compensate for variable conditions such as met, Muzzle Velocity (MV), propellant temperature and survey, to ensure that the first rounds will detonate as closely as possible to the target.
 - b. **Observation of the Target.** The greater the intelligence on the location and nature of the target and the ability to place fire accurately onto it, the greater the probability that fire will be effective. For this reason, whenever the target can be seen by an observer and such factors as surprise and time permit, the target should be engaged by observed fire rather than by predicted fire.
 - c. **Concentration of Fire.** Density of fire is proportional to both the number of guns simultaneously engaging the target and the rate at which the guns fire. Target coverage, however, is largely dependent upon the number and calibre of guns. Every effort must therefore be made to quickly concentrate the fire of the requisite number of guns to give an adequate coverage and density of fire on the target.

DUTIES WITHIN THE FIELD ARTILLERY ORGANIZATION

11. **Command, Control and Liaison.** Artillery commanders and their staffs are located at all levels of command to:
 - a. command the artillery resources and control the fire available to units or formations in accordance with the wishes of the commander;

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- b. advise the supported commander on all artillery matters;
and
- c. effect coordination of all available fire support means.

12. **Communications.** Artillery elements are interconnected by radio and if time permits, by line. Artillery communications are separate from the communications of the formations and units being supported.

13. **Survey.** Artillery surveyors provide accurate orientation and fixation of gun positions, target acquisition devices and observation posts. In certain circumstances they may also be required to determine the locations of targets. The latter is not always possible because of the priorities of other tasks and the limited number of surveyors available.

14. **Observation.**

- a. **Observers.** Observers, predominantly Forward Observation Officers (FOOs), are located in the forward areas. They direct fire onto targets by observation and provide information on the tactical situation to artillery headquarters (HQ) and Command Posts (CPs). In addition, observers provide advice on artillery support to supported arms commanders and coordinate those fire support resources available to those commanders.
- b. **Locating Devices.** Devices such as radars, drones, Remotely Piloted Vehicles (RPVs) and sound ranging equipment, which are integral to the artillery, are employed in observation, target acquisition and adjustment of fire.

15. **Deployment and Response to Calls for Fire.**

- a. **Deployment — Battery Captains (BKs).** The BK is overall responsible for ensuring that guns are deployed in accordance with the direction given by their commander.
- b. **Response to Calls for Fire.**

INTRODUCTION TO THE FIELD ARTILLERY

- (1) **Command Post Officers (CPOs).** The CPO is responsible for the passage of fire orders to the guns and must edit and issue them so that they can be readily understood and carried out.
- (2) **Gun Detachments.** The gun detachments are responsible for carrying out the orders received from the GPO/CPO and for keeping their guns and ammunition in a state of readiness to engage targets.
- (3) **Computing Device.** This term refers to electronic means of computing firing data only.

SECTION 3 INDIRECT FIRE THEORY

INTRODUCTION

16. Field artillery equipment is normally deployed where it cannot easily be located by the enemy. This precludes direct fire and makes necessary a system of aiming the guns indirectly. Gunnery is primarily concerned with solving the problem of indirect fire. See Figure 1-1.

17. The basic steps in the solution of the indirect fire problem are:
- a. determination of the battery location and orientation;

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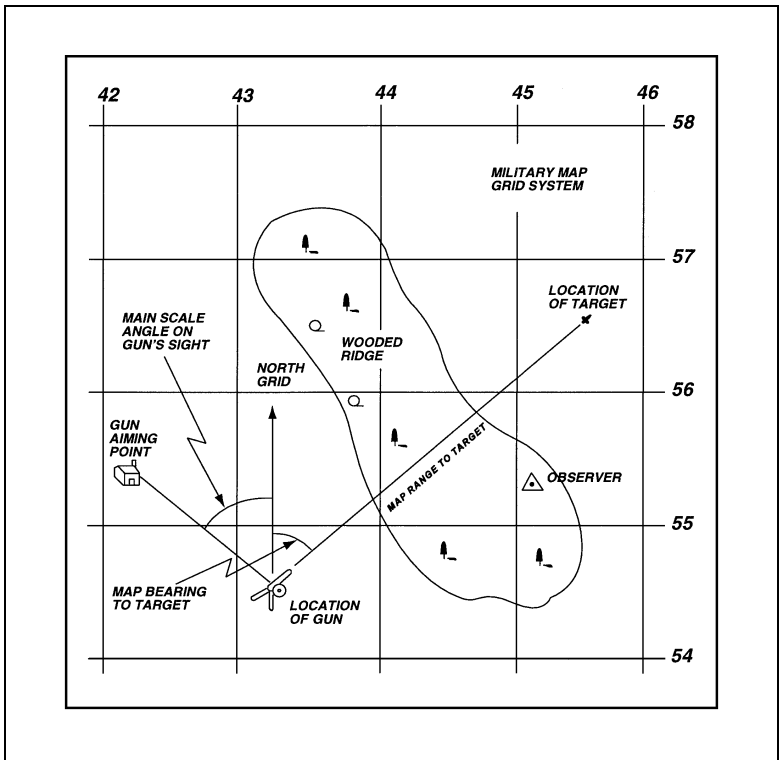


Figure 1 - 1 Indirect Fire

- b. determination of the target location;
- c. determination of the map bearing, map range and difference in altitude between gun and target;
- d. conversion of map data to gun data; and
- e. application of data to the gun.

ACCURACY

18. The main factors affecting the accuracy of artillery fire are as follows:

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- a. the accuracy of fixation and orientation of the guns and the fixation of the target;
- b. the accuracy with which the bearing, the angle of sight and the range from the gun to the target are determined;
- c. the accuracy of the data applied to compensate for non-standard conditions;
- d. the accuracy of sight testing and laying;
- e. the care taken in sorting ammunition by lots;
- f. the care taken in handling and storing ammunition, particularly maintaining a uniform charge temperature; and
- g. with separate loading ammunition, the uniformity with which projectiles are rammed during loading.

GUN DATA

19. Gun data is calculated by establishing the map bearing, the map range and the map difference in altitude between gun and target, adding to this any corrections for non-standard conditions and converting the totals into a form that can be applied on the gun sights and ammunition. The various corrections for map range, map bearing and map difference in altitude are as follows (see B-GL-306-006/FP-001, *Ballistics and Ammunition*, for a detailed description of variations and corrections):

- a. **Range.** The following corrections for range shall be applied when sufficient information is available as a basis for computation:
 - (1) **Correction of the Moment (C of M).** The range C of M contains those corrections which are common to all guns of a fire unit and which remain true for a relatively short period. These corrections are:

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- (a) corrections for non-standard met conditions, i.e., air density, air temperature, wind speed and wind direction, and
 - (b) correction for non-standard propellant temperature.
- (2) **Correction for the Rotation of the Earth.** This correction is applied to compensate for the rotation of the earth while the projectile is in flight. Its size depends upon the relative position of the gun and the target on the earth's surface, i.e., the bearing of fire and the range. The size of this correction at short ranges is not sufficient to justify the time required for computation when using manual methods of producing gun data and, therefore, it is applied only to guns firing at long ranges (in excess of 15 000 m). Computing devices include this correction in the computer program for all ranges.
- (3) **Projectile Weight Correction.** This correction is applied to compensate for any differences in weight between the standard projectile and fuze combination and the projectile and fuze combination to be fired.
- (4) **MV Correction.** The difference between the adopted (for all practical purposes actual) MV of the gun and the MV for which the firing table has been compiled is applied as a correction to range. Within units, guns shall be grouped according to uniformity of adopted MVs. When manual computations are employed, the mean fire unit MV will be used to determine a mean difference in MV, thus enabling a common MV correction to be applied to all guns of the fire unit. Grouping shall be carried out using the calibration results

INTRODUCTION TO THE FIELD ARTILLERY

of the change at which most targets are likely to be engaged. If a gun is found to shoot consistently plus or minus of the Mean Point of Impact (MPI) of the fire unit, it should be transferred to a fire unit of comparable mean MV, or a permanent correction should be applied to it. Individual MV corrections will be applied when gun data is determined by computing devices and individual gun display equipment is employed.

- b. **Bearing.** The following corrections to bearing shall be applied when the necessary information is available:
 - (1) C of M (see (1) above),
 - (2) rotation of the earth (see (2) above), and
 - (3) drift.

- c. **Difference in Altitude.** The difference in altitude between gun and target is compensated for as follows:
 - (1) When the difference is less than 20 m, only angle of sight is applied.
 - (2) If the difference is greater than 20 m, complementary angle of sight must be added to angle of sight to compensate for non-rigidity of the trajectory. See B-GL-306-006/FP-001, *Ballistics and Ammunition*, Chapter 6, “Variations and Corrections.”

DUTIES AT REGIMENTAL HEADQUARTERS
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CHAPTER 2
DUTIES

GENERAL

1. Although the regiment functions as an entity, it is normally deployed in three areas:
 - a. a number of command, observation and liaison elements deployed with the supported arms;
 - b. the gun groups deployed to the rear of the forward observation elements of our own troops; and
 - c. an administrative element which may be divided between the gun area and the formation administration area.

2. This separation is schematically illustrated in Figure 2-1. An outline organization of a typical Direct Support Regiment, HQ and Services Battery and Direct Support Medium Battery is shown in Figures 2-2 to 2-4 respectively.

3. The following definitions apply throughout this publication:
 - a. **Battery Area.** The battery area consists of a gun position and an echelon area. All elements will be located in the best possible position to ensure efficient firing of the guns and to maximize protection of the gun area.

 - b. **Gun Position.** The gun position consists of six guns and a command element (see Figure 2-4). The tactical situation will dictate the method of deployment (close, dispersed individually or dispersed in sections of two). Although the battery main and alternate CPs may deploy with a section or close to a gun for protection, the CP should normally deploy in the centre of the battery area for better overall control.

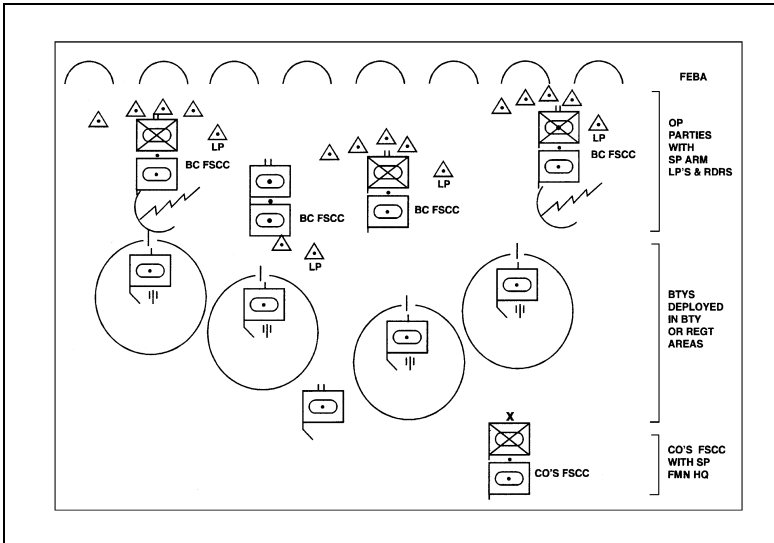


Figure 2 - 1 The Basic Functional Deployment of a Regiment

4. This manual is mainly concerned with RHQ and the gun group; however, brief descriptions of the duties of all key appointments in the regiment are given in this chapter in order to demonstrate the functioning of the unit as a whole.

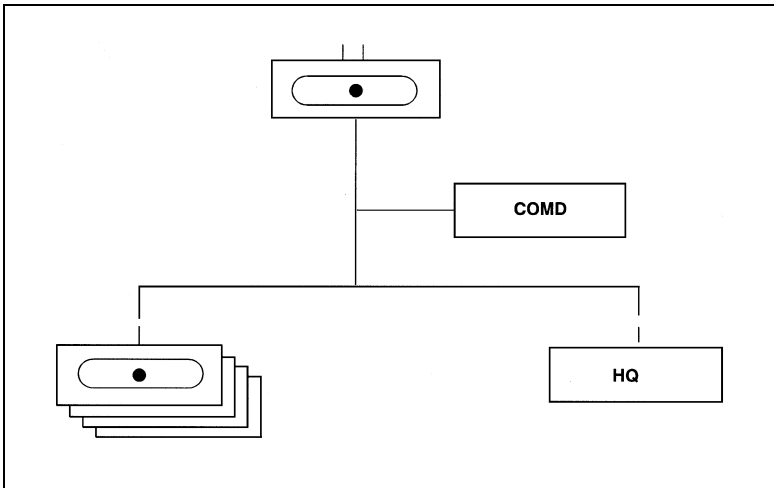


Figure 2 - 2 Outline Organization of a Direct Support Regiment

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

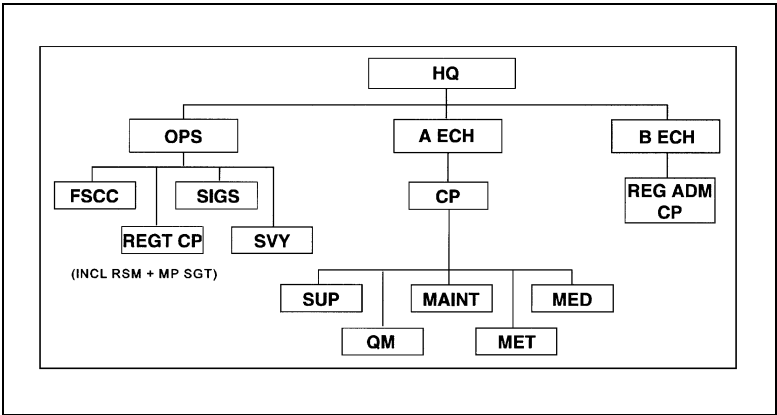


Figure 2 - 3 A Direct Support Regiment HQ and Services Battery RCA

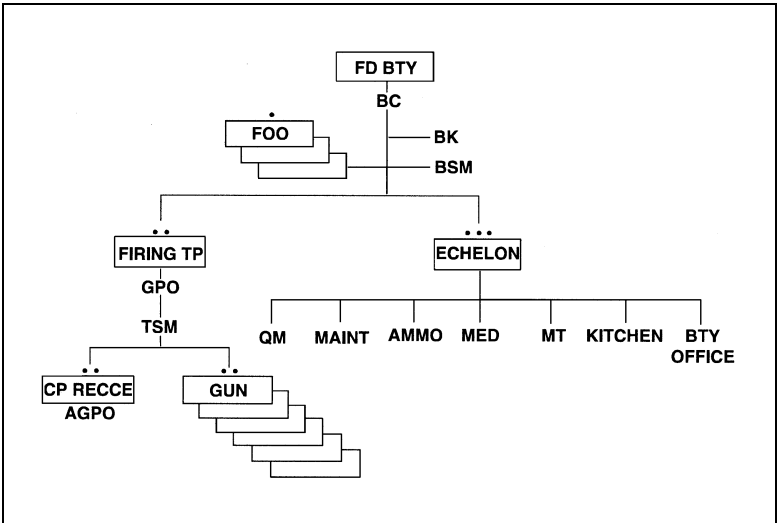


Figure 2 - 4 A Direct Support Medium Battery RCA

HQ AND SERVICES BATTERY

5. HQ and Services Battery comprises:
 - a. operations troop,
 - b. A echelon, and
 - c. B echelon.
6. In the field, these components are normally grouped as follows:
 - a. Commanding Officer's (CO's) tactical HQ at the HQ of the supported formation;
 - b. the regimental CP, the bulk of the signals troop and A echelon, as well as some locating elements in the regimental area;
 - c. B echelon elements in the formation administrative area or base if required; and
 - d. certain locating elements deployed separately.

CO'S TACTICAL HQ

7. **General.** The CO's tactical HQ consists of the CO, the Operations Officer (Ops O), the Assistant Operations Officer (A Ops O), a Fire Support Coordination Centre (FSCC), the Operations Warrant Officer (Ops WO), the Operations Sergeant (Ops Sgt) and communicators to operate for extended periods.
8. **Duties of the CO.** The duties of the CO are to:
 - a. command his regiment;
 - b. act as artillery adviser to the formation commander and establish a FSCC at formation HQ in conjunction with air, aviation and supporting arms;

DUTIES AT REGIMENTAL HEADQUARTERS
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- c. ensure that the fire of his unit is delivered when and where required by the supported formation;
- d. deploy target acquisition means as allocated; and
- e. control any additional artillery allotted to the formation.

9. **Duties of the Ops O.** The duties of the Ops O are to:

- a. assist the CO and act as the CO's representative in the FSCC;
- b. organize and operate the FSCC;
- c. maintain the operations, planning and CO's maps;
- d. report tactical information from and to the supported formation, the RCPO, the batteries, the alternative HQ when established and Divisional Artillery HQ;
- e. coordinate terrain requirements for all artillery resources deployed in the formation area;
- f. prepare operation orders and instructions for the CO as directed;
- g. produce fire plan tables, target and Defensive Fire (DF) lists;
- h. assist the CO in ammunition planning;
- i. keep the Regimental Command Post Officer (RCPO) informed of current developments;
- j. carry out nuclear/chemical target analysis as required;
- k. prepare written movement orders as required; and
- l. command tactical HQ personnel.

10. **Duties of the A Ops O.** He is normally delegated the responsibility to:
- a. understudy and relieve the Ops O;
 - b. act as the tactical HQ member of the formation HQ reconnaissance party; and
 - c. man a step-up link for the FSCC as required.

RHQ DUTIES IN THE REGIMENTAL GUN AREA

11. **Second in Command (2IC).** The 2IC will:
- a. act as the CO's deputy;
 - b. reconnoitre, allot and supervise the occupation of the new gun areas;
 - c. supervise the supply and replenishment of ammunition;
 - d. supervise administration and welfare throughout the regiment;
 - e. coordinate the local defence of the gun areas; and
 - f. coordinate all activities of the survey troop.
12. **HQ and Services Battery Commander (BC).** The BC of the HQ and Services Battery will:
- a. command his battery;
 - b. coordinate maintenance, supply and welfare matters within the regiment, and be responsible for maintenance and supply matters within the HQ and Services Battery;
 - c. deploy and coordinate the local defence of the regimental A and B echelons; and

DUTIES AT REGIMENTAL HEADQUARTERS
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- d. be responsible for the establishment and efficient operation of the regimental administrative CP.

13. **Regimental Command Post Officer (RCPO).** The RCPO is responsible for:

- a. **the control of fire** — the main responsibility of the RCPO is the control of the fire of the regiment and other artillery allotted. His duties in this respect are to:
 - (1) control the regiment's fire on regimental and higher targets, including fire plans. Acting upon the CO's orders and taking into account Standing Operating Procedures (SOPs) and the availability of guns and ammunition, he directs call for fire to the batteries. These orders may be verbal or in the form of written fire plan tables. He also carries out this function for units placed under command of the CO;
 - (2) reproduce fire plan tables as required;
 - (3) ensure that, as soon as possible after the commencement of a fire mission, he informs Divisional Artillery HQ of the batteries involved, and the target location and description. At the conclusion of the mission he reports the results; and
 - (4) ensure that target records are maintained;
- b. the monitoring of ammunition expenditure and reporting ammunition states to the Divisional Artillery HQ, CO's tactical HQ and formation G1/G4 (administrative) staff, if applicable;
- c. the organization and operation of the regimental CP;
- d. the reconnaissance and local defence of the regimental CP area;

DUTIES

- e. the enforcement of correct operational procedures within the regiment including radio discipline;
 - f. the maintenance of an operations map, capability chart and availability board;
 - g. the establishment of a regimental command or fire orders net;
 - h. the establishment of a regimental technical net (ring net) for passage of target information and other details to and from battery CPs;
 - i. the control of the adoption of met data and changes of survey state;
 - j. the implementation of the regimental registration policy;
 - k. the recording and passing of tactical information to Divisional Artillery HQ, the CO's tactical HQ and the batteries;
 - l. the supervision of calibration and the grouping of guns; and
 - m. the supervision of regimental training requirements.
14. **Assistant Regimental Command Post Officer (ARCPO).** The ARCPO is understudy to the RCPO.
15. **Adjutant.** The adjutant is responsible for:
- a. all personnel administration in the regiment;
 - b. the preparation of routine orders, reports, and returns dealing with administrative matters;
 - c. the reception of replacements;
 - d. the maintenance of the war diary; and

DUTIES AT REGIMENTAL HEADQUARTERS
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- e. the performance of the duties of the senior duty officer in the regimental administrative CP when he is not deployed in B echelon.

16. Signals Officer (Sig O) — Communications Electronics Engineering (CELE). The main duties of the signals officer are to:

- a. command the signals troop;
- b. act as the adviser on regimental communications; and
- c. supervise the:
 - (1) establishment and maintenance of all communications within the regiment and between the regiment and higher HQ;
 - (2) reconnaissance, planning and provision of telephone lines between the battery areas and RHQ, including line communication for alternate positions;
 - (3) maintenance of communications security, including the control and distribution of COMSEC material;
 - (4) technical control of communications training; and
 - (5) first-line maintenance and repair of communications equipment.

17. Regimental Sergeant-Major (RSM). The main duties of the RSM are to:

- a. maintain a high order of discipline and advise the CO on matters pertaining to Non-Commissioned Members (NCMs);
- b. assist the RCPO in maintaining a uniformly high standard of gun drill;

- c. assist the adjutant in the reception of replacements; and
- d. execute the ammunition supply plan.

18. **Medical Officer (MO) — Canadian Forces Medical Service (CFMS).** The MO is the regiment's adviser on medical matters and is responsible, through the BC HQ and Services Battery, for:

- a. advising the CO on all medical matters;
- b. the general prevention of disease; and
- c. the organization and operation of the Unit Medical Station (UMS), including the initial documentation of patients.

19. **Technical Adjutant — Electrical and Mechanical Engineering (EME).** The duties of the maintenance officer are to:

- a. command the maintenance troop;
- b. advise the BC HQ and Services Battery on maintenance matters;
- c. supervise unit repairs and first line recovery of all equipment (excluding communications equipment) within the regiment;
- d. effect liaison with the maintenance company and the formation maintenance staff; and
- e. act as a duty officer in the regimental administrative CP.

20. **Quartermaster — Logistics (LOG).** The quartermaster is responsible to:

- a. draw, issue and account for all supplies, stores and equipment; and
- b. act as a duty officer in the regimental administrative CP.

21. **Padre.** The padre is responsible to:

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

- a. advise the CO on the spiritual welfare of all personnel in the regiment;
- b. conduct religious services; and
- c. conduct burials.

22. **Regimental Survey Officer (RSO).** The main duties of the RSO are to:

- a. command the regimental survey section;
- b. conform to the formation survey plan;
- c. formulate and implement the regimental survey plan by placing the guns, locating devices, Observation Posts (OPs), and targets on a common grid in accordance with the priority ordered by the 2IC;
- d. revise survey data within the regiment and advise the RCPO on the change of grid;
- e. accompany the 2IC on reconnaissance; and
- f. act as a duty officer in the regimental CP.

DUTIES IN THE BATTERY

23. In the field, the battery is normally deployed as follows:

- a. the BC, FOOs and their parties with the supported arm; and
- b. the remainder of the battery, in a battery or regimental gun area and regimental or formation administrative areas.

24. In the paragraphs that follow, the duties of key battery officers and WOs are described in outline only to illustrate functions rather than to limit the fixed responsibilities of individuals.

25. **Battery Commander (BC).** The duties of the BC are to:
- a. command his battery;
 - b. establish and command the FSCC at supported arms unit HQ;
 - c. advise the supported arms commander on the detailed use of artillery resources, the general use of other fire support resources and the coordination of them all;
 - d. direct the fire of artillery and other fire support resources under his control;
 - e. deploy the FOOs and other observation resources allotted to him;
 - f. direct his observers to engage targets and, when necessary, to engage targets himself;
 - g. allot ammunition and fire units under his control to observers;
 - h. plan and order the movement of his battery and any other artillery sub-unit when placed under command or under command for movement;
 - i. report tactical information to the CO's tactical HQ, the RCPO and the supported arm commander;
 - j. report hostile mortaring, shelling, bombing and nuclear strikes to the CO's tactical HQ and the RCPO;
 - k. report all suitable potential gun areas which he notes during his moves to the CO's tactical HQ;
 - l. act as artillery adviser at alternate brigade/brigade group HQ as specified in orders; and
 - m. coordinate air defence and locating artillery resources deployed in location within the supported arm commander's area of responsibility.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

26. **Forward Observation Officer (FOO).** The main duties of the FOO include:

- a. establishing an OP and observing a zone or an area of terrain as ordered by the BC;
- b. accompanying the supported arm as required;
- c. engaging targets. A FOO is authorized to fire his own battery and he may be authorized to order regimental or higher missions. As he is also trained as a Forward Air Controller (FAC), he may request and direct close support aircraft;
- d. acting as fire support adviser and coordinator to the supported arms commander at combat team level;
- e. reporting tactical information to the BC, battery CP, and supported arm as required;
- f. reporting hostile mortaring, shelling, bombing and nuclear strikes to the BC and battery CP;
- g. reporting on the suitability of potential gun areas which he notes during movement, to the BC and battery CP; and
- h. performing other duties as detailed by the BC.

27. **Battery Captain (BK).** The BK is the 2IC of the battery. His duties include:

- a. overall responsibility to the BC for the efficient functioning of the gun area;
- b. supervising the GPO;
- c. commanding the gun area;
- d. overall responsibility for the reconnaissance of the gun area;

DUTIES

- e. implementing and coordinating the battery local defence plan and commanding the local defence battle in the gun area;
- f. directing battery administration and maintenance;
- g. relieving or replacing the BC as the situation demands; and
- h. any other duties detailed by the BC.

28. **Gun Position Officer (GPO).** The GPO is the senior technical gunnery officer appointment on the gun position. He works under the supervision of the BK. His main duties include:

- a. commanding the gun position;
- b. editing calls for fire and controlling the fire of the battery ensuring prompt and accurate delivery of fire from the guns;
- c. supervising the operation of the battery CP;
- d. controlling ammunition;
- e. conducting battery reconnaissance as required;
- f. implementing orders for movement of the battery;
- g. deploying the battery and preparing the guns for opening fire;
- h. formulating and initiating the implementation of the battery local defence plan on the gun position;
- i. maintaining an operations map, and passing technical and tactical information throughout the battery and to the RCPO and CO's tactical HQ;
- j. maintaining radio discipline on the battery net through the control station;

DUTIES AT REGIMENTAL HEADQUARTERS
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- k. ensuring the gun history books are maintained;
- l. performing duties of a battery training officer; and
- m. performing other duties as detailed by the BK.

29. **Command Post Officer (CPO).** The term CPO refers to the duty officer in the CP. He may also be called upon to carry out some of the following duties on the gun line:

- a. command a gun section for a specific mission;
- b. act as a reconnaissance officer as required;
- c. check and maintain parallelism, including establishing the cause of errors;
- d. relay orders as required;
- e. supervise the maintenance of guns and ammunition;
- f. ensure ammunition is distributed among the guns as required;
- g. report the type and quantity of ammunition by lot number and projectile weight;
- h. implement orders for movement;
- i. implement the battery local defence plan;
- j. ensure a system of relief for personnel on the gun position; and
- k. site and supervise the operation of the gun position.

30. **Battery Sergeant-Major (BSM).** The BSM is the senior NCM in the battery. His main duties include:

- a. supervising all echelon activities;

- b. maintaining a high order of discipline and advising the BC on matters pertaining to NCMs;
- c. assisting the BK with maintenance and administration;
- d. replenishing, distributing and accounting for ammunition within the battery;
- e. assisting the BK with the development of the battery local defence plan; and
- f. ensuring the detailed reconnaissance of the echelon area.

31. 31. **Gun line Troop Sergeant Major (TSM).** The TSM is the senior NCM in the firing troop. His duties include:

- a. assisting the GPO with the maintenance of discipline;
- b. assisting the GPO with maintaining a uniformly high standard of gun drill;
- c. controlling vehicle and personnel movement on the gun position;
- d. assisting the BSM with distributing and accounting for ammunition;
- e. assisting with the implementation of the local defence plan on the gun position;
- f. relieving or replacing the BSM as required;
- g. assisting with reconnaissance;
- h. assisting with the administration of firing troop personnel; and
- i. acting as a duty officer in the CP as required.

32. **Battery Technical WO.** The main duties of the battery technical WO include:

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- a. senior supervisor of the main and alternate CPs;
- b. setting up the battery main CP;
- c. establishing the duty shifts of the technicians and communicators in the battery CP;
- d. supervising battery technical drills in the CP;
- e. acting as a duty officer in the CP as required;
- f. performing other duties when detailed; and
- g. maintaining gun history books.

33. **Battery Technical Sergeant.** The main duties of the battery technical sergeant include:

- a. being the senior supervisor in the alternate CP;
- b. setting up the alternate CP;
- c. establishing the duty shifts of the technicians and communicators in the alternate CP;
- d. supervising technical drills in the alternate CP;
- e. carrying out the duties of the technical WO in his absence; and
- f. performing other duties as detailed by the technical WO.

SUPERVISION DURING FIRING

34. During periods of firing, the GPO, CPOs and TSMs will ensure that the guns are laid at the ordered bearing and elevation, using one of the following methods:

- a. **Bearing:**

- (1) by measuring the bearing at which each gun is laid using the detachment commander's centre of arc marker;
- (2) by measuring the bearing at which each gun is laid using a suitable distant object; or
- (3) by using a prismatic compass when neither of the above methods is practicable;

b. **Elevation:**

- (1) during periods of firing, a visual comparison between guns will suffice;
- (2) when all guns are not visible from one location, a visual check of one or more elevation quadrants is periodically required; and/or
- (3) during periods of prolonged firing, the elevation of each gun should be checked periodically with a gunner's quadrant.

35. **Determining the Cause of an Error.** One of the following procedures will be used to determine the cause of the error:

a. **Bearing — 105mm:**

- (1) ensure that the slipping scale is set to the correct bearing ordered and that the gunner's aid is properly positioned;
- (2) ensure that the layer is using the correct Gun Aiming Point (GAP) and point of lay;
- (3) ensure that the panoramic telescope is correctly clamped in its socket;
- (4) ensure that the Centre of Arc (C of A) bearing on the slipping scale is still above the main scale reading recorded on the record plate;

DUTIES AT REGIMENTAL HEADQUARTERS
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- (5) carry out the quick sight test; and
 - (6) if these steps fail to disclose an error, an error in the C of A record is indicated and the check bearing drill must be carried out;
- b. **Elevation — 105mm:**
- (1) ensure that the elevation is set correctly on the elevation scale;
 - (2) ensure that the angle of sight scale is set to the correct angle;
 - (3) ensure that the correct charge has been fired; and
 - (4) check the Quadrant Elevation (QE) with a tested gunner's quadrant;
- c. **Bearing — 155mm:**
- (1) ensure that the reset counter is set to the bearing ordered and that the "gunner's aid counter" is properly set;
 - (2) ensure that the layer is using the correct GAP and point of lay;
 - (3) ensure that the panoramic telescope is correctly clamped in its socket;
 - (4) ensure that the C of A bearing on the reset counter is still above the azimuth counter reading recorded on the record plate;
 - (5) carry out the quick sight test; and
 - (6) if these steps fail to disclose an error, an error in the C of A record is indicated and the check bearing drill must be carried out;

- d. **Elevation — 155mm:**
- (1) ensure that the elevation is set correctly on the elevation counter;
 - (2) ensure that the elevation correction counter is set to correct angle;
 - (3) ensure that the correct charge has been fired; and
 - (4) providing the barrel has not been moved to the loading angle, check the QE with a tested gunner's quadrant.

36. **Action on Discovery of an Error.** On discovering an error in bearing or elevation, the CPO or TSM proceeds as follows:

- a. if the gun has not fired, he orders the error corrected;
- b. if the gun has fired, he orders the offending gun to check firing, informs the CP of the nature of the error and awaits further orders; and
- c. during fire plans he orders the offending gun to check firing, reports the error to the CP, has the error corrected and orders the gun to continue firing at the correct data. Any rounds or serials missed while correcting the error, lapse.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

CHAPTER 3
DEPLOYMENT

SECTION 1
INTRODUCTION

THE ESTIMATE PROCESS

1. The fundamentals of defence and attack apply equally well to the artillery as they do to the other arms. However, the artillery is faced with both problems simultaneously. Targets must be attacked while at the same time the guns must be defended. Deployment of the guns, therefore, must be such that they are able to destroy, neutralize or suppress the enemy while ensuring their own survival. Indeed, concentration of artillery firepower, so critical in all phases of war, is only possible through careful application of tactics, technical gunnery expertise, and communications.

2. Reconnaissance and deployment of artillery is planned and executed in the same manner as in all other military operations by the use of the estimate process. The estimate process allows careful deductions to be drawn from certain factors. By asking the question "So what?" for each factor, a logical deduction should follow. This logical thought process allows for a thorough and sound reconnaissance and occupation plan. A general example of the estimate process is as follows:

- a. **Aim.** What is it that we are to accomplish? The aim should consist of one task. This section also includes limitations on the aim in the form of timing, reconnaissance, adjustment policy and movement restrictions, etc., all of which may be imposed by the higher HQ or formation concerned. The Time To Be Ready (TTBR) will be the critical factor in every estimate and must be considered throughout each part of the estimate process.
- b. **Enemy and Own Forces.** The enemy threat must be considered in the form of ground, air, CB and electronic warfare in terms of strengths, locations, tactics, capabilities, intentions, future actions and morale. Own

forces must be considered in the form of morale, strength, protection parties and sentries, proximity of other friendly forces, reliability of communications, technical gunnery capabilities and the need for command and control.

- c. **Ground.** Consider availability of natural cover, camouflage, concealment, routes, crests, accessibility, defensibility, availability of areas and proximity to other likely targets.
- d. **Assessment of Tasks.** This section covers the number and type of tasks that must be done and the manpower, material or equipment required to do those tasks. An all important consideration will be the time required versus the time available.
- e. **Enemy and Own Courses.** Possible action by the enemy must be balanced against our possible options. From these the best course available to meet the aim must be determined. Both technical and tactical considerations such as local defence must be balanced, although a priority must be given to the technical gunnery considerations.
- f. **Plan.** The plan, based on the best course open, is the result of asking the question “So what?” as applied against all the factors considered in the sequence above. Using good command and control the plan must now be executed. Clear and concise direction in the form of orders and briefings are essential to a successful and rapid execution of the plan. The task of deployment may include a number of possible plans as follows:
 - (1) reconnaissance plan,
 - (2) movement plan,
 - (3) occupation plan,
 - (4) communications plan,
 - (5) survey plan,

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

- (6) local defence plan, and
- (7) administrative plan.

COMMAND AND OBSERVATION ELEMENTS

3. **The CO's Tactical HQ.** The CO's tactical HQ is located at formation HQ and is deployed by the Ops O under the direction of the supported formation staff. Further details on the operation and deployment of the tactical HQ are given in B-GL-306-002/FP-001, *Artillery Staff Duties*.

4. **The BC and Observation Parties.** These parties move and deploy with the HQ and sub-units of the supported arm. Further details are given in B-GL-306-003/FP-001, *Duties of the Battery Commander and the Observer*.

REGIMENTAL DEPLOYMENT

5. Both the reconnaissance and deployment plans are initiated at the level at which command is retained for a particular operation or part of an operation. These plans are based on an estimate of the tactical situation, the personnel and equipment resources, the time available and the availability of information about the enemy and the terrain.

6. In keeping with the tactical plan, likely areas for deployment are selected from maps, air photographs, reconnaissance reports and reports from artillery officers who are forward. These locations are then circulated to lower formations and regiments. The suitability of these areas usually requires confirmation by ground reconnaissance and it is normal for this step to be completed by the regiment or battery concerned; see Section 3.

7. Once suitable areas have been selected, a coordinated and flexible deployment plan is made by the artillery commander. Before deployment is ordered, the availability of these sites is confirmed with the supported formation staff to ensure that they are reserved for artillery use.

8. In certain situations, it may be both possible and desirable to site two or more sub-units in the same area. The division of this regimental area among the batteries is the responsibility of the 2IC.

SECTION 2 HEADQUARTERS AND SERVICES BATTERY RECONNAISSANCE AND DEPLOYMENT

GENERAL

9. **Grouping.** The grouping of the elements of Headquarters and Services Battery may be varied to suit the type of operation, the tactical situation and reconnaissance requirements. In general terms, Headquarters and Services Battery is deployed in four separate locations for operations:

- a. CO's tactical HQ operating under the CO at the supported formation HQ.
- b. The regimental CP which deploys under the control of the RCPO and will normally include the signals officer and regimental survey elements.
- c. A echelon which deploys under the control of BC Headquarters and Services Battery in an area which is suitable for the maintenance and resupply of the regiment.
- d. B echelon which normally deploys in the formation services area under the control of the adjutant.

10. **Orders.** Orders for the movement of Headquarters and Services Battery elements will be issued by either the CO or the 2IC. On receipt of orders, reconnaissance parties must reconnoitre and prepare the new areas.

11. **Reconnaissance Parties.** Detailed grouping and composition of reconnaissance parties will be specified in SOPs. Normally the grouping will include the following:

- a. **Regimental CP Reconnaissance Party.** Detailed groupings and composition of reconnaissance parties

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

will be specified in SOPs. Normally the grouping will include the following:

- (1) ARCPO/Sig O,
 - (2) line detachment, and
 - (3) Liaison Officers (LOs).
- b. **Headquarters and Services Battery Reconnaissance (A Echelon).** This will form part of the regimental reconnaissance party. It may include:
- (1) BC Headquarters and Services Battery,
 - (2) BSM Headquarters and Services Battery,
 - (3) guides and sentries, and
 - (4) signals troop line detachment.
- c. **B Echelon Reconnaissance.** It will normally be composed of the adjutant, the regimental office and the regimental administrative CP.

RECONNAISSANCE AND SITING OF THE REGIMENTAL CP

12. **Regimental CP.** A major factor to be considered when selecting a site for the regimental CP is that it must be in a position from which radio communications can be maintained with the higher formation HQ, regimental FSCC, BCs and battery CPs. The following special requirements should be considered:

- a. It must be accessible yet clear of areas in which administrative activities will be carried out.
- b. It must provide security and concealment including:
 - (1) track and traffic control plans,

- (2) a visitor's car park well clear of the CP, and
- (3) a rest area well clear of the CP.

13. The regimental CP may be located within the A echelon area if conditions mentioned further in this section can be met; however, requirements for dispersion and communications usually preclude this.

14. When operations are conducted over a wide front, batteries may deploy separately. RHQ may be sited near or with a battery in some circumstances in order to gain local defence protection. When RHQ is sited separately, its areas must be confirmed with formation staff in the same manner as those for the batteries.

RECONNAISSANCE AND SITING OF HEADQUARTERS AND SERVICES BATTERY (A ECHELON)

15. **Reconnaissance.** The Headquarters and Services Battery reconnaissance officer shall reconnoitre the whole of the area before allotting it to QM, maintenance and medical troop representatives for detailed reconnaissance.

16. **Siting.** A major factor to be considered when selecting a site for the Headquarters and Services Battery is that it must be in a position from which supply, maintenance and medical support can be provided to the regiment. The following special requirements should be considered:

- a. It should be away from a heavy traffic route but accessible to the formation command axis, and should have good exits and entrances with sufficient internal roads to allow traffic to move easily in the area.
- b. It should have sufficient hard standing for maintenance and supply.
- c. It should have good communications with the batteries, formation administrative and B echelon elements.
- d. It must provide concealment from ground and air, be at a safe distance from likely target areas and have sufficient room for dispersion.

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

- e. It must be defensible.
- f. It should be centrally located in relation to the battery gun areas.

RECONNAISSANCE AND SITING B ECHELON

17. **Reconnaissance and Siting.** This will be done by formation reconnaissance parties in the BSA where B echelon will normally be deployed.

MOVEMENT

18. **General.** Normally all four elements of the Headquarters and Services Battery will move independently. Methods of movement for all RHQ elements will be conducted in accordance with B-GL-303-009/FP-001, *Road Movement*, and unit SOPs.

19. **Movement of the Regimental CP.** The regimental CP must remain in constant control throughout any movement. This is normally achieved by employing step-up.

20. **Movement of A Echelon.** A echelon will move as directed by BC Headquarters and Services Battery to support the regiment.

21. **Movement of B Echelon.** B echelon will move, under the control of the adjutant, as directed by the formation staff.

SECTION 3 RECONNAISSANCE AND PREPARATION OF THE BATTERY AREAS

GENERAL

22. **Area Suitability.** Once gun areas have been selected for the regiment, their suitability must be confirmed before their occupation is ordered. This is normally carried out by the 2IC by:

- a. personal reconnaissance by vehicle or aircraft;
- b. obtaining information from artillery officers in the forward areas; or
- c. directing battery reconnaissance parties to reconnoitre particular areas, often coupling this direction with orders to prepare the position to the required degree of preparation.

FACTORS IN SELECTING A BATTERY GUN AREA

23. In selecting and confirming battery gun areas, the 2IC gives consideration to the following points through an estimate process:

- a. **Crest.** Crests or other obstructions must not prevent shooting down to the minimum range, represented by the Line to Shoot Down To (LTSDT), or make the engagement of other targets within the primary arcs of fire impossible.
- b. **Flash Cover.** Local crests, a minimum of 15 m in height within 300 m, are required to provide flash cover.
- c. **Defensibility.** The gun area must be defensible against enemy threats which may include:
 - (1) **Infiltration.** This can be accomplished by small parties of enemy forces which may disrupt the ability of the battery to accomplish its primary mission to provide fire support to the supported arms. Proper siting of howitzers and crew-served weapons in mutual support to cover the main approaches is critical.
 - (2) **Threat of Air Attack.** Protection is normally provided by good camouflage and by positioning the sections sufficiently far apart to ensure that an attack against one section will not seriously endanger the others.

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- (3) **Air Reconnaissance.** The best protection against air reconnaissance is provided by good concealment. The battery should be deployed to take greatest advantage of local cover.
 - (4) **Counterbattery (CB).** Protection against CB requires sufficient distance between sections to provide a reasonable degree of safety for one section when another is attacked, or extensive fortification to protect each section when attacked.
 - d. **Concealment.** This should be provided from ground and air through the use of:
 - (1) areas of low scrub or trees;
 - (2) buildings that do not provide an obvious target; and
 - (3) folds of ground to provide cover or even reverse slope positions.
 - e. **Targets.** The area should be clear of features or installations that are likely targets for enemy artillery fire.
 - f. **Size.** The area should be large enough to accommodate all guns and the echelon. Command, control and administration are simpler to conduct within a small area. Size will also dictate the degree of dispersion possible to counter air or CB threats.
 - g. **Ground.** It should provide firm and level gun platforms.
 - h. **Accessibility.** The area should be readily accessible to supply vehicles particularly those carrying ammunition.
24. Proper consideration of the above factors will enable the initiator of movement orders to decide upon and order the deployment in order for

the reconnaissance officer to properly implement those orders. Terrain, the tactical situation and, most importantly, the time available will dictate the deployment unless specifically ordered by higher HQ.

TOPOGRAPHICAL CONSIDERATIONS

25. All topographical areas have their specific advantages and disadvantages. The aim of this subsection is to provide some insight and guidance in the selection of gun areas and positions.

26. **Urban.** With continued urbanization and the ability of urban terrain to mask IR signatures, urban deployments may be preferable or necessary in some situations. The effective use of buildings, streets and other urban features will enhance the concealment and thus the survivability of the unit. However, urban terrain may inhibit communications and adversely affect command and control. Careful reconnaissance and planning for the occupation of an urban area will be essential to make best use of the many advantages offered by this environment.

27. **Mountain.** All types of artillery units can operate in these topographical areas; however, it is normally better suited for light or towed guns. In general, the tactical deployment of field artillery follows the same rules as for open terrain. The concentration of fires is still as important, but it will be more difficult due to restricted mobility, limited deployment areas and crest problems. The following should be considered in mountain deployments:

- a. movement is restricted to roads, improved trails, or air;
- b. batteries should be stripped of all non-essential vehicles and equipment;
- c. reconnaissance parties should be continually deployed as far forward as possible to determine accessibility and suitability of gun areas;
- d. deployment methods will be determined by the availability of suitable terrain in the gun area;

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- e. crest problems will differ from position to position and dead ground traces must be prepared as soon as possible;
- f. harsh terrain and limited equipment will complicate local defence preparation;
- g. survey will be difficult and time consuming; and
- h. ammunition resupply will be difficult, particularly for air-lifted units due to limited resources and accessibility.

28. **Deserts.** Deserts are arid expanses of mountains, rocky plateaus, sand dunes or a combination of all three. This type of terrain will have a significant effect on the manner in which artillery is employed and deployed. Due to the nature of the terrain, ground is seldom important to hold. Of prime importance, however, is the capability to manoeuvre over the desert. Therefore, artillery units must be highly mobile to allow rapid movement and deployment. The tendency of the ground to be open will make concealment and camouflage difficult. This will make dispersion and deception vital to enhance battery survival. The use of dummy positions may offset the lack of locally available camouflage. The lack of recognizable landmarks and accurate maps will also make navigation difficult.

29. **Northern.** Artillery units operating in the north face two major problems: survival and mobility. Some of the terrain and weather considerations are as follows:

- a. Large areas of terrain are covered with coarse vegetation and boggy muskeg. Roads are scarce and swamps and heavy snowfall restrict mobility. One of the preferred methods of transportation is movement by helicopter, especially in the summer.
- b. Successful movement is accomplished as a result of careful, detailed and comprehensive route reconnaissance. Extensive ground and air reconnaissance should precede each operation.

- c. Supply difficulties will influence the selection of gun positions. They are chosen for a combination of tactical utility and protection from the elements. Maximum prior preparation is desirable. Parapets and gun platforms must be built up with snow and available brush and wood rather than dug-in.
- d. Camouflage, use of ground and careful attention to track plans will all aid in concealment. The operations of engines, personnel heaters, stoves and firing of guns can cause ice fog in very cold temperatures with consequent disclosure of positions. Frequent movement to alternate positions is advisable under these circumstances.

30. **Jungle.** Almost one third of the earth's tropical zone is an area of high temperature and humidity where the natural vegetation is largely rain forest. This area, which also includes deciduous forest, swamp and tropical grassland makes up the jungle and is to be found principally in Southeast Asia and Latin America. It is mostly underdeveloped, with poor communications and small and often primitive indigenous populations. Artillery will frequently have to be deployed into difficult and apparently inaccessible areas to provide support for infantry operations. Transportation methods will include helicopter, air landing or air dropping, manhandling, movement by waterways, and animal transport. Although Self-Propelled (SP) artillery has an advantage in negotiating rough terrain, logistical and deployment problems mitigate against its employment in jungle operations. Considerable effort will often be necessary to prepare battery positions and construct gun platforms. The cover provided by the jungle, for enemy offensive operations, poses a constant threat to the security of gun areas. Guns should always be deployed in the most secure area such as a fire support base. Dispersion will generally have to be sacrificed to keep the base small and defensible from ground attack, but guns must also be well protected against enemy counterbattery fire or air attack.

GUN AREA LAYOUT

31. The battery normally deploys in two separate areas as follows:
- a. the BC, FOOs and their parties travel and deploy with the supported arm; and

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- b. the remainder of the battery deploys in a gun area.

32. The purpose of reconnaissance is to determine the suitability of an area as a gun area.

33. **Gun Area.** The gun area consists of a gun position and an echelon area. All elements will be located in the best possible position to ensure efficient firing of the guns and to maximize protection of the gun area.

34. **Gun Position.** The gun position consists of the guns and the battery command post elements. The guns will be numbered one to six consecutively from right to left in relation to the C of A. When two guns are on the same axis, the forward gun will be numbered first and the rear gun second. The CP should be deployed to an area with good communications and concealment and be centrally located in order to permit maximum control of the guns. The CP should not be so close to the guns that its operation is disrupted by firing, but should be positioned so that visual and voice control are maximized. The alternate CP will be placed on either the left or right flank to avoid the loss of both CPs. Both CPs should be connected to the battery line network. If normal communication with the guns fails, a voice or voice relay system must be established. The CPs must be able to maintain contact with the stations on the battery net and with the RCPO at all times. Other considerations are:

- a. the areas should be large enough to accommodate the CP, the DR, where applicable, and a living area; and
- b. the CPs, and the routes to them, should be well hidden but accessible to visitors.

35. **Positioning of the Guns.** The layout of the gun position is normally affected by the following:

- a. **Factors:**
 - (1) ground,
 - (2) need for command and control,

- (3) requirement to disperse to counter the CB threat and air attack,
 - (4) requirement for protection against infiltration, and
 - (5) requirements of administrative activities.
- b. **Principles.** The following principles govern the positioning of the guns:
- (1) the guns must be able to cover their allotted arcs laterally and in depth;
 - (2) platforms must be firm, level and free from obstructions such as large stumps or stones. Use of excessive slope may result in:
 - (a) difficulty in handling the equipment,
 - (b) reduction in the range capability of the equipment, and
 - (c) exceeding the capability of the equipment to compensate for canted trunnions or equilibrators adjustment;
 - (3) the guns should be positioned to gain the maximum natural cover from ground and air observation. Flash cover should also be provided; and
 - (4) the guns' local defence arcs should cover as many likely approaches as possible and shall include the provision of mutual support among sections.

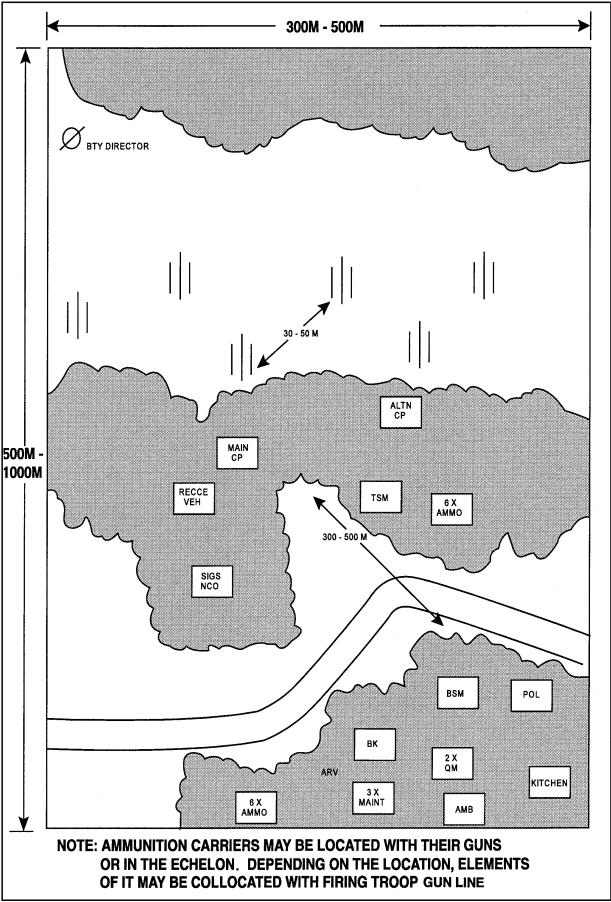
36. **Wagon Line.** An area, as close to the gun platform as the tactical situation will allow, where vehicles are positioned so as to be immediately available for either ammunition resupply or movement. Wagon lines can be established as either a battery wagon line positioned in the echelon or on the gun position. The area should be under good

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cover and sited within the defensive perimeter of either the section area, gun position or the echelon.

37. **Echelon Layout.** Major considerations affecting the layout of the echelon are as follows:

- a. the availability of hard standings, good routes and cover for parking vehicles and for battery administration;
- b. positioning to avoid interference with the functioning of the guns and CPs, but where the echelon can contribute to battery local defence; and
- c. on occasion, elements of the echelon may be grouped with either the regimental or supported arm echelon.



NOTE: AMMUNITION CARRIERS MAY BE LOCATED WITH THEIR GUNS OR IN THE ECHELON. DEPENDING ON THE LOCATION, ELEMENTS OF IT MAY BE COLLOCATED WITH FIRING TROOP GUN LINE

Figure 3 - 1 Deployment (Sheet 1 of 2)

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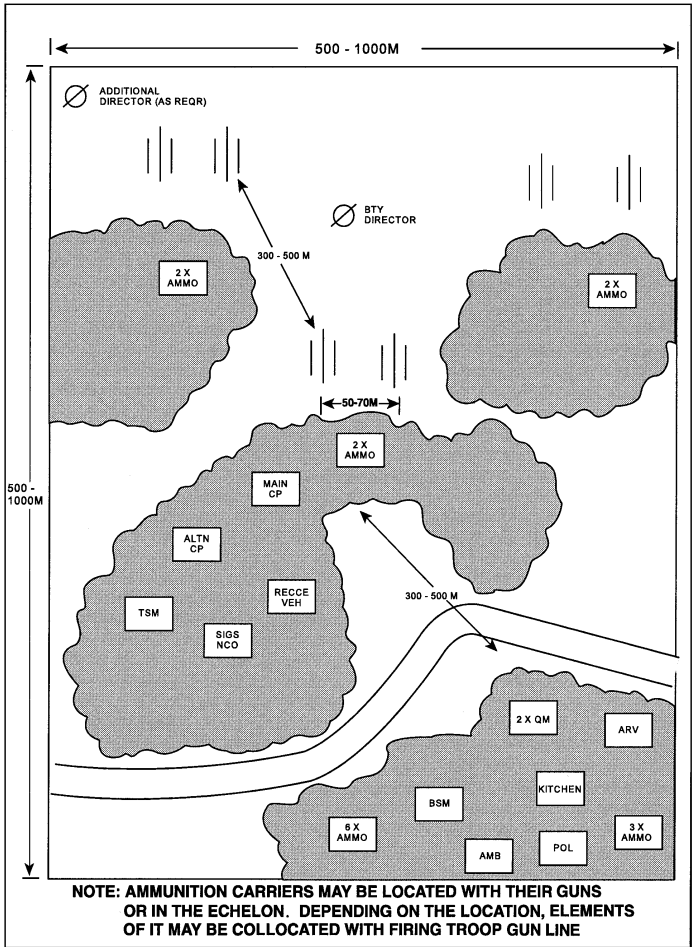


Figure 3 - 1 Deployment (Sheet 2 of 2)

ORGANIZATION, EQUIPMENT AND DUTIES

38. **The Reconnaissance Party.** The composition of the battery reconnaissance party shall be varied to fit the requirements of the situation

or the orders received. The suggested composition shown in Figure 3-2 contains those personnel considered essential to conduct a normal reconnaissance task. In certain tactical situations, it may be necessary for a protection party to accompany the reconnaissance party. When the tactical situation demands reduced reconnaissance parties, only those personnel and vehicles essential to complete the task are to be taken.

SER	VEHICLE	PERSONNEL	RADIO	REMARKS
(a)	(b)	(c)	(d)	(e)
1	Vehicle 1 (Reconnaissance Vehicle)	Reconnaissance Officer Reconnaissance Sgt Arty Tech x 2 Driver	A Set — Regimental Net A Set — Battery Net	
2	Vehicle 2 (Reconnaissance TSM Vehicle)	Reconnaissance TSM Guides x 3 Driver	A Set — Battery Net	For night occupations and certain other situations one guide per gun may be required.
3	Vehicle 3 (Signals Sgt Vehicle)	Signals Sgt Lineman/Driver	A Set — Battery Net	
4	Vehicle 4 (BSM Vehicle or BQMS Vehicle)	Echelon Rep	A Set — Battery Net	

Figure 3 - 2 Suggested Composition of a Battery Reconnaissance Party

39. **Equipment.** The following are recommended stores for the battery reconnaissance party:

- a. sufficient directors,
- b. gun markers,
- c. marking stakes,
- d. marking tape,

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- e. night vision devices,
- f. two stadia rods,
- g. computing equipment for computing battery survey,
- h. prismatic compass,
- i. binoculars,
- j. field telephones and lines,
- k. flashlights,
- l. signs,
- m. maps,
- n. night pickets,
- o. distance measuring devices,
- p. firing tables,
- q. a Convergence, Position and Fuse Correction (CPFC) graph,
- r. crest clearance table, and
- s. two radios.

40. **The Reconnaissance Officer.** The reconnaissance officer can be any of the officers in the battery. The reconnaissance officer should be accompanied by the reconnaissance TSM. The reconnaissance officer's duties are as follows:

- a. organize and supervise the operation of the battery reconnaissance party;
- b. implement reconnaissance orders;

- c. prepare gun areas for occupation;
- d. formulate and execute the battery survey plan;
- e. formulate and initiate the implementation of the battery local defence plan;
- f. supervise the occupation of the gun position; and
- g. assist with the deployment of the firing troop and with preparations to begin firing.

41. **The Reconnaissance TSM.** The reconnaissance TSM is usually a senior Non-Commissioned Member (NCM) appointed by the BK/GPO. His duties include:

- a. securing the reconnaissance Rendezvous (RV);
- b. assisting the reconnaissance officer with as many of his duties as possible;
- c. confirming the suitability of the battery track plan;
- d. briefing the guides;
- e. meeting the guns at the RV; and
- f. assisting with the occupation of the gun position.

42. **The Battery Reconnaissance Sergeant.** The battery reconnaissance sergeant is the senior NCM responsible for:

- a. assisting the reconnaissance officer with as many of his duties as possible;
- b. supervising the set up of the battery director(s);
- c. collecting CPFC data;
- d. conducting battery survey as directed; and

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- e. ensuring that all equipment is ready for the next reconnaissance.

MOVEMENT

43. **Warning Order.** Before movement is ordered, a warning order should be issued, indicating:

- a. approximate time that the movement will take place or the degree of notice that will be given before movement is ordered; and
- b. location of the new area.

44. **Standard Movement Order Form.** Movement orders are sent using a standard form to ensure clarity and speed of transmission. Only the common items are listed on the form; other orders must be included under "miscellaneous". This standard form is also used for orders to observation parties. See Figure 3-3.

45. **Content of Movement Orders.** Any or all of the following items may be included in a movement order, but items in subparagraphs "a" to "e" below must be ordered. See Figure 3-3.

- a. **Location of the Gun Area.** This may be ordered as a grid reference, a grid square or parts of a grid square, a specific area designated on a trace, or a grid reference coupled with a radius, or by a previously arranged reference such as a nickname or distinctive letter and/or number group. Grid information transmitted by radio must be encoded if the radios are not secure.
- b. **Time to Move and Time To Be Ready (TTBR).** Time to move is the time at which cease firing will be ordered unless the guns are engaged in a fire mission, in which case cease firing will be withheld until the fire mission is terminated. The battery must be in action in the new position by the TTBR.

- c. **Degree of Preparation.** The degree of preparation ordered for a new gun area will depend upon the likelihood of early occupation and whether the occupation is to take place in daylight or darkness. By convention NORMAL will be the degree of preparation unless MINIMUM or MAXIMUM is ordered.
- (1) **Minimum.** This is the initial degree of preparation. The following activities occur when a gun area is prepared to this degree:
- (a) confirmation that the area is suitable;
 - (b) selection of the gun, echelon and CP areas;
 - (c) check for crest clearance;
 - (d) selection and map spot of the originating point of battery survey; and
 - (e) a rough sketch of the gun area;
- (2) **Normal.** This is the standard degree of preparation for a daylight occupation. In addition to minimum preparations, it shall include:
- (a) selecting locations for the director(s), gun platforms, CPs, and wagon line if applicable;
 - (b) marking gun platforms,
 - (c) completing battery survey,
 - (d) laying line,
 - (e) formulating the local defence plan and track plans,

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- (f) obtaining CPFC data, and
 - (g) if time permits, any additional preparations for opening fire that can be made;
- (3) **Maximum.** This is the maximum degree of preparation and is the norm for positions prepared in daylight for occupation after last light. In addition to the normal preparations, it usually includes:
- (a) the reconnaissance of a preliminary position,
 - (b) recording night Reference Objects (ROs) for the director(s),
 - (c) erecting night pickets,
 - (d) making any additional preparations required for orienting the guns,
 - (e) laying of line from the director(s) to the CP; from the CP to the alternate CP; and from the CPs to the local defence outposts as required; and
 - (f) if the occupation is to take place after last light, laying marking tape at last light to mark the route from the preliminary position to the gun platforms and thence to the echelon or wagon line.
- d. **Centre of Arc (C of A) and Arcs of Fire.** The C of A must be ordered as a grid bearing to the nearest 100 mils. The C of A and arcs of fire for each alternative position must be specified separately if their requirements differ.

- e. **Line to Shoot Down To (LTSDT).** The LTSDT must be specified either as a range or preferably in more exact terms related to a grid line, a ground feature, or a series of grid references. It is for low angle fire unless otherwise ordered.
- f. **Route.** When the route is not specified it shall be detailed by the BK or reconnaissance officer.
- g. **Order of March.** This is normally ordered by the BK or reconnaissance officer.
- h. **Start Point and Release Point.** These points are usually only specified to control movement during large scale deployments. Timings for each point are given.

46. **Movement of the Battery.** Regimental movement planned and controlled by formation HQ will be conducted in accordance with B-GL-303-009/FP-001, *Road Movement* and unit SOPs. The following discusses battery tactical movement:

- a. **Reconnaissance Party.** The reconnaissance party, less the reconnaissance officer who can move independently, moves in one packet to the reconnaissance RV under the reconnaissance TSM's control. Vehicles comprising the reconnaissance party must be capable of moving on short notice without disrupting other activities on the battery position. They will be loaded with the necessary stores and equipment, less weapons, and positioned in such a way that they can move immediately in response to movement orders. Normally they will be located on the out route.

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MOVEMENT ORDER FORMAT

1. **Warning Order**
 - a. Originator of order
 - b. No move before/degree of notice to move from
 - c. New area
 - d. Order of march
2. **Observation Parties**
 - a. New location of OPs
 - c. Location of O Gp
 - d. Location of RV (if required)
 - e. Liaison with _____ at _____
 - f. Time to move
 - g. Zone of obsn
 - h. Route
 - i. Miscellaneous
3. **Reconnaissance Party**
 - a. New Area
 - b. Degree of preparation
 - c. C of A and Arcs of Fire
 - d. LTSDT
 - e. RV
 - f. Route
 - g. Miscellaneous
4. **Gun Group**
 - a. New Area
 - b. (Not necessary if the same as item 3a)
 - b. Move Now or Move At
 - c. RV
(Not necessary if the same as item 3e)
 - d. Route
 - e. Order of March
 - f. TTBR
 - g. Miscellaneous

(To be reproduced locally)

Figure 3 - 3 Movement Order Format

- b. **Gun Group.** The troop normally travels in an order of march determined by the GPO. The following positions are established to assist with control of movement of the firing troop:
- (1) **Position of Assembly.** When orders to move take effect, the guns and vehicles will proceed individually and as quickly as possible to the battery position of assembly. The guns automatically form themselves into their packets and move as ordered. The position of assembly should be at least 400 m from the gun position. Normally separate positions are provided for advance and withdrawal.
 - (2) **Battery RV.** A battery RV may be included in the movement order or shall be given by the BK or GPO. If it is not, the reconnaissance officer will select and order it. While it may be necessary for guns and vehicles to pause at the RV, the ideal is for them to be met there and directed or led immediately onto the gun position. If for any reason the guns must remain at the RV, the gun group will automatically move into a hide in the immediate vicinity, take local defence measures and carry out prepare for action drills.

47. **Echelon.** The echelon will conform to the movements of the gun group, staging through its own position of assembly and the battery RV. It will normally travel in at least two packets and move after the gun group.

ACTION ON RECEIPT OF MOVEMENT ORDER

48. **Action on Receipt of a Warning Order.** The duty officer in the CP will take the following action on receipt of a warning order from higher HQ:

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- a. ensure the battery is briefed on the warning order by passing the information to the BK, GPO, BSM, signals sergeant, and reconnaissance party;
- b. order preparations to be made for movement which may include, depending on the warning order received and the situation:
 - (1) dismantling camouflage;
 - (2) packing and loading ammunition;
 - (3) positioning the vehicles in a wagon line under cover close to the gun platforms; and
 - (4) administrative measures such as cleaning up the area and filling in the latrines;
- c. Inform the RCPO of the impending move if the authority to move the guns has been delegated by the CO.

49. **Action on Receipt of Reconnaissance Party Orders.** The GPO will take the following action on receipt of reconnaissance orders:

- a. notify the BK;
- b. determine the composition of, and alert the reconnaissance party;
- c. do a map estimate and plot the gun RV, new gun area and routes on the map and tentatively select a battery reconnaissance RV. Study the route to determine likely obstacles or difficulties en route, including reported enemy locations or activity.
- d. brief the BK, GPO, BSM and Signals Sergeant on the movement orders.

50. **Action on Receipt of Gun Group Orders.** The following action will be taken on receipt of movement orders:

- a. guns remain on their platforms with support weapons and camouflage deployed until they are given cease firing, unless otherwise ordered;
- b. orders are issued, which include the following details:
 - (1) new area,
 - (2) route,
 - (3) time to move, packets and the time to be ready,
 - (4) position of assembly — guns will move individually to the area designated, disperse under cover and dismount soldiers in all round defence,
 - (5) C of A,
 - (6) gun RV,
 - (7) an update of the tactical picture, and
 - (8) administrative details such as:
 - (a) ammunition resupply,
 - (b) refuelling plan, and
 - (c) feeding.

CONDUCT OF THE RECONNAISSANCE

51. **General.** The reconnaissance of an allocated area requires the reconnaissance officer to conduct a thorough and methodical reconnaissance. Preparation of the gun area can be very time-consuming. In order for the reconnaissance officer to save time and be both complete and thorough, he must use the estimate process. The sequence and some of the considerations for a reconnaissance estimate of a gun position are as follows:

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- a. **Aim.** Limitations such as:
 - (1) type of position, close/ dispersed/maximum, and
 - (2) TTBR.

- b. **Factors:**
 - (1) **Enemy:**
 - (a) threat, ground, air, CB, EW, and
 - (b) location.
 - (2) **Own:**
 - (a) other units,
 - (b) areas cleared by them, and
 - (c) protection parties/sentries/guides.
 - (3) **Ground:**
 - (a) Stage 1 — Map Reconnaissance of likely areas; unlikely areas; route to new position; routes in/out; gun/reconnaissance RVs; positions of assembly; Forward Edge of the Battle Area / Forward Line of Own Troops (FEBA/FLOT),; and alternate position.
 - (b) Stage 2 — Vehicle Reconnaissance, including how much time left; changes to the threat; and clearing/confirmation of area.
 - (c) Technical Considerations:

DEPLOYMENT

	Option 1	Option 2	Option 3
Size of Area			
Centre of Arc			
LTSDT			
Crests			
Cover, Concealment			
Routes In/Out			
Firm Level Platforms			
Track Plan			
Area for Echelon			
Best Area			

(d) Stage 3 — Detailed Reconnaissance, including how much time left; location of sections/gun line, wagon lines, echelon, track plan, director(s), battery centre, CP, alternate CP, and positions of assembly; method of passing orientation; method of collecting CPFC data; and survey point of origin (eight-figure grid).

(e) Local Defence, including possible enemy course of action against your position; siting of weapons, trenches, and anti-tank arcs; and sketch of the position.

(4) **Tasks:**

- (a) how much time left,
- (b) battery strength,
- (c) survey plan, and
- (d) reconnaissance of alternate position.

(5) **Plan.** Based on the best course, an occupation plan is chosen, briefings are given to the

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reconnaissance party as per Stage 3 and a local defence sketch is made.

DETAILED PREPARATIONS

52. Reconnaissance parties should include extra personnel to be used as guides and sentries as laid out in Figure 3-2. Detailed preparations of the gun area must include the following major activities:

- a. selecting and marking sites for:
 - (1) the gun position including:
 - (a) guns,
 - (b) director(s), and
 - (c) command elements;
 - (2) making adequate provision for:
 - (a) the vehicles not required on the gun position,
 - (b) a maintenance area for servicing vehicles,
 - (c) the ammunition and Petroleum, Oils and Lubricants (POL) vehicles, and
 - (d) a kitchen area;
 - (3) living areas, and
 - (4) wagon lines;
- b. establishing a track plan;
- c. completing battery survey including obtaining CPFC data;

- d. laying required communication lines;
- e. preparing for night occupation and night firing if required;
- f. formulating a local defence plan, including a sketch showing the layout of the gun area;
- g. improving sites and routes within and into the area if necessary; and
- h. digging, if ordered.

NOTE

The battery director can be used as the battery centre. This simplifies the problem of gathering CPFC data; however, it complicates the gunnery problem when using the Manual Artillery Plotting System (MAPS). The reconnaissance officer must detail the method to be used in his orders to the reconnaissance party. When using MAPS, the battery centre should be the physical battery centre.

53. **Reconnaissance Sequence.** To permit rapid, orderly and precise response to orders, the procedures that affect the deployment of the battery must be employed consistently and departed from only to meet the requirements of a peculiar situation (See Figure 3-7). On the receipt of orders the following should occur:

- a. The reconnaissance officer does a map estimate and selects both the gun and reconnaissance RVs, if not selected by GPO, and briefs the reconnaissance group or leaves reconnaissance orders at the CP. These orders should include the following:
 - (1) new area,
 - (2) gun RV,
 - (3) reconnaissance RV,
 - (4) time to move and time to be ready,

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- (5) route, and
 - (6) C of A.
- b. The reconnaissance TSM collects the guides from a pre-arranged point and ensures all necessary equipment has been loaded. The TSM may move independently of the reconnaissance officer to the reconnaissance RV.
- c. En route, the reconnaissance officer confirms the suitability of the RVs and the route, reporting all information of tactical significance, more specifically likely gun areas and obstacles to movement.
- d. Upon arrival in the new area the following actions are carried out:
 - (1) the reconnaissance group dismounts at the reconnaissance RV and deploys in all round defence;
 - (2) the reconnaissance officer moves forward and reconnoitres the entire area, confirming the absence of enemy. He will then confirm his C of A and prepare an occupation plan based on his estimate, to include the following:
 - (a) gun platforms,
 - (b) CP locations (communications must be confirmed by radio check),
 - (c) wagon lines,
 - (d) A echelon location,
 - (e) method of orientation based on the following priorities: individual angle method or modified individual angle method; aiming point method; and prismatic compass,

- (f) director position(s),
 - (g) a survey point of origin, if it is obvious,
 - (h) location of battery centre, and
 - (i) method of collecting CPFC data;
- (3) the reconnaissance sergeant and technicians may be briefed and deployed with their equipment at this time;
 - (4) the reconnaissance officer calls the reconnaissance party forward to the area selected by him;
 - (5) the reconnaissance TSM deploys sentries (NBCD, air and ground) for the protection of the reconnaissance party, as directed by the reconnaissance officer;
 - (6) the reconnaissance officer double checks his map spot of the battery centre with the reconnaissance TSM;
 - (7) the reconnaissance officer briefs the BSM, reconnaissance TSM, signals sergeant, and the reconnaissance sergeant, if not previously briefed, on the occupation plan and the survey plan, if known;
 - (8) the BSM departs to reconnoitre the A echelon location given by the reconnaissance officer;
 - (9) the reconnaissance officer, accompanied by the reconnaissance TSM, signals sergeant and the guides (carrying prisms), conducts a walk or drive through. He marks the gun platforms, indicates locations for CPs, other vehicles, the track plan, crew served weapons, junction

DUTIES AT REGIMENTAL HEADQUARTERS
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- boxes for line and Observation Posts /
Listening Posts (OPs/LPs) or sentries;
- (10) the reconnaissance TSM then confirms the track plan and the signals sergeant lays line;
 - (11) the reconnaissance officer checks the set up of the main director;
 - (12) the reconnaissance officer briefs the reconnaissance sergeant on the details of the battery survey plan (in accordance with Section 5, further in this Chapter).
 - (13) the reconnaissance sergeant and the second technician set up additional directors and survey equipment as required, receive line from the main director and collect CPFC data;
 - (14) CPFC data is measured or computed for each gun from the designed battery centre by the reconnaissance sergeant, or as detailed by the reconnaissance officer. It is double checked by the reconnaissance officer.
 - (15) battery survey is initiated and computed as time permits;
 - (16) the BK finalizes the local defence plan on arrival;
 - (17) the reconnaissance TSM rehearses the track plan from the gun RV or the preliminary position to individual gun platforms with the guides, one gun at a time. On completion, if time permits, he will return each guide to his position of observation before rehearsing the next track plan (for simple track plans, the rehearsal can be completed with all guides prior to their departure for the gun RV);

- (18) as a general rule, the reconnaissance TSM and guides will not depart for the gun RV until the last possible moment.

54. **Reduced Visibility.** Reconnaissance during reduced visibility requires a greater degree of planning and preparation and a greater reliance on night vision devices and SOPs. The occupation plan will depend on the time available, the terrain and the visibility. Maximum preparation of the gun position should be completed in daylight if possible and precautions taken to avoid disclosing the position to the enemy by unnecessary noise and light. Night vision devices should be used by the BK, reconnaissance officer and detachment commanders to assist in the deployment.

55. The following points should be used as a guide for the conduct of reconnaissance and the estimate process during periods of reduced visibility:

- a. If possible, two officers should be taken on reconnaissance.
- b. Aiming posts with night lights and additional directors should be taken in addition to those listed in later in this section.
- c. Line should be laid to assist during the passing of orientation. If this is not possible, then manpack radios can be used if radio silence is not in effect. Runners may be used.
- d. **Orientation.** The battery director is oriented in grid North as described in B-GL-306-008/FP-001, *Instruments*. Orientation is then passed from the battery director to any other directors. The following preparations must be carried out depending on the method to be used to lay the guns in the C of A manually:

(1) **Director Method:**

- (a) A round of angles to the gun markers should be taken with the director.

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- (b) A telephone line from the director to the CP should be laid. Radios may be used if the equipment and frequencies are available and radio silence is not in effect.
- (c) Each gun is sent an individual angle from the director.

NOTE

Directors must be sited to eliminate confusion. Different coloured lights may be used.

(2) **Method:**

- (a) A round of angles should be taken to each gun marker with the director and recorded. The director position should be marked so that it can be seen from each gun platform.
- (b) If only one director is available, the director should be moved over each gun marker and oriented by placing the ordered angle (gun to director) on the horizontal scale and laying on the director marker.
- (c) If a second director is available, line should be passed instrument to instrument and aiming posts planted directly.
- (d) The technician, assisted by the guide from the gun detachment, should plant the aiming posts and record the angle.
- (e) Having verified the recorded angle to the aiming posts, the technician should lay the director in the C of A and mark the C of A with mine tape.

- (f) The reconnaissance officer should check the recorded angles to the aiming posts by prismatic compass.
 - (g) The reconnaissance officer should give the guide a written record for the detachment commander, e.g.,
NUMBER ____, LAY ON AIMING POST AT ____ MILS, RECORD AT ____ MILS.
- e. A minimum of one guide per gun should be taken as part of the reconnaissance group for the gun position and additional guides for the echelon element.
- f. The reconnaissance officer or the reconnaissance TSM coordinate the laying of line. It should be connected and checked by the guides using telephones if necessary. At last light the guides should mark the route from the preliminary position to each gun marker and to the vehicle area.
- g. After the gun position has been prepared, the reconnaissance TSM will brief the guides ensuring that they know the:
 - (1) direction of the C of A,
 - (2) position of the night picket(s), ROs and colours,
 - (3) location of the director and the CP,
 - (4) location of the preliminary position,
 - (5) location of the wagon line,
 - (6) track plan,
 - (7) local defence plan for their gun, and
 - (8) location of sentries.

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56. **Laying of Line.** There are several methods available for the laying of line on the gun positions:

- a. **Omnibus Loop.** When time and resources are available this method of line system should be used (see Figure 3-4). An omnibus loop provides the following advantages:
 - (1) It provides redundancy, in that at least two sections of the loop must be cut to destroy communications to a gun.
 - (2) It improves the reliability of communications because the only line which crosses the track plan is the heavy duty cable from the CPs, and only a short length of gun line is required to go forward to the section junction box or to the guns.
 - (3) It provides instant communications on deployment, as the detachment commander immediately plugs into a system that was laid during reconnaissance.
 - (4) Both CPs and the guns plug into the nearest junction box, thereby providing continuous line communications to both CPs and giving each the capability to compute firing data and pass orders to six guns without delay. The omnibus loop with a single line will necessitate the voice acknowledgement of orders, because each gun does not have a dedicated line.

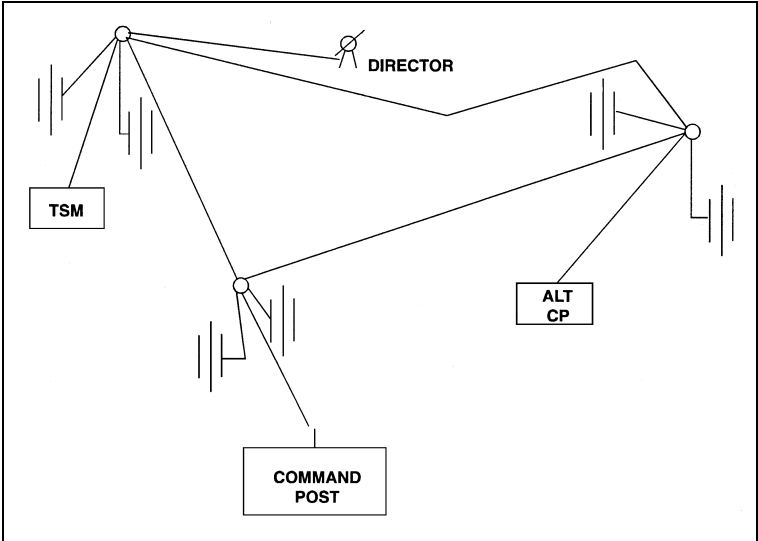


Figure 3 - 4 Omnibus Loop

- b. **Individual Line.** This method provides a level of redundancy to each gun but lacks some of the advantages of the omnibus loop. See Figure 3-5.

DUTIES AT REGIMENTAL HEADQUARTERS
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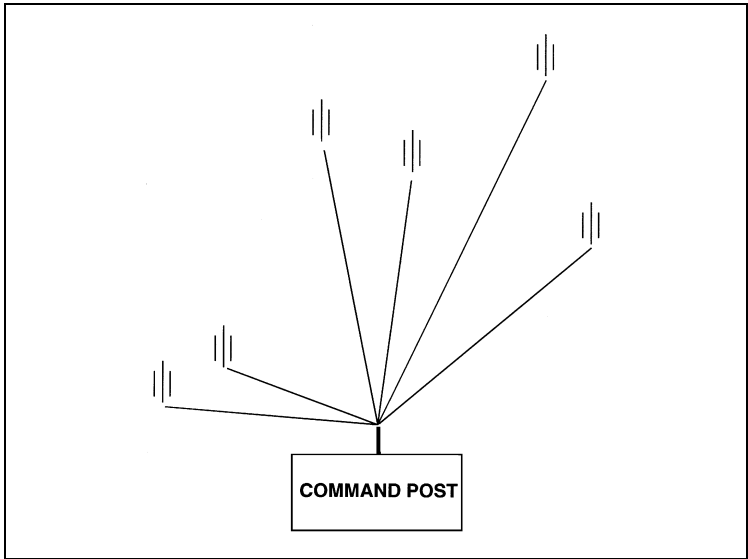


Figure 3 - 5 Individual Line

57. Line should be laid in the following priority:
- a. gun line communications;
 - b. battle CP to guns, sentries, LPs and echelon;
 - c. main CP to alternate CP; and
 - d. main CP to A echelon.

ALTERNATE GUN AREAS

58. Immediately after the occupation of a gun area is complete, the reconnaissance of an alternate must be conducted. Alternate positions are selected and prepared in order that a battery which has been located by the enemy and is suffering casualties may move and rapidly be ready to open fire again. Movement to an alternate position is only conducted on order from higher HQ. The following considerations, in conjunction with regimental SOPs, will apply:

- a. alternate areas should be located more than 1,000 m from the present area, but be close enough to be occupied with a minimum amount of time out of action;
- b. if an alternate area has not been specified, permission to use the nearest suitable location must be obtained;
- c. alternate areas are normally prepared to the minimum degree, however a higher degree of preparation may be ordered;
- d. the battery, or elements thereof, may not move to an alternate area without the permission of the appropriate artillery commander;
- e. all personnel must be briefed on the location, method of occupation and layout of the alternate gun area, and
- f. detachment 2IC should be sent on reconnaissance for the alternate position.

HARBOURS

59. A harbour is an administrative area which permits the dispersal and concealment of vehicles and troops against the threat of an enemy. The criteria for selecting harbours and their occupation drills are illustrated in Figure 3-6. It is used as:

- a. an administrative or waiting area for the control of tactical movement;
- b. a base for offensive operations;
- c. a location for maintenance, replenishment, reorganization and rest; and
- d. a location to obtain concealment and cover during halts in movement.

DUTIES AT REGIMENTAL HEADQUARTERS
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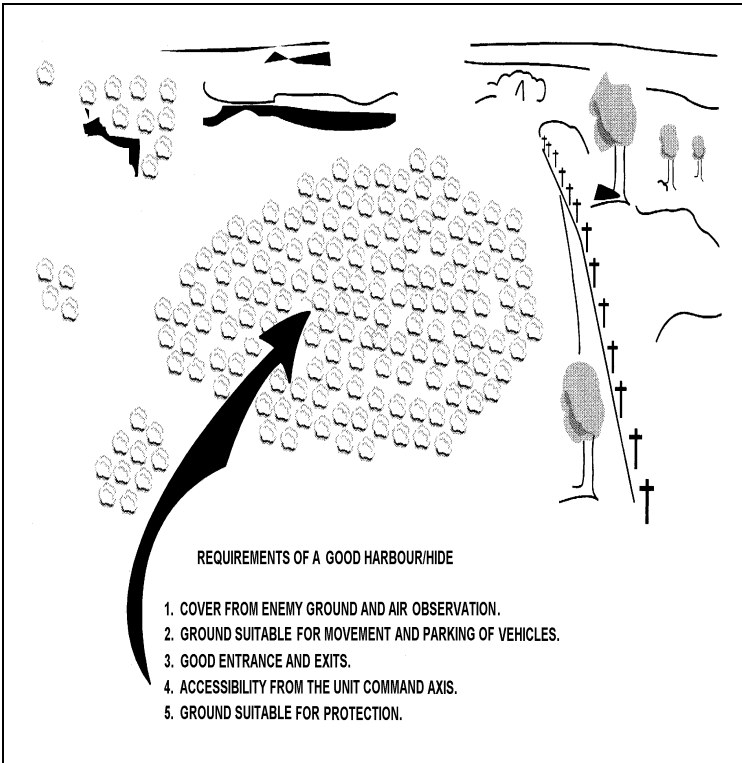


Figure 3 - 6 A Battery Harbour/Hide (Sheet 1 of 2)

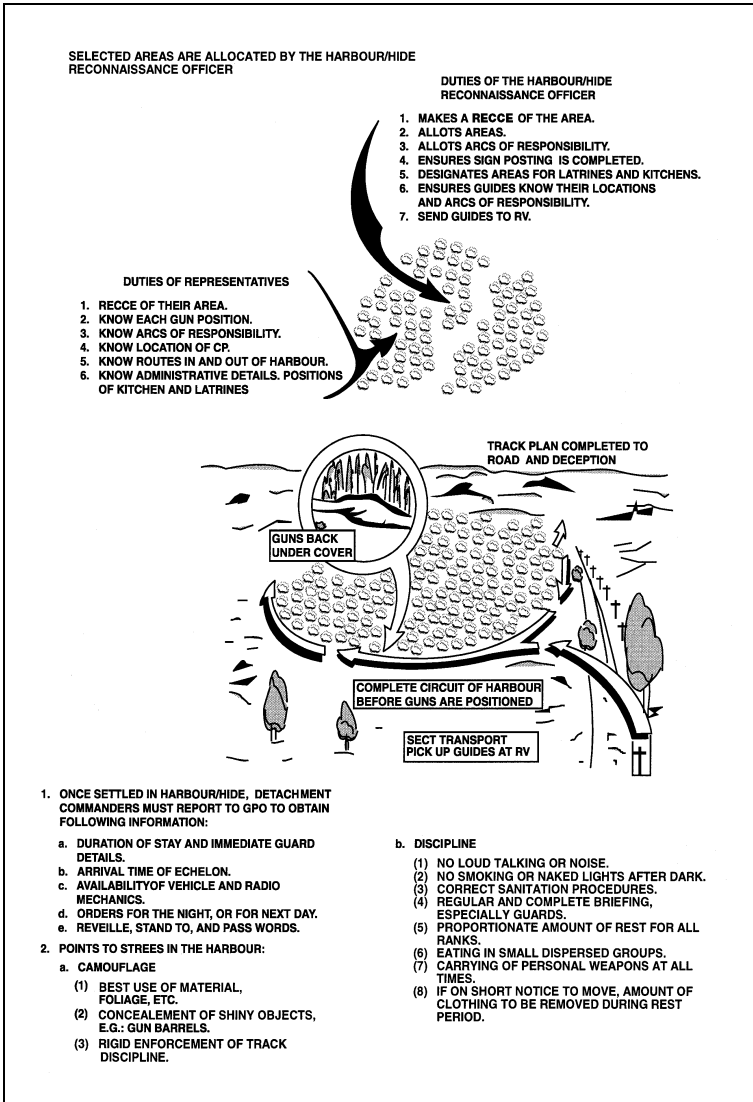


Figure 3 – 6 A Battery Harbour/Hide (Sheet 2 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
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HIDES

60. A hide is a tactical area that the battery can occupy prior to the occupation of a gun position. The criteria and the drills for the conduct of reconnaissance and occupation of a hide are the same as those used for a harbour. The difference between the two is their purpose; a hide is tactical whereas a harbour is administrative. A hide is usually occupied for a period of less than 24 hours. It may be advantageous, in certain tactical situations, to select gun platforms but not to occupy them until receipt of a Warning Order as follows:

- a. the guns deploy to a hide;
- b. reconnaissance of one or more gun positions is conducted as per normal; reconnaissance of the routes from the hide to the gun platforms is also conducted;
- c. upon receipt of a Warning Order, the guns move on to their gun platforms and conduct the fire mission; and
- d. upon receiving End of Mission, they then redeploy back to the hide.

61. **Harbour/Hide Reconnaissance Parties.** On administrative moves, it may be possible to use the normal reconnaissance party for harbour/hide reconnaissance. However, the battery reconnaissance party will often be fully occupied reconnoitring gun areas and a separate reconnaissance party, normally composed of an officer, guides and a protection party, is required.

62. Drills on reconnaissance of a harbour/hide are as follows:

- a. **Harbour/Hide Reconnaissance Officer** will:
 - (1) make a thorough sweep of the area to ensure it is clear of mines, booby traps and enemy;
 - (2) select and mark gun and vehicle positions;
 - (3) allot arcs of responsibility to each section and echelon;

- (4) designate areas for latrines, kitchen, etc.;
- (5) select routes in and out;
- (6) erect route signs in and out (optional);
- (7) ensure that the guides know the location of their section areas and the RV for crash harbour;
- (8) send guides to RV to meet the battery;
- (9) send the grid reference of the RV to the 2IC, RCPO and battery CP; and
- (10) prepare a local defence briefing to be given upon occupation.

b. **Guides** will:

- (1) after the briefing by the reconnaissance officer/TSM, proceed to the RV and guide vehicles into the harbour/hide;
- (2) indicate each vehicle position in the harbour/hide; and
- (3) notify the detachment commanders of the:
 - (a) section arc of responsibility,
 - (b) location of RV for crash harbour,
 - (c) location of the battery CP,
 - (d) routes in and out of the harbour/hide, and
 - (e) any administrative drills.

63. The **GPO** will, upon occupation:

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- a. post sentries;
- b. point out arcs of responsibility to each gun ensuring that arcs interlock;
- c. brief on any administrative details;
- d. ensure work is under way in accordance with priorities set out in SOPs; and
- e. implement the local defence plan.

DEPLOYMENT

SER	EVENT	BK	GPO	RECCE OFFR	RECCE TSM	DET COMDS	BSM	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1	Recv orders.		Conduct map recce, select gun RV, inform BK and Recce Gp of Wng O.					
2	Move to main CP for orders.			1. Conduct map recce. 2. Select and order bty recce RV. 3. Select and order gun gp RV, if not selected by GPO, and detail order of march.				
3	On recv orders.		Brief Det Comds and Ech Rep on Wng O. Order preliminary work to be carried out before mov i.e., packing ammo, cam taken down, etc.		1. Familiarize himself with recce plan. 2. Re-gp guides. 3. Estb comms. 4. Lead recce party to recce RV.	Brief det on orders.	1. Familiarize himself with recce plan. 2. Brief BQMS or ech rep. 3. Estb comms. 4. Join recce party or proceed to recce RV indep if nec.	
4	En route.			1. Report to 2IC, RCPO and Bty CP on regt net any obs and rtes around them and any suitable gun areas. 2. Remain alert for en air and grid activity. 3 Cfm suitability of the bty and recce RVs.				
5	On arr in new gun area.			1. Conduct an initial recce of the whole area and determine: a. if en or friendly tps are present; and b. determine the best bty posn in the area alloc. 2. If area not suitable report immed to 2IC and originator of the Mov O on regt net. (He must be prep to suggest suitable altn.)	1. Secur recce RV. 2. Posn sentry to warn of air or grd atk.			If en are in the area, Recce O will use recce party pers to secur the area, req add sp to secur the area or recommend a new area.
6	Recce Offr conducts recce.			1. Verify C of A and arcs of fire on the grd with a compass and map. 2. Check crest clr. 3. Ensure LTSDT can be reached from the posn. 4. Select posns for CPs, each gun, the ech and wagon lines if reqr. 5. Formulate local def plan and trk plans. 6. Rtn to recce RV or call recce party fwd. 7. Give dir to the BSM or Ech Rep and Recce TSM with regards to gen areas for: a. gun sects; b. bty CP; c. wagon lines if nec; and d. ech. 8. Outline local def plan incl digging and signing of rtes. 9. Instr Sigs Sgt on line laying.	Cfm grid with recce offr			

Figure 3 - 7 Reconnaissance and Deployment Sequence (1 of 3)

DEPLOYMENT

SER	EVENT	BK	GPO	RECCE OFFR	RECCE TSM	DET COMDS	BSM	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
7	Prep posn.			<ol style="list-style-type: none"> 1. Recce the allotted GP to incl: <ol style="list-style-type: none"> a. Selecting and marking gun platforms considering the fol: <ol style="list-style-type: none"> (1) crest clr, (2) firm, level gun platforms, (3) concealment, and (4) flash cover. b. Selecting posns for ammo vehs and recce party vehs. c. Ensuring area is clr of features and instls that are likely tgts for en arty fire. d. Ensuring that the area is readily accessible to sup vehs, particularly those carrying ammo. e. Ensuring a min 30 m (105 mm) and 50 m (155 mm) separation between gun platforms and the appropriate distance between sect, based on tac sits. f. Selecting posns for bty orientation device(s). g. Initiating the bty svy plan. 2. Brief Recce NCM on rte in, type of action. 	<ol style="list-style-type: none"> 1. Assist Recce Offr. 2. Estb track plan. 3. Brief guides on: loc of gun platforms, CPs, aiming circle(s), local def arcs, pri of work, type of action. 		Complete detailed recce of ech area.	Recce Sgt sets up dir and obtains CPFC data.
8	When posn is prep.			<ol style="list-style-type: none"> 1. Report to Ops O, 2IC, RCPO and BC when posn is prep. 2. Cfm the bty's order of march. 3. Select posn(s) of assy. 4. Verify orientation. 5. Verify CPFC data. 6. Check results of bty svy. 7. Pass bty cen and CPFC data to main CP ASAP. 8. Cont prep if ordered, to a higher degree. 				
9	Mov of the bty.		Implements Mov Os.		Departs for RV area with guides in time to meet guns on their arr at the RV.	Implements Mov Os.	BSM or guide departs to meet ech at RV.	Normally the gun gp moves in sect packets and does not halt at the RV.
10	Arr at RV.				<ol style="list-style-type: none"> 1. Ensure guides link up with guns and lead gun to posn. 2. Brief Sect Ldrs on trk plan, and the loc of the aiming circle(s) and CPs. 3. Give CFFC data to CP if not sent by radio prior. 			
11	Arr at new posn.	Coord and improve bty local def plan and supervise occupation as reqr.	<ol style="list-style-type: none"> 1. Ensure all preparation conducted prior to firing. 2. Familiarize himself with gun posn and assist with the passage of line, if nec. 	<ol style="list-style-type: none"> 1. Conduct passage of line. 2. Order check bg. As soon as the guns are laid in the C of A, the recce O shall order the det comd to record C of A indicating the method to be used. 3. Cfm with CP check bg completed. 	Assist in occupation and passage of line.	Supervise occupation of posn and preps for opening fire.		<ol style="list-style-type: none"> 1. Guides will brief det comds on: <ol style="list-style-type: none"> a. loc of bty/sect aiming circle; b. angle to dir if aval; c. C of A; d. loc def plan; and e. wagon line.

Figure 3 - 7 Reconnaissance and Deployment Sequence (2 of 3)

DEPLOYMENT

SER	EVENT	BK	GPO	RECCE OFFR	RECCE TSM	DET COMDS	BSM	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
12	On completion of occupation of new posn.	Brief GPO, BSM and Det Comd on detailed local def plan.	1. Ensure Det Comds place ni ROs and that the guns have recorded them if nec. 2. Conduct map recce of altn posn.	1. Order recce eqpt prep for next mov. 2. Recce altn area taking guides or 2ICs from each det.	Assist in recce of altn area.	1. Check orientation of guns. 2. Ensure night ROs are recorded if nec.	Recce ech altn area.	1. All pers to be briefed on: a. gen tac sit incl the posn of other sect and ech; b. local def plan; c. posn of assy; d. rtes; and e. routine. 2. Recce altn posn as soon as time permits.
13	Completion of recce of the altn.			Brief BK, GPO, TSM, Det Comds and BSM on altn area.	Ensure recce party ready for next mov.	Brief pers.	Brief ech pers.	If possible key pers should see altn posn.

Figure 3 - 7 Reconnaissance and Deployment Sequence (3 of 3)

SECTION 4 CREST CLEARANCE

GENERAL

64. The officer responsible for the preparation of the battery position must ensure that the guns are sited so that they can cover their arcs of fire down to the LTSdT.
65. In the engagement of targets, the GPO/CPO must ensure that the guns do not fire at such a QE that the projectiles will hit a crest.
66. For the purposes of this manual, a crest is any obstruction, either natural or artificial, on the trajectory, e.g., ground, buildings, trees and vehicles.
67. Crest clearance assessment will be based upon low angle fire; however, the availability of suitable gun areas may be so restricted as to compel the artillery commander to accept high angle fire for the engagement of a target along the LTSdT.

THE PROBLEM

68. In Figure 3-8, target T1 which lies on the LTSdT cannot be engaged safely because the QE to T1 is less than the QE required to clear the crest of C. Target T2 is clearly safe to engage as the QE to hit T2 is greater than that required to clear C.

DUTIES AT REGIMENTAL HEADQUARTERS
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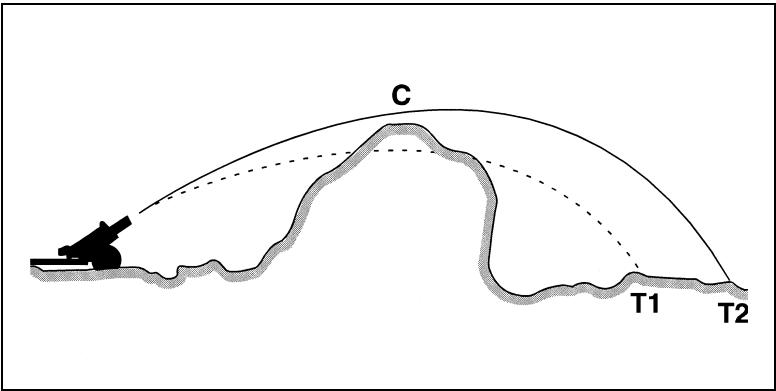


Figure 3 - 8 The Basic Crest Clearance Problem

69. The highest crest will not necessarily be the most critical; a lower crest near either end of the trajectory may present greater difficulty (see Figure 3-9). The points can be determined by a careful map study and the problem solved by the use of crest clearance tables.

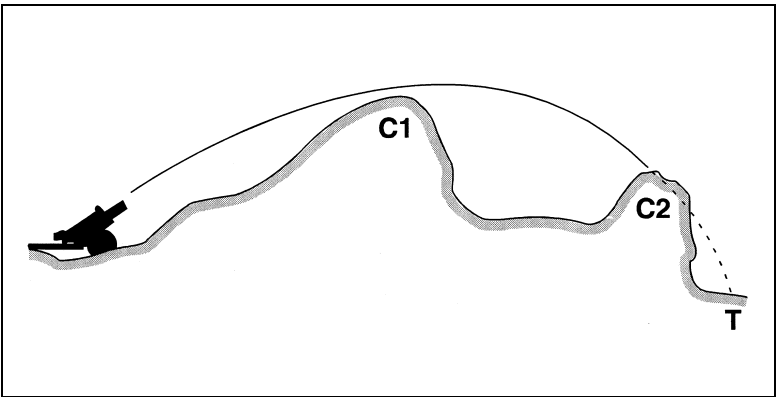


Figure 3 - 9 The Crest Clearance Problem — Second Crests

RESPONSIBILITIES

70. **Commanders.** Artillery commanders must consider crest clearance in their planning by conducting a thorough map study.

71. **Observers.** The BCs and FOOs shall:
- a. inform the CPs of the nature and height of any unusual obstacles such as trees, towers, or features in the OP area which may cause the actual altitude of these features to be significantly greater than those shown on the map; and
 - b. advise the supported arm of any areas of dead ground that are within the supported arms of interest. This information may be obtained from the CPs.
72. **Reconnaissance Officers.**
- a. **Regimental.** The 2IC, in his reconnaissance of the regimental gun area and in his selection and allocation of gun areas to each battery, is responsible for ensuring that those areas meet crest clearance criteria, particularly for visible crests.
 - b. **Battery.** The officer conducting the reconnaissance of the battery gun area shall:
 - (1) ensure the guns are able to engage the LTSDT by carrying out the procedure detailed later in this section; and
 - (2) provide the necessary data to the CPO on all crests visible from the position.
73. **CPs.**
- a. **RCPO.** When so ordered, the RCPO will order the batteries to prepare battery dead ground traces. The preparation of a battery dead ground trace is a laborious operation and should not be ordered unless absolutely necessary.
 - b. **GPO/CPO.** The GPO/CPO shall:
 - (1) ensure the battery position is suitable from a crest clearance point of view for crests visible

DUTIES AT REGIMENTAL HEADQUARTERS
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- from the gun position, if the reconnaissance officer has not already done so;
- (2) determine crest clearance data for the battery for crests within his allotted arcs of fire which are not visible from the gun position;
 - (3) ensure his guns never fire at a QE that would allow the projectiles to hit a crest; and
 - (4) prepare dead ground traces as ordered by the RCPO.

74. **Detachment Commander.** The detachment commander shall ensure that his gun does not fire if a local crest such as a tree, building or camouflage is visible through the bore.

**PROCEDURE TO DETERMINE IF A POSITION IS SUITABLE
FROM A CREST CLEARANCE POINT OF VIEW**

75. Examine the map within the arcs of fire assigned and short of the LTS DT and mark all crests which may pose a crest clearance problem. Note the bearings to those points from the proposed gun position.

76. Determine the minimum safe QE for each crest from the crest clearance tables using the lowest possible charge that will reach the LTS DT.

77. At the same bearing and using the same charge, determine the QE to hit the LTS DT. Corrections for non-standard conditions are not applied.

78. If the QE to the LTS DT is less than the minimum safe QE and the LTS DT cannot be engaged by any charge, then the position is unsuitable.

CREST CLEARANCE CALCULATIONS AND DEAD GROUND TRACES

79. The procedures to be followed in calculating crest clearance are covered in B-GL-306-008/FP-001, *Instruments*.
80. Traces showing dead ground from a particular battery position may be produced if required. These traces are time consuming to create and suffer from inevitable inaccuracies due to changing met conditions, etc.

SECTION 5 BATTERY SURVEY

INTRODUCTION

81. This section describes the survey procedures used within the battery. The procedures used by regimental survey parties are contained in B-GL-307-009/FP-001, *Theory of Survey*.
82. Battery survey is used to orient and fix the battery in relation to the map or grid in use.
- a. **Orientation.** The procedure of placing the guns of the battery on a common bearing.
 - b. **Fixation.** The procedure of establishing the position of the battery in relation to the map or grid in use.
83. Every survey procedure must incorporate a method of independent checking. The procedure must be such that it achieves a uniform degree of accuracy. The time available is always an important factor in deciding the procedure to use.
84. Special care must be taken to guard against mistakes in reading angles, measuring distances and computation. Results cannot be guaranteed unless all observations and computations are double checked so that mistakes may be disclosed and rectified. Common sense checks must be constantly applied. An accurate scale diagram should be prepared for ease of verification.

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

85. The accuracy of survey work is governed by the accuracy of field observations. The overall accuracy attainable depends primarily upon the inherent accuracy of the instruments used. Uniformity of the standard of accuracy of the instruments used is important. Uniformity of the standard of accuracy is essential within any one survey operation. If survey is to be carried out over a considerable distance, it is necessary to work to a higher standard of accuracy than for a short range scheme. For example, the use of a director and a stadia rod would give sufficient accuracy for a short distance measurement from an SCP/RSCP/PBL, but more accurate distance measuring would be required for a two- or three-station traverse.

86. One of the principal requirements of artillery survey is to produce results within a given time. The officer in charge of the survey task must bear in mind the ultimate accuracy required by the user and his equipment. The accuracy achievable will often be governed by the time available. Mistakes cannot be tolerated but when time is short, it may be necessary to choose a method with low inherent accuracy and improve upon it later.

ASSISTANCE PROVIDED BY THE REGIMENTAL SURVEY OFFICER

87. The RSO is responsible for providing regimental grid data to the degree ordered by the 2IC. The degree to which the regimental survey plan aids the batteries will depend upon the time available, the nature of the country and the tactical situation. The degrees of assistance that may be provided are as follows:

- a. **Conventional Survey Section:**
 - (1) **Minimum.** Orientation of a point in the gun area, normally the battery director.
 - (2) **Normal.** Orientation and fixation of one point in the gun area.
 - (3) **Maximum.** Orientation of the battery director and fixation of the battery centre.

b. **Position and Azimuth Determining System (PADS) Survey Section:**

- (1) **Minimum.** Orientation and fixation of a point in the gun area, normally the battery director.
- (2) **Normal.** Orientation of the battery director and fixation of the battery centre.

88. When data for a higher grid becomes available, the RSO shall issue it to each battery.

89. **Survey States.** The state of survey is normally sent to higher HQ, RCPO and the BC along with the report of READY. They are as follows:

- a. **State A.** All guns within the battery are not on common fixation and orientation.
- b. **State B.** All guns within the battery are on common fixation and orientation.
- c. **State C.** All guns in the battery are on common fixation and orientation and in sympathy with the regiment.
- d. **State D.** All guns in the battery are on common fixation and orientation and in sympathy with the regiment, with a higher degree of precision.

DEPLOYMENT

	ORIENTATION		FIXATION		REMARKS
	ORIGIN	REMARKS	ORIGIN	REMARKS	
A	PRISMATIC COMPASS	CARRIED OUT BY BTY RECCE	MAP SPOT OF BTY CENTRE	CARRIED OUT BY BTY RECCE	<ol style="list-style-type: none"> IF WORKING IN SECTIONS, POINTS 3 TO 5 APPLY BETWEEN SECTIONS UNTIL BATTERY SURVEY PLAN COMPLETED. NO GUARANTEE ON ACCURACY OF PREDICTED FIRE. NO GUARANTEE ON ACCURACY OF FIRE OF NON-ADJUSTING BATTERIES. INDIVIDUAL BATTERIES WILL PROBABLY REQUIRE ADJUSTMENT ON MULTI-BATTERY MISSIONS. REGISTRATION CORRECTIONS OR RECORDED TARGETS SHOULD NOT BE CIRCULATED OR ADOPTED IF RECEIVED FROM AN OUTSIDE SOURCE.
B	DIRECTOR COMPASS AT DIRECTOR POSITION	CARRIED OUT BY BTY RECCE	FIRM MAP DETAIL	<ol style="list-style-type: none"> CARRIED OUT BY BTY RECCE AS MANY LEGS AS REQUIRED MAY BE USED BUT FOR BEST ACCURACY SHOULD BE NO MORE THAN 2 OR 3 LEGS 	<ol style="list-style-type: none"> ALL GUNS WITHIN BTY ARE ON COMMON FIXATION AND ORIENTATION. AS FOR STATE A.
C	RSP	CARRIED OUT BY REGIMENTAL SURVEY SECTION	RSCP	MAX 2 LEGS FROM POINT	<ol style="list-style-type: none"> ALL GUNS WITHIN BTY ARE ON COMMON FIXATION AND ORIENTATION AND SYMPATHY WITH THE REGIMENT. PREDICTED FIRE RELIABLE WITHIN THE REGIMENT TARGET RECORDS, REGISTRATION AND ADJUSTMENT CORRECTION CAN BE CIRCULATED WITH THE REGIMENT.
D	RSP	CARRIED OUT BY REGIMENTAL SURVEY SECTION	RSCP	ON POINT	<ol style="list-style-type: none"> ALL GUNS WITHIN BATTERY ARE ON COMMON FIXATION AND ORIENTATION AND IN SYMPATHY WITH THE REGIMENT. PREDICTED FIRE RELIABLE TO THE LEVEL OF SURVEY CONTROL. TARGET RECORDS, REGISTRATION AND ADJUSTMENT CORRECTIONS ARE ALSO RELIABLE TO THE LEVEL OF SURVEY CONTROL. SURVEY ASSISTANCE SHOULD BE MAXIMUM.
<p>NOTE ORIENTATION AND FIXATION CAN BE AT DIFFERENT STATES.</p>					

Figure 3 - 10 Survey States

DUTIES WITHIN THE BATTERY

90. The GPO is responsible for ensuring that the guns of the battery are placed on a common grid and, when higher formation grid is received, for adopting it and issuing the new data when ordered.

THE SURVEY PLAN

91. The battery survey plan is part of the preparations for occupying a position. Time will be saved and confusion avoided if the plan is kept as simple as possible. The most important considerations in making the plan are the:

- a. amount of assistance to be expected from the regimental survey section;
- b. amount of time available; and
- c. time at which higher grid data may be expected in the gun area.

92. If higher grid data is not immediately available, the survey plan is implemented in two phases:

- a. the battery is fixed and oriented by the most accurate means in the time available; and
- b. a change of grid is carried out when more accurate data has been obtained. The procedure for conducting a change of grid is explained in Chapter 6, Section 4.

93. The battery survey plan, when completed, will include the:

- a. position of the battery director(s) and battery centre;
- b. method of orienting the director;
- c. method of passing orientation;

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- d. point of origin for fixation;
- e. method to be used in determining the grid reference of the point of origin; and
- f. method to be used in fixing the battery centre.

ESTABLISHING THE BATTERY GRID

94. The normal sequence for establishing a battery grid is as follows:
- a. the battery director is oriented and orientation passed to any other director(s) as required; and
 - b. the battery centre is fixed from a point of origin.
95. The procedures used to obtain this data are detailed in B-GL-306-008/FP-001, *Instruments*.

METHODS OF OBTAINING GRID BEARINGS FOR ORIENTATION

96. **Prismatic Compass.** This is the quickest but not the most accurate method of measuring a grid bearing, and is used primarily for checking against the possibility of a gross error. With practice, bearings can be read within 10 mils; however, the accuracy of the compass is 20 mils.
97. **Aiming Circle or Theodolite Compass.** When properly adjusted and calibrated, the aiming circle C2 or theodolite compass measure grid bearings to within five mils.
98. **Computed Bearings.** The accuracy of this method depends largely on the quality of the map in use and the method of computation used.

99. **Simultaneous Observations of a Celestial Body:**
- a. Using an aiming circle or theodolite, this method provides an accuracy of two and .6 mils respectively from the grid bearing used by the master station when outstations are within 26 km of the master station.
 - b. Sympathy is the primary advantage to this method, but clear weather and good communications are required.
 - c. This method is recommended when leap-frogging or stepping-up batteries and for alternate positions to maintain sympathy in orientation.
100. **SCP/RSCP.** The orientation accuracy obtained is that of the higher grid on which the Survey Control Point (SCP) or Regimental Survey Control Point (RSCP) has been established. In transferring the bearing from an SCP or RSCP to the position of the battery directors, provided there is no intermediate station, an accuracy of one mil (.2 mil using theodolite) is achieved. For each intermediate station used to carry the orientation, the accuracy depreciates by one mil (.1 mil with theodolite), e.g., with one intermediate station the guaranteed accuracy at the battery director is within three mils (.3 mils with theodolite) of the higher grid. The accuracy of a grid bearing depreciates by .1 mil every time a theodolite is set up over a station, e.g., if a survey plan has a total of four stations from start to finish, bearing depreciates by .4 mil.

DETERMINATION OF THE GRID REFERENCE OF A POINT OF ORIGIN

101. The following are methods for determining the grid reference of a point of origin:
- a. map spotting;
 - b. compass resection; and
 - c. SCP/RSCP.

DUTIES AT REGIMENTAL HEADQUARTERS
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102. Procedures for these methods are detailed in B-GL-307-009/FP-001, *Theory of Survey*. Accuracy for these methods are listed in Figure 3 -11.

METHOD	ACCURACY
MAP SPOT	1/50,000 MAPS - 100 M 1/25,000 MAPS - 50 M
COMPASS RESECTION AND TRACING PAPER RESECTION	1/50,000 MAPS - 100 M 1/25,000 MAPS - 50 M
RSCP	10 M EASTINGS/NORTHINGS 1/2 CONTOUR INTERVAL ALTITUDE
SCP	2 M EASTINGS/NORTHINGS/ALTITUDE

Figure 3 - 11 Accuracy Methods for Determining the Grid Reference of a Point of Origin

CPFC COLLECTION METHOD

103. Although it is essential that guns use the most accurate data possible, time will often not permit the use of the most accurate methods of collection. The following methods should be considered, in order of priority, as the accepted methods of collecting CPFC:

- a. the director compass and an infra-red distance measuring device;
- b. the director compass and a stadia rod;
- c. a prismatic compass and pacing; and
- d. a prismatic compass and computed distance using a map.

104. Procedures for these methods are detailed in B-GL-307-009/FP-001, *Theory of Survey*. Accuracies of linear measurements are listed in Figure 3 -12, and bearing accuracies are listed earlier in this section.

METHOD	ACCURACY
PACING	1/50
VERTICAL STADIA ROD	± 5 METRES - LESS THAN 200 METRES ± 10 METRES - FROM 200 TO 400 METRES
TAPING	ACCURACY 1/500
LASER AN/GVS-5A	± 10 METRES AT ALL RANGES
INFRA-RED DEVICE (TROOP RANGER)	1/1000
DISTOMAT DH-1000	1/10,000

Figure 3 - 12 Accuracies of Linear Measurement

FIXATION AND ORIENTATION OF THE BATTERY

105. Procedures for fixing and orienting the battery are detailed in B-GL-307-009/FP-001, *Theory of Survey*.

106. All resulting grid references must be plotted on the map and checked against map and ground details.

CHANGE OF GRID

107. The prime purpose of a change of grid is to place as many guns and targets as possible on the same grid, e.g., to place the batteries on a common grid by changing from separate battery grids to a regimental grid.

108. Full details of this procedure, including responsibilities and its application to target records are contained in Chapter 6.

SECTION 6 OCCUPATION OF THE GUN POSITION

GENERAL

109. Time available is the principal factor affecting the manner in which a gun position is occupied. The guns must be ready to fire in the new position at the time specified regardless of any other considerations.

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The time to be ready is established by the originator of the movement order after carefully considering the:

- a. urgency demanded by the tactical situation;
- b. distance of the move and the condition of roads and tracks;
- c. degree to which the gun position must be prepared;
- d. visibility and terrain;
- e. need to achieve surprise; and
- f. state of training.

110. This section describes standard procedures for the occupation of a gun position by day and night. In both these procedures it is assumed that there was sufficient time to do a proper estimate and prepare the position to the degree required before the arrival of the battery. It should be noted that the major differences in the two procedures are the degree to which the position is prepared for occupation and the amount of control maintained, e.g., the use of preliminary position and guides.

OCCUPATION SEQUENCE

111. The reconnaissance TSM will normally arrive at the battery RV before the arrival of the battery. When the guns arrive at the RV, the guns and CPs will be met by guides and the detachment commanders will be briefed by the reconnaissance TSM on the method of occupation, track plan, layout and any information particular to the position. In an SP battery, this may be done by radio; the RV could be a rolling RV. See Figure 3-7.

112. Accompanied by the guide, each gun will proceed via the track plan to the gun platform. The guide will brief the detachment commander on the layout of the position.

113. The officer designated to pass line goes to the main director to pass orientation. He should remain there until all guns visible from that

position have been ordered to record. The reconnaissance officer normally remains on the gun line to control the occupation.

114. The battery technical WO will set up the main CP and the technical sergeant will set up the alternate CP.

115. Each detachment commander shall direct his gun to its platform and put his gun into action as detailed in the applicable gun drill manual.

116. The GPO shall ensure that orientation is passed as soon as the first gun is in position. As soon as the guns are laid in the C of A, the GPO shall order the detachment commanders to record C of A using any combination of two aiming points in the following priority:

- a. collimator;
- b. aiming posts;
- c. distant GAP; and
- d. close GAP.

117. The detachment commander is responsible for selecting GAPs. If suitable GAPs are not available, or at his discretion, the reconnaissance officer should order the aiming posts be planted in areas to avoid confusion and the possibility of mistake.

118. The guns will always respond to calls for fire at any time. When one gun is recorded and the primary computing device is set up, and ammo is available on the position, the report of READY will be sent immediately by the CP to the BC, the FOOs, the RCPO and to the Ops O.

119. The GPO will check the orientation of each gun by prismatic compass to ensure battery parallelism.

120. At the first opportunity after the guns have been reported recorded, the GPO shall ensure that a check bearing and a quick sight test are carried out. The check bearing drill is conducted to ensure parallelism:

- a. as soon as possible after the C of A is recorded;

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- b. as soon as possible after the spades are embedded;
- c. at least once daily;
- d. before any programmed shoot;
- e. at first light after a night occupation;
- f. when there is a line error on a gun(s) which can not be found; and
- g. anytime the GPO determines it is necessary to check the guns for line.

121. When the battery reports ready the BK will brief the Battery Orders Group (O Gp) on the following:

- a. the local defence plan;
- b. locations for the crew served weapons;
- c. locations of other weapons;
- d. primary targets and other targets each detachment is responsible for in the local defence fire plan;
- e. locations of sentries and OPs/LPs, and responsibility for the following:
 - (1) mines,
 - (2) wire,
 - (3) the battle CP,
 - (4) feeding,
 - (5) ammunition resupply, and
 - (6) Casualty Collection Point (CCP); and

- f. at this time, the BK should also detail his priority of work. The following is a guide:
- (1) sentries are positioned;
 - (2) camouflage is completed;
 - (3) artillery and small arms ammunition are prepared as required;
 - (4) support weapons are deployed;
 - (5) fields of fire are cleared and range cards prepared;
 - (6) mines, wire and/or anti-intrusion devices are set out; and
 - (7) digging is started with the aim of achieving Stage 4.

122. All members are briefed on the tactical situation and the positions of assembly for both the advance and the withdrawal.

123. As soon as convenient after coordination, the BK shall conduct a rehearsal of the local defence plan.

124. Before last light, the GPO shall ensure that night ROs are established, that the guns record night GAPs and are, in all respects, prepared for night firing.

OCCUPATION IN REDUCED VISIBILITY

125. If possible, and just prior to last light, the gun area and the gun RV must be cleared to ensure that they are free of enemy. Outposts must be manned.

126. Before the guns arrive, the guides are dispatched to the preliminary position, which should be on the edge of the gun position.

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127. The reconnaissance TSM will meet the sections at the gun RV and lead them forward to the preliminary position.
128. From the preliminary position, the guides shall lead the vehicles individually to their positions following the established track plan.
129. On arrival at the gun platform, the guide will point out to the detachment commander the C of A, the location of the CP, the position of the director or aiming posts, the land line or line, the night picket and the wagon line.
130. If manually recording, the guide then gives the detachment commander the recorded angle to the director or the aiming posts. The detachment commander carries out the drill, dependent upon the method that is to be used, to place the guns in the C of A. Following are the manual methods of orienting the guns in reduced visibility:

a. **Director Method.**

- (1) With the director light on, the guns place their angles on the sight and lay on the director.
- (2) As soon as the guns are finished with the director light they will shine a flashlight through their sight, holding it there until they receive a new angle or the order RECORD AT _____.
- (3) When all the gun sights are illuminated, the director light is switched OFF and a second round of angles is taken and sent via the telephone to the CP and from there via line to the guns. If lines and radios are not available, a runner from each gun must be used. When runners are used, the reconnaissance officer will issue a written record.
- (4) The director light is switched ON after the round of angles is completed.

- (5) When the guns receive the second round of angles (if one is necessary), they will lay on the director with the new angle and, when finished, report to the CP.
- (6) The guns are then ordered to record the C of A.

b. **Aiming Post Method.**

- (1) The angle to the aiming posts is placed on the sight.
- (2) The gun is then laid on the aiming posts at the recorded angle. This orients the gun in the C of A.
- (3) The guns then record the C of A.

131. When the guns are laid in the C of A using the director method, the reconnaissance officer shall order them to record night GAPs, indicating the method to be used. Any combination of two of the following aiming points in order of priority are acceptable:

- a. aiming posts with lights;
- b. night picket; and
- c. collimator.

132. Ammunition vehicles or gun tractors may be removed from the gun position and camouflage completed as soon as possible.

133. The battery must be completely camouflaged by first light and any marking tape removed from the position.

134. Survey is improved and a check bearing is done at first light.

135. A local defence plan should be in place prior to the guns' arrival.

136. If the gun area has not been cleared prior to the guns' arrival, the BK should issue a clearing patrol task to be conducted at first light.

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

137. At first light, the GPO shall ensure that a check bearing drill is carried out and day GAPs recorded. This doesn't preclude the necessity for a check bearing drill to be done at night as soon as possible after the guns are recorded.

138. **Echelon.** The echelon will be met at the battery RV by the BSM, signals sergeant or guide, who will lead it into the position. The BSM shall supervise its occupation and initiate local defence and camouflage preparations. Additional guides may be used to lead individual vehicles to their positions during night occupations.

SECTION 7 LOCAL DEFENCE

GENERAL

139. The enemy threat will vary according to the level of intensity and the geographical area in which the operation is conducted. The deployment of the regiment and the characteristics of the local defence plan will be tailored to meet the threat.

140. In a mechanized, high intensity conflict, the enemy will likely attack on a broad front with leading elements mounted in armoured vehicles with good cross country and amphibious performance. His battle groups will attempt to penetrate our forward positions and gun areas to carry out exploitation in the rear. Infiltration by sizable enemy forces may occur unexpectedly and there will often be little warning of an attack. Potential enemies possess impressive counterbattery capabilities and their doctrine calls for maximum counterbattery fire for all but the smallest assaults. The siting of two or more batteries in the same area should be avoided since they would make an attractive target. Thus, the batteries are normally deployed independently and must rely on their own resources for local defence. There may be occasions when it will be necessary to locate RHQ with one of the batteries and it is then included in the defensive perimeter of that battery.

141. In certain conditions, fronts may be narrower and shallower. Available deployment areas will be fewer under these circumstances and batteries may be sited together, often in regimental gun areas.

142. In counterinsurgency operations, the primary threat will be from well-planned attacks by infantry, either by ambush, direct assault or sniping. Batteries may be sited independently, often in conjunction with a supported unit, in order to gain coverage over the area of operations.

143. In all cases, the defence of the gun area must be aggressive, determined and carefully coordinated. Reconnaissance parties and the battery must always be prepared to defend themselves from fighting patrols, from company-sized groups supported by tanks or from aircraft.

144. Camouflage, an important factor in local defence, is covered in Section 8.

THE PLAN

145. The reconnaissance officer, while conducting the reconnaissance of the battery gun area, must consider local defence of the position. After the technical requirements of siting the guns have been satisfied, the position must be such that all approaches can be covered against a ground or air attack.

146. The reconnaissance officer will formulate an initial plan for the local defence of the gun group. The BSM will plan and initiate it for the echelon area. As soon as possible, the BK will coordinate the local defence of the entire gun area, adjusting defensive deployments as necessary. It is important that this be coordinated prior to the arrival of the battery.

147. When the guns arrive, the detachment commanders will implement the plan on the gun position and the BSM or representative will implement it in the echelon area. Care must be taken to ensure mutual support between all parts of the battery and between the battery and any neighbouring units. The BK or GPO will order the priority of work on local defence tasks; the local patrolling routine if one is needed in the area, and plan the further development of defensive plans including trip flares, wire, mines, the clearing of fields of fire, etc. The BSM will assist in the development of these plans.

148. At each level, those responsible for local defence shall ensure that:

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- a. the plan is simple to implement and thorough rehearsals are conducted;
- b. orders are given to each detachment commander concerning:
 - (1) his local defence sector, flanking and supporting assets;
 - (2) ammunition to be used in the event of an attack by tanks;
 - (3) construction of range cards;
 - (4) maximum range to open fire;
 - (5) anti-aircraft drills;
 - (6) location of reference points;
 - (7) warning signals; and
 - (8) action on being attacked; and
- c. orders are given to all sentries and patrol commanders.

149. The local defence plan is recorded as a sketch map on which the following are shown as the plan is developed:

- a. prominent ground features and reference points;
- b. likely enemy approaches;
- c. the CPs, wagon line and ammunition pits;
- d. guns and their arcs of fire;
- e. weapon sites and arcs of fire;
- f. location of sentries and listening posts;

- g. protective trenches;
- h. wire, mines, trip flares, etc;
- i. arcs of fire and defences of other units in the immediate area; and
- j. priority of work, availability of defensive stores, arrangements with other units, method of alarm, etc.

150. A copy of the local defence plan shall be displayed in the CPs and in a secure location in the battery echelon area.

151. DFs for the defence of the battery area should be selected as soon as possible and forwarded as a target list to the RCPO.

BATTERY LOCAL DEFENCE RESOURCES

152. **The Guns.** The guns have an anti-armour capability of firing High Explosive (HE) or armour-defeating ammunition. If necessary, fields of fire will be cleared, but care must be taken not to prejudice concealment. The guns have an excellent capability as anti-personnel weapons firing HE or anti-personnel projectiles. On a report of enemy approaching the position, the senior officer present may order FIRE MISSION OPEN ACTION, to deal effectively with enemy on foot or in soft-skinned vehicles.

153. **Open Action.** There are two methods which may be employed for the engagement of targets using HE airburst in the direct fire role:

- a. fixed fuze setting method; or
- b. fixed charge method.

154. The difficulties likely to be experienced, especially at night, in setting time fuzes during a local defence engagement indicate that the fixed fuze setting method may provide a practical solution.

155. Regardless of the method used, gun data must be prepared. In the instances of an exact situation, e.g., a local DF, the GPO/CPO shall prepare the exact gun data in advance. Suggested methods are as follows:

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a. **105mm.**

(1) **Fixed Fuze Method:**

- (a) Fuze is 2.0 seconds;
- (b) Range in hundreds of metres minus two will be the charge to use, e.g., range 900 m, 9-2 use Charge Seven. Elevation will be found with firing table; and
- (c) For ranges under 300 m, use Charge One.

(2) **Fixed Charge Method:**

- (a) Charge is Charge One; and
- (b) One-half the range in hundreds of metres is fuze setting in seconds, e.g., Range 1 000 m, use fuze setting five seconds.

b. **155mm.**

(1) **Fixed Fuze Method:**

- (a) Fuze is 2.0 seconds;
- (b) Range in hundreds of metres minus 3 will be the charge to use, e.g., range 900 m, 9-3 use Charge Six. Elevation will be found with firing table; and
- (c) For ranges under 500 m, use Charge Two Green Bag.

(2) **Fixed Charge Method:**

- (a) Charge is Charge Two Green Bag;
and
- (b) One-half the range in hundreds of metres is fuze setting in seconds, e.g., Range 900 m, use fuze setting 4.5 seconds.

156. **Emergency Smoke Engagement.** If enemy fire is brought to bear against the gun position from close range, it may be possible to blind the enemy by firing smoke from one or more guns. In addition, it may be necessary to fire HE until the smoke becomes effective. The normal Anti-Tank (AT) sectors may be used to indicate the target. With reference to the example at Figure 3-13, the procedure is as follows:

- a. The GPO may go to one gun and direct it at the required point of origin.
- b. Detachment commanders control the firing of their guns and, at their own discretion, deliver additional rounds as and where required. For smoke rounds, normal laying need not be used. Guns may be directed at the desired point of impact by sighting along the barrel.
- c. The lowest charge shall normally be used for smoke rounds.
- d. When time fuzes are in use, they shall normally be set at the lowest setting that will accomplish ejection of the canisters clear of the gun position.
- e. If the screen is to cover the withdrawal of the battery, the BK shall decide which gun is to be the last to leave and shall personally control its fire. The GPO shall not wait for this gun before moving with the remainder of the battery. Each gun firing smoke should fire two rounds immediately on receipt of CEASE FIRING in order to ensure that the smoke persists for the time required to evacuate.

157. The safety of our troops in the vicinity must be fully considered.

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FIRE MISSION, NUMBER 1 AND NUMBER 2 DIRECT FIRE EMERGENCY SMOKE RIGHT SECTOR, STONE WALL PATROL NUMBER 1 SMOKE, CHARGE ONE NUMBER 2 HE, CHARGE SEVEN ENGAGE
NUMBER 2, CEASE LOADING NUMBER 2 EMPTY GUNS NUMBER 2 END OF MISSION NUMBER 2 CEASE FIRING
END OF MISSION, EMPTY GUNS CEASE FIRING

Figure 3 - 13 Orders for Smoke Engagement

158. **Anti-Tank Weapons.** These weapons are sited to cover mounted approaches not covered by the guns. An alternative method is to hold them in a central location and move them to prepared positions to strengthen a threatened sector. This method necessitates the preparation of more than one position for each weapon and a thorough knowledge and rehearsal of the routes to each position.

159. **Machine Guns.** Machine guns should be sited employing the following principles:

- a. fire in pairs for mutual support;
- b. deploy in defilade positions to provide enfilade fire;
- c. heavy machine guns are sited to exploit their anti-APC (Armoured Personnel Carrier) and anti-aircraft capability;

- d. other machine guns are sited to cover infantry approaches. They are normally sited on the flanks in order to cover the front and rear of the battery/section area and to ensure mutual support between the gun positions and the echelon. They may also be deployed in an anti-aircraft role.

160. **Personal Weapons.** These are sited in conjunction with the local defence plan so that all around defence is established. NCMs must be trained and proficient in the duties of an infantry section commander so that small arms fire can be controlled.

COMMAND AND CONTROL OF THE LOCAL DEFENCE BATTLE

161. The local defence battle at the gun position is commanded by the BK. When the guns are used in open actions, or anti-tank engagements, fire control is exercised by the senior officer present.

162. Control of the local defence battle is exercised from a battle CP designated by the BK.

ENGAGEMENT OF TARGETS WITH THE GUNS

163. The senior officer present engages targets which threaten the gun position using the open action procedure. When he decides that direct fire is likely to be the most effective, he may delegate control of the engagement(s) to:

- a. an officer controlling a section of guns; or
- b. individual detachment commanders.

164. When an attack may develop on the gun position, the BK/GPO orders either:

- a. PREPARE FOR TANKS (for armoured vehicle targets);
or

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- b. **PREPARE FOR OPEN ACTION** (for personnel targets).

165. The following action is taken:

- a. guns remain on their current tasks;
- b. all listening posts are manned;
- c. each gun detachment details a sentry to watch its own sector; and
- d. the appropriate ammunition is prepared.

166. Fire orders for the control of these fire missions are found in Chapter 4; a description of their detailed conduct is found in Chapter 5.

167. Airburst may be fired using two methods, fixed fuze settings for various charges or variable fuze settings for one charge.

MOVEMENT

168. **Reconnaissance Parties.** A protective element should be established in all reconnaissance parties. It should include automatic and anti-armour weapons. These weapons are deployed while the detailed reconnaissance is being carried out.

169. **Harbours and Hides.** Whenever the battery occupies a harbour, weapons must be sited to provide all around defence. The degree of local defence development will be dependent upon the length of the intended period of occupation.

170. **Moving.** Drills must be developed and practiced in the event that reconnaissance parties or the main body are ambushed or attacked from the air while on the move. These drills must be included in unit SOPs. Subjects which should be covered are:

- a. preparation of vehicles, including policy on tarpaulins and sand-bagging against mines;

- b. location of convoy and vehicle commanders and their duties;
- c. vehicle sentries, number and duties;
- d. briefing of drivers and vehicle commanders;
- e. action on contact;
- f. dismounting drills;
- g. use of indirect fire support; and
- h. counterattack.

SECTION 8 CAMOUFLAGE

GENERAL

171. Camouflage is the use of concealment and disguise to minimize the possibility of detection and/or identification.
172. Instructions on camouflage must be included in unit SOPs.

PRINCIPLES OF CAMOUFLAGE

173. **Choice of Position.** From the point of view of camouflage, the best position is one which offers flash cover, concealed routes and maximum cover from observation. A unit is thus first concealed and then is disguised in that concealed position.
174. **Camouflage Discipline.** Camouflage discipline involves the avoidance of revealing a position to the enemy by carelessness or by unnecessary changes to the natural surroundings. It must be strictly enforced as follows:
- a. Do not make changes to existing vegetation or previous construction. If changes are necessary, effect them in

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

- such a manner as to blend with the existing surroundings.
- b. Do not make fresh marks on the landscape. Use existing tracks, paths, roads and natural terrain features. If new routes are necessary and cannot be concealed, extend them to a logical location remote from the position. Once a track plan is established it must be rigidly followed. Sentries must advise visitors.
 - c. Hide all spoil or debris by covering it or disposing of it in a location where it does not reveal the position.
 - d. Conceal blast marks by covering them with camouflage nets, hessian or natural material.
 - e. Do not reveal the position by smoke, exposed reflective surfaces such as shaving mirrors, unnecessary light, excessive noise and equipment such as unpainted ammunition boxes left in the open.

175. **Disguise.** When it is impossible to fully conceal equipment, e.g., deployments in the open during the winter, effective use of camouflage materials will still enable the unit to disguise itself so that it cannot be identified as artillery.

CAMOUFLAGE MATERIALS

176. **General.** Camouflage construction is used to blend equipment and personnel with the surroundings; therefore, maximum use should be made of natural materials. Artificial materials similar to the surroundings are the next most valuable. Even when they differ from the surroundings, their use is still valuable in concealing the nature of the unit to the enemy.

177. **Natural Material.** This material provides the best camouflage as it matches local colours and textures. For best results, cut foliage must be matched to its surroundings and placed in a natural position with the tops upright, the tips of the branches out and the leaves with their upper surface uppermost. Care must be taken to hide signs of cutting by using lower branches from scattered trees or trees from the inside of copses and

by covering over stumps with soil. When natural camouflage begins to wither, it must be changed immediately.

178. **Artificial Material.** This material includes camouflage nets, wire netting, hessian, scrim and various types of camouflage/IR paints. The most commonly used item is the camouflage net, scrimmed to match the landscape and the season of the year. Camouflage nets may be erected in either of the following manners:

- a. **Draped.** A heavily scrimmed net is thrown over the vehicle or other piece of equipment that is to be hidden. By the use of small sticks, branches or surrounding trees, etc., the net is shaped to distort the outline of the equipment. This method is not suitable for guns as it allows no working space underneath. It is effective against vertical and high oblique air photography, air observation and to a more limited extent, low oblique photography and ground observation. To be effective, camouflage nets must be at least one metre about facility and extended to the ground.
- b. **Framework.** This method can be used with any other type of net and is best suited to towed artillery equipment. By means of poles and guy wires, the net is held taut over the equipment allowing work to be carried out beneath. It is effective against vertical and oblique air observation.

LEAVING A POSITION

179. Air photographs of a littered area may reveal to the enemy the type of weapon or equipment used by a unit, the approximate strength of the unit and the route by which the unit left the area. On leaving a position, spade and weapon pits should be filled, dumps and trenches closed and garbage hidden or destroyed.

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CHAPTER 4 FIRE DISCIPLINE

SECTION 1 INTRODUCTION

GENERAL

1. Fire discipline is the language of fire control. It consists of words, phrases, rules and conventions which have specific meanings and which result in some definite actions at the guns.
2. The aim of fire discipline is to ensure that in response to fire orders, appropriate action is taken at the guns, strictly in accordance with the intention of the originator and with the minimum of delay.
3. Throughout this chapter the term observer is used in its generic sense and is used to designate all originators of calls for fire. The GPO/CPO is responsible for the passage of fire orders to the guns and must edit and issue them so that they can be readily understood and carried out.
4. In many instances fire discipline cannot be separated from its associated actions without lengthy explanation of its employment. In this chapter will be found those orders and terms which are of general application. Other orders arising from special circumstances will be found in the appropriate places in other chapters of this manual or in the gun drill manual.

PROCEDURE FOR THE CONDUCT OF A FIRE MISSION

5. To minimize delay and to ensure that mistakes or omissions are readily detected, fire orders are given in a specific sequence. In the interest of speed, certain conventions are used in the passage of fire orders between the observer and the CPs. However, the GPO/CPO must invariably order all applicable details in full to the gun detachments as shown in Section 3. Certain ABCA and NATO nations may send fire orders in different sequence than that specified in this chapter; however, all essential elements will be included.

STAGES OF A FIRE MISSION

6. A fire mission will normally be conducted in the following stages:
- a. An initial call for fire is sent, indicating the guns that are required to take part in the fire mission, and where and when the opening round or rounds are to be fire.
 - b. Adjustment, if required, is carried out to the degree appropriate for the type of target and the time available.
 - c. Fire For Effect (FFE) is opened, adjusted if necessary, and continued for as long as circumstances warrant.
 - d. The target is recorded if required.
 - e. The fire mission is terminated.

**SECTION 2
ORDERS TO THE CP****CALL FOR FIRE**

7. The set of orders sent by an originator to carry out a fire mission is referred to as a call for fire. A call for fire takes precedence over all communications traffic on artillery nets and will be acted upon immediately.

8. The basic elements of a call for fire are:
- a. observer identification;
 - b. warning order;
 - c. location of target;
 - d. description of target;
 - e. method of engagement; and

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f. method of fire and control.

9. A full explanation of each of these elements is given in the succeeding articles of this section.

OBSERVER IDENTIFICATION

10. The observer will identify himself during the establishment of communications at the beginning of a fire mission, e.g., 2, THIS IS 21.

WARNING ORDER

11. The warning order is FIRE MISSION. The order FIRE MISSION is normally coupled with the number of guns or the size of the fire unit to engage the target. If less than a battery is required, the number of guns is specified by the observer.

12. If the observer does not name the specific fire unit to be used, it will be designated by the RCPO or GPO/CPO based on target description and the number of guns available. Examples are:

- a. FIRE MISSION;
- b. FIRE MISSION ONE GUN;
- c. FIRE MISSION TWO GUNS;
- d. FIRE MISSION THREE GUNS;
- e. FIRE MISSION LEFT SECTION/RIGHT SECTION;
- f. FIRE MISSION BATTERY;
- g. FIRE MISSION REGIMENT (or BATTALION when dealing with allied artillery whose basic unit is so named);

- h. FIRE MISSION ___ BATTERIES (the observer will indicate the number of batteries he requires for the mission);
- i. FIRE MISSION DIVISION;
- j. FIRE MISSION CORPS; and
- k. FIRE MISSION ALL AVAILABLE.

13. When an observer wishes to conduct two fire missions simultaneously with a battery, he may specify the guns to be used for each mission by ordering, 1, THIS IS 11, FIRE MISSION LEFT SECTION for the first mission and FIRE MISSION RIGHT SECTION for the second mission. If only FIRE MISSION THREE GUNS is ordered by the observer, the GPO/CPO will designate three guns and send a message to the observer, e.g., RIGHT SECTION.

LOCATION OF THE TARGET

14. **General.** This element of the call for fire gives the location of the target and, if adjustment is to be carried out, the direction of the line along which the observer will adjust the fire.

15. **Location of the Target.** This will be indicated by:

- a. grid coordinates, e.g., GRID 482 642, ALTITUDE 125;
- b. a target number or a known point, e.g., ZP 1242, REGISTRATION POINT ONE or LASER POINT 6000;
- c. a reference from a known point using a direction, target grid correction and an alteration in altitude if any, e.g., FROM ZT 1234, DIRECTION 1220, RIGHT 400, DROP 200, UP 20; and
- d. polar coordinates, i.e., direction, distance and an alteration in altitude if any, measured from the observer's location. For this type of target location, the alteration to altitude is understood to be in **mils** unless

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metres is specified. This method of target location will only be used when the position of the observer is known by the CP, e.g.:

- (1) DIRECTION 3170, DISTANCE 2800, DOWN 25;
- (2) DIRECTION 2860, DISTANCE 3000, UP 30 METRES; or
- (3) DIRECTION 3320, DISTANCE 3500, ALTITUDE 175 METRES.

16. **Altitude.** The altitude may be ordered by the observer. If it is not, it is determined at the CP from the map. For missions utilizing more than one battery, the adjusting battery is responsible for determining the altitude and circulating it to the other batteries and to the RCPO if applicable. **Metres** are understood unless another unit of measurement is specified or polar coordinates are used.

17. **Direction.**

- a. The direction ordered is normally the grid bearing and is sent as accurately as the instrument will permit (to a minimum of one mil) from the observer to the target, e.g., DIRECTION 1240.
- b. If the observer wishes to use the line GT as a reference line, he shall order it as DIRECTION GT.
- c. If direction is not ordered by an air observer, DIRECTION GT is understood. If a direction is ordered in degrees by an air observer, the CPO shall perform the necessary computations to convert it into mils. However, when using this procedure only magnetic degrees shall be sent, e.g. 130 DEGREES MAGNETIC.
- d. If the observer wishes to use an arbitrary reference line other than the line OT or GT, he shall order it in the normal way, e.g., DIRECTION 1440.

- e. If direction GT is ordered for missions utilizing more than one battery, the adjusting battery is responsible for determining the direction and circulating it to the other batteries and to the RCPO as applicable.

DESCRIPTION OF TARGET

18. The observer shall send a brief informative description of the target. This description is sent primarily for intelligence use by higher HQ. On occasion, it is used at artillery HQ and CPs to assist in determining the relative importance of the target and the type of ammunition and amount of FFE to be applied. The amount of detail included in the target description should be sufficient for such an assessment to be made when necessary. The description should be as accurate as possible and indicate any or all of the following target features:

- a. **Target Type.** The number of men, number and types of vehicles or the kind of material, e.g., INFANTRY COMPANY, EIGHT APCS, THREE TANKS.
- b. **Degree of Protection.** e.g., COMPANY IN OPEN, CONCRETE PILLBOX.
- c. **Size.** The size of a target is described in the following manner:
 - (1) **A Circle.** The radius is given, e.g., RADIUS 100. This method is also used for irregular shaped targets which are equated to a circular measurement which approximates their size.
 - (2) **A Line.** The total length and attitude of the target are reported. The attitude is the grid bearing of the target as accurately as possible, e.g., ATTITUDE 1855.
 - (3) **A Rectangle.** The length and width of the target in metres is reported, e.g., 200 BY 50. The attitude is the grid bearing of the longest side as accurately as possible.

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- d. **Target Activity.** e.g., ADVANCING,
WITHDRAWING, PREPARING TO MOVE.

19. Examples of complete target descriptions sent by an observer are as follows:

- a. THREE TANKS IN OPEN, RADIUS 150,
ADVANCING; or
- b. COMPANY DIGGING IN ALONG RIDGE, 800 X
200, ATTITUDE 1500;

20. The firing unit shall send a target engagement report including the grid reference and description to the next higher artillery HQ without delay.

21. Once a target has been recorded, the target description may be omitted from the initial sequence of orders.

METHOD OF ENGAGEMENT

22. **General.** Method of engagement is a collective term encompassing four items which shall either be specified in the fire orders or be the subject of a convention, i.e., a certain action automatically taken at the gun position in response to an observer's orders. The four items and their use is described below.

23. **Type of Engagement.** When a type of engagement is not given, the convention is that an Area Neutralization (AN) is required. The other types of engagement that may be ordered, some of which indicate the use of a special procedure, are as follows:

- a. **Registration.** Mission conducted to determine the total correction to Map Bearing and Map Range to compensate for non-standard condition.
- b. **Destruction.** The target shall be engaged for the purpose of destroying it.

- c. **Mark.** Rounds shall be fired for the purpose of identifying the zone of observation or indicating targets to ground troops, aircraft or fire support ships.
- d. **Danger Close.** The target is within 600 m of our own troops and special measures shall be taken to ensure troop safety.
- e. **Adjustment for Future Engagement.** To indicate that the fire mission is being adjusted for future engagement. Any of the following may be specified:
 - (1) ADJUSTING ZQ 5691; or
 - (2) ADJUSTING WITNESS POINT, ZQ 5679; or
 - (3) ADJUSTING LASER POINT, 5400 (if the laser point is a target it is prefixed by the alpha designator, e.g., LASER POINT ZT 5400).

24. **Trajectory.** Targets are engaged at low angle unless high angle is ordered by the observer.

25. **Ammunition.** The ammunition order shall specify the type of ammunition to be used in adjustment and in FFE and shall normally include an estimate of the volume required at FFE.

- a. **Type.** The type of projectile and fuze required in adjustment and in FFE is indicated as follows:
 - (1) **Projectile.** HE, ILLUMINATING, WP, DPICM, APICM or SMOKE (include colour if other than white).
 - (2) **Fuze.** VT, TIME, DELAY or CONCRETE PIERCING.
- b. The following conventions apply with respect to the observer's ammunition orders:

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- (1) When a type of ammunition is not specified, the GPO/CPO shall order HE quick to be used during adjustment and during FFE.
 - (2) When the type of ammunition required for adjustment differs from that to be used at FFE, it shall be ordered by specifying the type of ammunition in conjunction with the term IN ADJUSTMENT or IN EFFECT as applicable, e.g., WP IN ADJUSTMENT, VT IN EFFECT. When HE quick is to be used in either phase, it need not be specified.
 - (3) When extended range ammunition is required, the GPO/CPO shall cause it to be fired without further reference to the observer.
- c. The action to be taken on receipt of specific ammunition orders is illustrated in the following example:
- (1) **DELAY.** HE delay is fired during adjustment and FFE.
 - (2) **VT IN EFFECT.** HE quick is used in adjustment and VT is used in FFE.
 - (3) **WP IN ADJUSTMENT.** WP is used in adjustment and HE quick in FFE.
 - (4) **WP IN ADJUSTMENT, TIME IN EFFECT.** WP is used in adjustment and HE time in FFE.
- d. **Mixed ammunition orders.** The OP may order a mixture of ammunition to be used in FFE. This shall be ordered from the OP in the form of a percentage. Fifty (50) percent shall be the standard, e.g. 50 PERCENT VT IN EFFECT. In this instance, the GPO will fire HE with half the guns (left or right) and fire VT with the other half. If there is an odd number of guns, the ammunition first ordered will be fired by the majority of

the guns. If HE will be fired by convention, it will be considered as the first ammunition ordered.

- e. **Volume.** When planning the engagement of a target, the observer should estimate the number of rounds which will be required at FFE. This estimate is sent to the CP in the form __ ROUNDS in the initial call for fire. After adjustment, the number of rounds ordered in the opening sequence may be altered by ordering ROUNDS FFE. If no reference to volume of ammunition required is made in the initial call for fire, it shall be determined and ordered by the RCPO or GPO/CPO as applicable and reported in a message to observer. It shall be based on the description of the target and a consideration of the quantity and types of ammunition available.

26. **Distribution of Fire.** Targets are engaged with a converge fall of shot during adjustment and circular fall of shot with a standard radius of **30 m** for 105mm and **50 m** for 155mm at FFE unless a convention applies or one of the orders listed below is given:

- a. **CONVERGE.** Lines of fire are concentrated on a point.
- b. **PARALLEL.** Guns are fired with a common bearing and common elevation. The fall of shot will be similar to the deployment of the guns. This order should not be given when guns are deployed in disperse position.
- c. **CIRCULAR RADIUS.** This order is used when the observer wishes to change the standard radius of fall of shot. When ordered, the radius specified by the observer shall be used, e.g., CIRCULAR or CIRCULAR RADIUS __.
- d. **Special Procedures.** Special procedures concerning distribution of fire are applicable to the following types of fire mission and are described in Chapter 5:
 - (1) Linear,

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- (2) Deliberate Smoke,
- (3) Illumination,
- (4) RAAMS, and
- (5) DPICM, ICM.

METHOD OF FIRE AND CONTROL

27. **General.** The method of fire and control element of the observer's call for fire will indicate his intentions regarding:

- a. whether adjustment is to be made or fire delivered without adjustment;
- b. method of FFE; and
- c. time of delivery of fire.

28. **Adjustment.** Adjustment is the process of correcting the fire of guns onto the target. The order ADJUST FIRE is used to indicate that adjustment will take place. The following conventions and orders shall be used.

- a. **Selection of the Adjusting Fire Unit.** When the observer wishes to designate the adjusting fire unit, he shall do so by coupling the unit identification with the order ADJUST FIRE, e.g., 2, ADJUST FIRE. In the case of a regimental mission when the observer does not designate an adjusting battery, it shall be designated by the RCPO.
- b. **Selection of the Adjusting Gun(s).** On the order ADJUST FIRE, the GPO/CPO shall order a single gun to be used in adjustment. To specify a particular gun or guns to be used in adjustment, the observer shall prefix ADJUST FIRE with one of the following terms (see Figure 4-1):

- (1) **NUMBER (named gun).** The named gun shall be used for adjustment.
- (2) **TWO (or more) GUNS.** The number of guns named shall be used for adjustment. When more than one gun is used for adjustment, the GPO/CPO shall ensure that they fire simultaneously or properly sequenced by ordering **AT MY COMMAND.**

SER	OBSERVER'S ORDER	CPO'S ORDER TO THE GUN DETACHMENTS
(a)	(b)	(c)
1	ADJUST FIRE	NUMBER 3 ADJUST FIRE
2	NUMBER 2 ADJUST FIRE	NUMBER 2 ADJUST FIRE
3	TWO GUNS ADJUST FIRE	NUMBER 3 AND 4 ADJUST FIRE (NOTE)
4	LEFT/RIGHT SECTION ADJUST FIRE	NUMBER 4, 5 AND 6 ADJUST FIRE, OR NUMBER 1, 2 AND 3 ADJUST FIRE
5	BATTERY RIGHT/LEFT ADJUST FIRE	BATTERY RIGHT ADJUST FIRE, OR BATTERY LEFT ADJUST FIRE
NOTE GPO/CPO should select sequentially numbered guns.		

Figure 4 - 1 Example Orders for Designating the Adjusting Gun(s)

c. **Changing the Adjusting Gun(s).**

- (1) The observer may change the gun(s) in adjustment or the number of guns in adjustment by giving any of the appropriate orders shown in Figure 4-1.
- (2) To avoid delay, the GPO/CPO may change the adjusting gun(s) without reference to the observer except:
 - (a) when the observer has named the adjusting gun(s);
 - (b) a danger close mission;

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- (c) registration;
 - (d) laser point; or
 - (e) destruction.
- d. **Firing the First Round in Adjustment.** ADJUST FIRE is the executive order to fire the first round in adjustment unless AT MY COMMAND is in effect.
- e. **Reversion to Adjustment.** The observer may revert to adjustment at any time by use of the term ADJUST FIRE, prefixed as necessary with one of the terms shown in Figure 4-1.
- f. **Reporting Adjusting Gun(s).**
- (1) The number of the adjusting gun(s) coupled with the Time of Flight (TOF) shall be reported to the observer on the initial report of SHOT, e.g., SHOT FOUR, 24.
 - (2) When firing in sequence, the firing of the guns shall be reported individually, e.g., SHOT ONE, SHOT TWO, etc. If it is the first round to be shot, the firing of the guns shall be reported individually with the TOF being coupled with the first gun only. E.g., SHOT 1, 24; SHOT 2, etc.
 - (3) When the adjusting gun is changed, the number of the new adjusting gun shall be reported to the observer, e.g., SHOT FOUR.
 - (4) If AT MY COMMAND (AMC) is in effect, the CPO will report READY with the TOF and, on the order FIRE, will report SHOT with the adjusting gun, e.g., READY 24, SHOT 1.

29. **Fire For Effect.** FFE shall be ordered by the observer using the orders shown below. Each of these orders is an executive order to fire

unless AT MY COMMAND is in effect. The action to be taken on receipt of these orders is as follows:

- a. **ROUNDS FFE.** The number of rounds ordered will be fired, as quickly as possible or at the interval ordered, by each gun taking part in the engagement.
- b. **FFE.** The number of rounds specified in the initial call for fire or authorized in the message to observer shall be fired, as quickly as possible or at the interval ordered, by each gun. When the observer has ordered ROUNDS FFE and subsequently orders FFE, the number of rounds specified in the initial call for fire or authorized in the message to observer shall be fired, less the number of rounds previously fired on the order ROUNDS FFE. If events prove that the target requires more FFE than was originally ordered by the observer in the initial call for fire or authorized in the message to observer, he shall order an additional amount in the form __ ROUNDS FFE. (If the original amount was subject to authorization or modification, then any subsequent requests for fire may be subject to the same.)
- c. **TIME ON TARGET (TOT).** See paragraph 29b above.
- d. **CONTINUOUS FIRE.** Guns will continue to fire until fire is suspended by the order CEASE LOADING, CHECK FIRING or the fire mission is terminated. This order is normally coupled with an interval.
- e. **CONTINUOUS ILLUMINATION.** Guns will continue to fire at the interval ordered by the observer or determined by the CP, in order to provide uninterrupted illumination over a target or specified area.
- f. **COORDINATED ILLUMINATION.** The fire of the illuminating gun is coordinated to provide illumination of the target area only at the time required for adjustment of HE.

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30. **Timing of Delivery of Fire.** The orders ADJUST FIRE, FFE, ROUNDS FFE constitute executive orders to fire and the GPO/CPO will fire as soon as ready unless the observer controls the timing of the delivery of fire by one of the following:

- a. **AT MY COMMAND.** When it is required to control the moment of firing, the order AT MY COMMAND may be used. The guns of a fire unit shall report READY and shall not fire until given the order FIRE. If AT MY COMMAND is cancelled before the report of ready is sent, the fire unit shall fire when it is ready.
- b. **TOT.** TOT coupled with a time, e.g., TOT 0710 HOURS, is an executive order to fire and means that the first rounds are to arrive at the target at the time ordered. The GPO/CPO shall subtract the Time of Flight (TOF) from the TOT and order the guns to fire at the appropriate moment. By convention, all scheduled targets on a fire plan are TOT.
- c. **Sequence.** Guns shall fire individually except:
 - (1) when the procedure calls for simultaneous firing, e.g., when adjusting with more than one gun; and
 - (2) when BATTERY RIGHT (LEFT) is ordered. This order indicates that the observer requires each gun engaged in the fire mission to fire in succession from the right or left as ordered, e.g., THREE GUNS BATTERY RIGHT ADJUST FIRE or BATTERY RIGHT ONE ROUND FFE.
- d. **Interval.** Guns normally fire as quickly as possible, however, an interval may be ordered for the purpose of separating successive rounds. It shall always be expressed in seconds.
 - (1) **BATTERY RIGHT (LEFT).** The order _____ RIGHT/LEFT when prefixed by a

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fire unit will cause that unit to fire its sub-units in numerical ascending (RIGHT) or descending (LEFT) order with an interval of five seconds unless an interval has been ordered. At battery level, a sub-unit refers to a gun. **BATTERY RIGHT/LEFT 10 SECONDS ADJUST FIRE/ONE RD FFE** will cause the guns of the battery to fire in succession with the appropriate interval. The order **REGIMENT RIGHT ONE RD FEE/ADJUST FIRE** will cause C/S 1 (complete) to fire, five second interval, followed by C/S 2 (complete), five second interval, followed by C/S 3 (complete), etc.

- (2) **FFE.** The interval ordered is the time between successive rounds fired by each gun, e.g., **THREE ROUNDS FFE, TWO ZERO SECONDS.** A change of interval may be effected during FFE by orders for a new interval, e.g., **THREE ZERO SECONDS.** The new interval shall be applied immediately and shall cancel the previous interval.
- (3) **FOLLOWED BY.** When the observer wishes to indicate that a change in the rate of fire is to take place automatically during FFE, he may order **FOLLOWED BY**, e.g., **THREE ROUNDS FOLLOWED BY EIGHT ROUNDS FFE, THREE ZERO SECONDS.** In the above example, four rounds are fired as quickly as possible and subsequent rounds are fired with a 30-second interval.
- (4) **CONTINUOUS ILLUMINATION.** The interval ordered is the time between successive rounds fired by each gun. If no interval is given by the observer, it shall be determined by the CP based on half the burning time of the illuminant in use.

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- (5) **COORDINATED ILLUMINATION.** The interval shall be ordered by the observer and is the time between the firing of the illuminating and HE rounds. Allied observers may use AT MY COMMAND to control this interval.

- (6) **Cancellation of Interval.** The interval shall be cancelled by:
 - (a) the order CANCEL INTERVAL;
 - (b) an order for a new interval; or
 - (c) a new order for FFE.

RECORDING THE TARGET

31. The observer may order the target recorded, e.g., RECORD AS TARGET or RECORD AS ZP 4932. As soon as the data from the guns has been compared with the data in the CP, the GPO/CPO shall report the target recorded to the observer, e.g., ZP 4932 RECORDED. If at a later time it is necessary to upgrade a target, it shall be ordered in the following manner: REFERENCE ZP 4932 RECORD AS ZT 4932.

END OF MISSION

32. A fire mission shall be terminated by the order:
- a. END OF MISSION; or
 - b. TANK ALERT.

33. The GPO/CPO shall inform the RCPO that the fire mission has been terminated. He shall send an availability report (will include: available, target result and ammo expended), unless it was a fire mission regiment, in which case only the ammunition expended will be sent.

SEQUENCE OF SENDING THE INITIAL CALL

34. The sequence in which the observer sends his initial call for fire is shown in Figure 4-2.

MESSAGE TO OBSERVER

35. **General.** On receipt of a call for fire from the observer, the RCPO or GPO/CPO as applicable, shall comply immediately with all details unless:

- a. there are restrictions on the number of guns or the types and quantities of ammunition available;
- b. the observer has omitted any of the essential elements referred to in Figure 4-2; or
- c. the observer is not authorized to fire the number of guns he has stated in his call for fire.

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SER	SEQUENCE OF THE ELEMENTS OF THE OBSERVER'S CALL FOR FIRE	EXAMPLE
(a)	(b)	(c)
1	Observer's Identification	3, THIS IS 32
2	Warning Order	FIRE MISSION BATTERY
3	Location of Target	GRID 158 346, ALTITUDE 150
4	Direction	DIRECTION 1240
5	Description of Target	MG, DUG IN WITH OHP RAD 25
6	Type of Engagement	ADJUSTING ZR 2230
7	Trajectory	HIGH ANGLE
8	Ammunition	DELAY IN EFFECT, THREE ROUNDS
9	Distribution of Fire	CONVERGE
10	At My Command	AT MY COMMAND
11	Method of Adjustment or Order for FFE	ADJUST FIRE
NOTE		
Elements which are in boldface type must be included in the initial sequence of orders .		

Figure 4 - 2 Observer's Sequence for the Initial Call for Fire

36. **Procedure.** Under any of the circumstances listed in the previous paragraph the RCPO or GPO/CPO, as applicable, shall send a message to the observer which shall contain some or all of the four elements shown below:

- a. **Guns or Batteries to Fire.** These elements shall indicate the number of guns assigned to engage the target. Below battery level, it shall be specified as the number of guns, e.g., THREE GUNS. At battery level or above, as the number of batteries or call signs, e.g., BATTERY, 1 AND 2, TWO BATTERIES, REGIMENT, etc. This element needs to be included only when:
 - (1) the observer has not indicated in his warning order the number of guns he required, e.g., FIRE MISSION;

- (2) the observer's requirement for guns specified in his warning order, e.g., FIRE MISSION REGIMENT, or FIRE MISSION BATTERY, etc., cannot be met; or
- (3) the observer is not authorized to fire the number of guns or batteries he has stated in his call for fire.

- b. **Projectile or Fuze Combination.** This element shall indicate the type of ammunition to be used in FFE. It needs to be included only when the observer's requirements for projectile or fuze cannot be met. When the observer omits any reference to projectile or fuze, the GPO/CPO shall order HE QUICK to be used and no reference to the type of ammunition shall be included in the message to observer.
- c. **Number of Rounds for FFE.** This element shall indicate the quantity of ammunition to be used at FFE. It shall be specified as a number of rounds per gun in the form __ ROUNDS. This element needs only to be included when the:
 - (1) observer did not specify his requirement in his initial call for fire; or
 - (2) observer's requirement cannot be met.
- d. **Target Number.** This element shall be included when the CP decides, based on the target description, to allot a target number. When the CP has not allotted a target number, the observer may still order the target recorded. The inclusion of a target number in the message to observer is decided by the CP concerned. Normally, the target number shall be omitted from the message to observer for fire missions at the battery level and below. (It should be noted that some allied nations allot a target number in the message to observer for every fire mission.)

37. **Examples of Message to Observer.**

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- a. **When all elements are necessary :**
 - (1) REGIMENT, WP, THREE ROUNDS, ZT 1462; and
 - (2) 1 AND 2, TIME, EIGHT ROUNDS, ZT 5862.

- b. **Projectile or Fuze Combination and Number of Rounds:**
 - (1) TIME, SIX ROUNDS (the observer had ordered VT, and none was available); and
 - (2) WP, EIGHT ROUNDS.

- c. **Projectile or Fuze Combination:**
 - (1) HE (the observer had ordered DPICM and none was available);
 - (2) TIME; and
 - (3) WP.

- d. **Guns or Batteries to Fire and Number of Rounds:**
 - (1) 1 AND 2, SIX ROUNDS;
 - (2) REGIMENT, EIGHT ROUNDS,
 - (3) THREE GUNS, EIGHT ROUNDS (the observer had ordered battery and four rounds); and
 - (4) TWO BATTERIES, THREE ROUNDS.

- e. **Guns or Batteries to Fire, Projectile or Fuze Combination and Number of Rounds:**
 - (1) REGIMENT, VT, SEVEN ROUNDS;

- (2) 1, WP, FIVE ROUNDS;
 - (3) BATTERY, TIME, FOUR ROUNDS; and
 - (4) TWO GUNS, QUICK, EIGHT ROUNDS (the observer ordered VT and none was available).
- f. **NOT AVAILABLE.** When the unit or sub-unit concerned is unable to accept the observer's call for fire, it shall report NOT AVAILABLE coupled with an explanation. However, the fire orders must be relayed to the next higher artillery CP so that some other fire unit may be allotted.

CALL FOR FIRE ORIGINATING AT AN ARTILLERY HQ

38. Calls for fire originated by a HQ outside the regiment are similar to other calls for fire. These targets are often engaged without adjustment.
39. Examples of calls for fire from a divisional artillery HQ follow:
- a. FIRE MISSION REGIMENT
ZU 2714
VEHICLE CONCENTRATION 100 X 200
HIGH ANGLE
VT, FIVE ROUNDS
TOT 1325 HOURS.
 - b. FIRE MISSION DIVISION
GRID 892 124
AMMO DUMP 200 X 200
FIVE ROUNDS FFE.
40. When answering calls for fire of this nature, a message to observer (originator) is not necessary unless guns or ammunition are not available.

SECTION 3 ORDERS TO THE GUNS

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

GENERAL

41. Orders to the guns contained in this section refer to those given by the GPO/CPO.

GPO’S SEQUENCE OF INITIAL ORDERS

42. The GPO’s sequence of initial orders to the guns is as shown in Figure 4-3.

SER	GPO’S SEQUENCE OF INITIAL ORDERS	EXAMPLE ORDER TO THE GUNS
(a)	(b)	(c)
1	Warning Order	FIRE MISSION BATTERY
2	Type of Engagement	ADJUSTING ZT 2015
3	Trajectory	HIGH ANGLE
4	Ammunition	HE, TIME, CHARGE 4, PREPARE 3 ROUNDS PER GUN
5	Converge	CONVERGE. NUMBER 1 (Note 1) LEFT 6, NUMBER 2 LEFT 3, etc.
6	Bearing	BEARING 0568
7	Quadrant Laying	QUADRANT LAYING
8	Gun Correction	GUN CORRECTIONS (Note 1) NUMBER 1 PLUS 2, NUMBER 1 MINUS 3, etc.
9	Fuze Correction	FUZE CORRECTIONS, NUMBER 1 LENGTHEN 0.2, etc. (Note 1)
10	Fuze Setting	FUZE, NUMBER 1 26.2, NUMBER 2 27.2 etc.
11	Load (Note 2)	NUMBER 3 LOAD
12	At My Command	AT MY COMMAND
13	Elevation	ELEVATION 868.0
14	Method of Adjustment or Order for FFE	NUMBER 3 ADJUST FIRE
15	Description of Target	MGs
NOTES		
1. For manual systems only.		
2. Load may be ordered at any time providing necessary ammunition orders have been issued.		

Figure 4 - 3 The GPO’s Sequence of Initial Orders

43. The orders in boldface type **must** always be included in the GPO’s sequence of initial orders. Orders not in bold are ordered only as required.

44. A full explanation of each of these elements is given in the succeeding articles of this section.

WARNING ORDER

45. The warning order is FIRE MISSION and is given together with the number of guns required in one of the forms shown in Figure 4-4.

SER	OBSERVER'S ORDERS	GPO'S/CPO'S ORDERS
(a)	(b)	(c)
1	FIRE MISSION	FIRE MISSION BATTERY
2	FIRE MISSION ONE GUN	FIRE MISSION NUMBER 3 (OR 4)
3	FIRE MISSION TWO GUNS	FIRE MISSION NUMBER 3 AND 4
4	FIRE MISSION THREE GUNS	FIRE MISSION NUMBER 2, 3 AND 4
5	FIRE MISSION RIGHT SECTION/LEFT SECTION	FIRE MISSION NUMBER 1, 2 AND 3
6	FIRE MISSION BATTERY	FIRE MISSION BATTERY
7	FIRE MISSION REGIMENT THREE GUNS	FIRE MISSION NUMBER 1, 2 AND 3
8	FIRE MISSION REGIMENT (BATTALION)	FIRE MISSION REGIMENT
9	FIRE MISSION TWO REGIMENTS	FIRE MISSION TWO REGIMENTS
10	FIRE MISSION DIVISION	FIRE MISSION DIVISION
11	FIRE MISSION ALL AVAILABLE	FIRE MISSION BTY

Figure 4 - 4 Example Warning Orders to the Guns

TYPE OF ENGAGEMENT

46. When a special type of engagement is required, the GPO/CPO shall order it to the guns in the same form as received from the observer, i.e.:

- a. REGISTRATION;
- b. MARK;

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

- c. DANGER CLOSE;
- d. ADJUSTING _____ (target number: ZT4320); or
- e. DESTRUCTION.

TRAJECTORY

47. Targets are engaged at LOW ANGLE unless HIGH ANGLE is ordered by the GPO.

AMMUNITION

48. **General.** When engaging a fire mission, the GPO/CPO shall select the propellant and charge most suitable unless the charge is specified by the RCPO.

49. **Ammunition Orders.** The particulars of projectile, fuze, propellant and charge shall be ordered by the GPO/CPO to the guns as follows (see Figure 4-5):

- a. The projectile shall be ordered by type and description (including model number, weight and lot) as necessary, e.g., HE, DPICM, WP, RAAMS LONG/SHORT, ILLUMINATING, SMOKE (including colour if other than white), HESH.
- b. The fuze shall be ordered as the fuze action required, i.e., QUICK, DELAY, TIME or VT. When more than one model of a particular fuze is available on the gun position, the fuze model will be specified, e.g., TIME M582, TIME M564. The fuze action is not required when BE smoke or illuminating is ordered.
- c. The type of propellant shall be ordered if more than one type is available on the position, e.g., GREEN BAG, WHITE BAG or RED BAG. If more than one lot number is available on the position then the lot number

FIRE DISCIPLINE

will be ordered after the type, e.g., WHITE BAG PCV
8214-6406 CH 5.

- d. The charge shall be ordered by specifying the charge
number or type, e.g., CHARGE ONE, CHARGE
SEVEN.

FIRE DISCIPLINE

SERIAL	PROJECTILE			
	TYPE	DESCRIPTION		
		MODEL NO.	WEIGHT	LOT
(a)	(b)	(c)	(d)	(e)
1	HE	M107		
2	HE	M1		
3	HE	M1		
4	ICM	M483A1	4 Square	CA3-5A
5	RAAMS/LONG	M718	(Note 1)	
6	RAAMS/SHORT	M741	(Note 1)	
7	ADAM/LONG	M692	(Note 1)	
8	ADAM/SHORT	M731	(Note 1)	
9	ILLUMINATING	M485		
10	ILLUMINATING	M485		
11	WP	M110		
12	SMOKE GREEN	M116		

1. RAAM and ADAM projectiles are approximately 7.5 squares above the standard weight.
2. Propellant need not be given when charge alone is sufficient to identify it. See for example

Figure 4 - 5 Examples of GPO's Ammunition Orders to the Guns

50. **Orders for Preparation of Ammunition.** When the GPO/CPO receives an indication of the type or quantity of ammunition required in FFE, he shall order the guns to prepare the required ammunition by ordering PREPARE __ ROUNDS __ PER GUN, e.g., PREPARE EIGHT ROUNDS, HE, QUICK, CHARGE SEVEN PER GUN. If the ammunition in FFE is to be the same type as that being used in adjustment, it need not be specified again. For example, the GPO/CPO, having previously ordered HE QUICK, may later order PREPARE SIX ROUNDS PER GUN.

LOAD

51. After the details pertaining to adjustment or FFE have been received, the GPO/CPO may order LOAD at any time providing the orders pertaining to ammunition have been issued.

CONVERGE

52. In his initial orders to the guns the GPO/CPO may order a convergence, e.g., CONVERGE LEFT SIX, or CONVERGE, NUMBER ONE LEFT SIX, NUMBER TWO LEFT THREE. Converge is cancelled by the order CANCEL CONVERGE or by a new convergence.

BEARING

53. In his initial orders to the guns the GPO/CPO shall order a bearing, e.g., BEARING 6012.

54. For subsequent alterations to bearing, the new bearing shall be ordered in the same form as the original one, e.g., BEARING 6070. When individual guns of the battery are being fired at different bearings, alterations may be ordered as right or left, e.g., BEARING, RIGHT TWO. If the use of right or left alterations is likely to cause confusion, the GPO/CPO must order a new bearing for each gun.

55. The ordering of a new bearing to the gun in the form BEARING 6050 cancels the previous bearing.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

QUADRANT LAYING

56. The order QUADRANT LAYING shall be given by the GPO/CPO after bearing, if it is included in the observer's call for fire. On receipt of this order, the guns shall be laid using the gunner's quadrant. If ordered by the observer after firing has commenced, the GPO/CPO shall order REPORT QE, e.g., QUADRANT LAYING, REPORT QE.

GUN CORRECTION

57. In his initial orders, the GPO/CPO may order a gun correction in one of the following forms:

- a. GUN CORRECTION, NUMBER ONE PLUS TWO, NUMBER TWO MINUS EIGHT etc.; or
- b. GUN CORRECTION, PLUS FIVE (when the same correction is applicable to all guns).

58. When the gun correction requires changing, the GPO/CPO may order the change by issuing fresh gun corrections or by ordering RAISE or LOWER, e.g., GUN CORRECTIONS, LOWER TWO.

FUZE CORRECTIONS

59. Fuze corrections are ordered by the GPO/CPO in the form LENGTHEN (SHORTEN) ___, e.g., FUZE CORRECTIONS, NUMBER ONE, LENGTHEN POINT TWO, etc.

60. Fuze corrections are not cumulative. They remain in force throughout the mission unless orders for a new fuze correction are given.

FUZE SETTING

61. The GPO/CPO shall order fuze settings in one of the following forms:
- a. FUZE, NUMBER ONE, TWO SIX POINT TWO, NUMBER TWO, TWO SEVEN POINT TWO, etc.;
 - b. FUZE, TWO SEVEN POINT THREE (when one fuze setting is applicable to all guns).
62. A fuze setting must be ordered for each round in adjustment or the first round of FFE. A fuze setting is not required for subsequent rounds of FFE not involving an elevation change.

AT MY COMMAND

63. When it is required to control the moment of firing, the order AT MY COMMAND shall be used. When AT MY COMMAND is in force the guns shall report READY and shall not fire until given the order FIRE, or if guns are being controlled individually, NUMBER __ FIRE.
64. AT MY COMMAND is cancelled by CANCEL AT MY COMMAND or the termination of the mission.
65. When more than one gun is used in adjustment, the GPO/CPO shall order AT MY COMMAND to ensure that the guns are fired simultaneously or in the correct sequence, e.g., AT MY COMMAND, NUMBER ONE AND TWO ADJUST FIRE.

ELEVATION

66. **General.** The GPO/CPO may order a common elevation to all guns, e.g., ELEVATION 358. Also, he may order individual elevations to each gun, e.g., ELEVATION, NUMBER ONE 258, NUMBER TWO 268, etc.
67. **Alterations.** For subsequent alterations in elevation the GPO/CPO will normally order the new elevation to the guns in the same

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

form as the original elevation. If the GPO/CPO has previously ordered an individual elevation to each gun, he may order a common alteration to elevation in the same form as the original elevation or in the form ADD or DROP, e.g., ELEVATION ADD TWO. When confusion is likely to arise, the GPO/CPO must order a new individual elevation in full for each gun. A new elevation ordered in the form ELEVATION 368, cancels a previously ordered elevation.

68. **Adjustment.** An elevation must be ordered to the gun(s) for every round fired in adjustment. The adjusting gun(s) shall fire on receipt of the elevation unless a restricting order such as AT MY COMMAND is in effect.

69. The GPO/CPO must order an elevation to the guns for the first round of FFE. For subsequent rounds of FFE not involving a change in firing data, the order ___ ROUNDS FFE is sufficient.

METHOD OF FIRE AND CONTROL

70. **Adjustment.**

- a. **Detailing the Guns.** In his initial orders to the guns, the GPO/CPO shall specify by number the guns to be used in adjustment and order ADJUST FIRE.
 - (1) Unless otherwise specified by the observer, a single gun will be used.
 - (2) The term NUMBER (of the guns) is used when less than all the guns in the battery are to adjust fire, e.g., NUMBER THREE ADJUST FIRE, NUMBER THREE AND FOUR ADJUST FIRE.
- b. **Changing Gun(s) in Adjustment.** When changing the gun(s) during adjustment, the GPO/CPO must order ADJUST FIRE prefixed by the number(s) or grouping of the gun(s) which will continue the adjustment.

- c. **Firing Rounds in Adjustment.** If more than one gun is being used in adjustment the GPO/CPO shall order AT MY COMMAND.
- (1) **First Round(s).** ADJUST FIRE, prefixed by the number of the adjusting gun(s), is the GPO/CPO's executive order to the adjusting gun(s) to fire the first round in adjustment unless AT MY COMMAND is in effect, e.g., NUMBER TWO ADJUST FIRE.
 - (2) **Subsequent Rounds.** For subsequent rounds during adjustment, the adjusting gun(s) shall fire on receipt of an elevation unless AT MY COMMAND is in effect.

71. **Fire For Effect.**

- a. The GPO/CPO, in passing orders to the guns, must always prefix the order FFE with the number of rounds to be fired by each gun, e.g., FOUR ROUNDS FFE.
- b. **FOLLOWED BY.** When it is necessary for FFE with one rate of fire to be completed before another FFE with a different rate of fire, or when ordered by the observer, the GPO/CPO should use the order FOLLOWED BY, e.g., THREE ROUNDS FOLLOWED BY EIGHT ROUNDS FFE, THREE ZERO SECONDS.
- c. If a target grid correction is ordered during FFE the GPO/CPO will continue neutralizing the target until the new data is available for passage to the guns unless the observer has ordered CHECK FIRING or CEASE LOADING.

72. **Time of Firing.** Once he has received a method of adjustment or FFE, the detachment commander shall fire as soon as his gun is ready, unless AT MY COMMAND is in effect, in which case he shall report his gun READY to the GPO/CPO. The GPO/CPO shall not use the term TOT __ HOURS as an order to the gun. During firing when gun programmes are in use, the detachment commander shall fire at the designated time.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- a. **Sequence.** Guns shall fire individually except as follows:
- (1) If the guns are to fire simultaneously, the GPO/CPO shall order AT MY COMMAND, and then order FIRE when all detachment commanders have reported ready.
 - (2) If the guns are to be fired in succession from either right or left, the GPO/CPO will order BATTERY RIGHT or BATTERY LEFT as received from the observer. The GPO/CPO shall prefix this order with AT MY COMMAND and when the guns are ready, order FIRE (unless AT MY COMMAND is in force from the observer), e.g., AT MY COMMAND, NUMBER TWO AND THREE, BATTERY RIGHT, ADJUST FIRE, FIRE; AT MY COMMAND, BATTERY RIGHT, ONE ROUND FFE, FIRE.
- b. **Interval.** The GPO/CPO may order an interval to the guns in order to separate successive rounds.
- (1) **Battery Right (Left).** The interval ordered in seconds will be the time between firing one gun and firing the next gun. If no specific interval is ordered, a five second interval shall be adopted.
 - (2) **During FFE.** The interval ordered in seconds will be the time between firing one round and firing the next round. A change of interval may be effected during FFE by ordering a new interval, e.g., TWO ZERO SECONDS, in which case the interval shall be taken into effect immediately.

DESCRIPTION

73. At a convenient time, the GPO/CPO should briefly describe the target to the guns.

RECORDING THE TARGET

74. The GPO/CPO will order RECORD AS (TARGET NUMBER) if so ordered by the observer. On this order the detachment commanders shall carry out the drill for recording a target as detailed in the applicable gun drill manual.

TERMINATION OF THE FIRE MISSION

75. A fire mission shall be terminated by the order:

- a. END OF MISSION; or
- b. TANK ALERT.

NOTE

If the FOO sends a fire mission while it is already engaged in a fire mission, the CPO will have to ask the RCPO to carry out the second fire mission.

76. Upon termination of the mission the GPO/CPO may pass target results to the guns.

SECTION 4 MISCELLANEOUS ORDERS AND REPORTS

GENERAL

77. The orders and reports explained in the following articles may be used between either the observer and the CP or the CP and the gun detachments unless otherwise specified.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

MISCELLANEOUS ORDERS

78. **ADJUST.** This is an order to an observer to initiate the adjustment of a designated target, e.g., ADJUST ZP 1234. It is used between a BC and his observers and is not used between the CP and the guns.

79. **ADOPT.** This is an order used to initiate the adoption for use of technical information, such as met, survey, laser points, witness points, target lists and target series or groups, e.g., ADOPT MET, ADOPT REGIMENTAL GRID, ADOPT LP 5000, ADOPT WITNESS POINT ZT 1400, ADOPT TARGET LIST __, ADOPT HOT DOG. This order is cancelled by the order CANCEL ADOPT.

80. **CANCEL.** The word CANCEL prefixing a fire order cancels that fire order (see Figure 4-6). CANCEL is used to cancel all fire orders except when they contain a quantity or type of ammunition. Orders containing a quantity or type of ammunition are cancelled by a new order for quantity or type of ammunition and the new order takes effect immediately.

SER	ORDER OR REPORT	CANCELLATION	EXAMPLE CORRECTION
(a)	(b)	(c)	(d)
1	ADD 400	CANCEL ADD 400	ADD 200
2	CHECK FIRING	CANCEL CHECK FIRING	---
3	NEGLECT NUMBER FOUR FIRED AT RIGHT 100	CANCEL NEGLECT NUMBER FOUR FIRED AT RIGHT 100	NEGLECT NUMBER THREE FIRED AT RIGHT 100
4	PREMATURE. NUMBER TWO AT MUZZLE	CANCEL PREMATURE. NUMBER TWO AT MUZZLE	PREMATURE. NUMBER THREE AT MUZZLE
5	DANGER CLOSE	CANCEL DANGER CLOSE	---
6	AT MY COMMAND	CANCEL AT MY COMMAND	---

Figure 4 - 6 Examples of Cancelling Orders by Using the Order CANCEL

81. **CEASE FIRING.** This order is given by the GPO/CPO to bring the guns out of action. It is never used by the observer. Cease firing shall not be given until:
- a. an order to move the guns has been received; and
 - b. the guns are verified empty.
82. **CEASE LOADING.** This order means that guns are not to be reloaded and fire shall be brought to an end with the bores clear. CEASE LOADING takes effect immediately and the guns will not be reloaded until the order CANCEL CEASE LOADING or initial orders for a new mission. All action on the guns with the exception of loading shall continue in accordance with the orders received.
83. **CHECK FIRING.** This order means to stop firing immediately. All action on the guns with the exception of firing shall continue in accordance with the orders received. CHECK FIRING is cancelled by CANCEL CHECK FIRING.
84. **CONTINUOUS FIRE.** This order is used when the guns are to be loaded and fired continuously at FFE. On this order, the guns shall continue to fire until either fire is temporarily suspended by CEASE LOADING, CHECK FIRING or the fire mission is terminated. An interval may be specified, e.g., CONTINUOUS FIRE THREE ZERO SECONDS, otherwise, the guns shall be fired as rapidly as possible consistent with accuracy, within the prescribed maximum rate of fire for the equipment in use. This order is used only under exceptional circumstances when the observer, because of the tactical situation, is required to bring fire to bear on a target for an indefinite length of time.
85. **EMPTY GUN(S).** This order is used to fire the guns. Its omission need be verified only if the guns are loaded. The observer must ensure that the rounds will land in a safe area. To this end, if a fire mission is in progress, the guns will fire at the current gun data. Otherwise, the order will be given by the observer as EMPTY GUN(S) AT __, specifying a safe grid reference or a safe target number. Detachment commanders shall order their guns to fire on receipt of the order EMPTY GUN(S). The CPO/GPO shall report GUN(S) EMPTY after he has received the report NUMBER __ EMPTY from all guns. He may determine whether guns are empty by ordering VERIFY GUN(S) EMPTY or VERIFY NUMBER __ EMPTY.

DUTIES AT REGIMENTAL HEADQUARTERS
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86. **FPF, FIRE.** Indicates that the final protective fire is to be executed using the ammunition, the rate of fire and the duration stipulated in the (SOPs).

87. **Adjustment of VT/Time Fuzes.**

- a. **LENGTHEN/SHORTEN.** The observer may adjust the Height Of Burst (HOB) by ordering LENGTHEN/SHORTEN to the fuze setting. This is normally used with VT fuzes when all rounds impact, e.g., SHORTEN ONE POINT ZERO.
- b. **UP/DOWN.** Alternatively for time fuzes, the observer may adjust the HOB by ordering UP/DOWN, e.g., UP 20. The unit of measurement shall always be metres. The GPO/CPO shall order the actual fuze setting to the guns.

88. **PREPARE TO MOVE.** PREPARE TO MOVE is a warning order for movement. It may be coupled with a timing, e.g., PREPARE TO MOVE, NO MOVEMENT BEFORE 1800 HOURS, or PREPARE TO MOVE, FIVE MINUTES NOTICE TO MOVE FROM 1800 HOURS. It may be necessary to pass this order in code. On receipt of this order, certain preparations shall be made for movement, but the guns shall remain in action until CEASE FIRING has been ordered.

89. **QUADRANT LAYING.** QUADRANT LAYING may be ordered by the CPO when greater precision of laying is required for a mission, e.g., during a destruction mission or a sniping gun mission. QUADRANT LAYING REPORT QE must be ordered by the CPO after adjustment or FFE has commenced. If QUADRANT LAYING is ordered at the beginning of a fire mission, the order REPORT QE is not necessary. The CPO may also order QUADRANT LAYING REPORT QE when the range quadrant is damaged (see Section 5-14).

90. **REPEAT.** The order REPEAT means:

- a. **During Adjustment.** Another round or rounds, if more than one gun is being used, shall be fired at the last data ordered by the observer.

- b. **During FFE.** The same number of rounds at the same interval shall be fired again. REPEAT may be combined with alterations to the number of guns, a correction, or the nature of ammunition, but if the number of rounds or the interval is changed, REPEAT must not be used.
- c. REPEAT shall not be used by the GPO/CPO as an order to the guns.

91. **REST.** The order REST indicates that the unit(s) or gun(s) to which it is addressed shall not follow up orders during the time that the order is in force. Routine work may be ordered by the detachment commander and the detachments remain at their positions in action. REST is cancelled by CANCEL REST.

92. **STAND EASY.** This order may be used by the GPO/CPO to the detachment commanders to order the withdrawal of the detachments from the guns, except at the termination of a fire mission when the order END OF MISSION shall be used. The detachment commander may also use STAND EASY as shown in the gun drill manual for the equipment in use. The order STAND EASY is cancelled by TAKE POST or a fresh sequence of orders. STAND EASY is not used by the observer.

93. **STAND FAST.** The order STAND FAST is used only in connection with local safety and may be ordered by a person in the interest of safety. On receipt, all personnel shall stand motionless at their positions. This order is used **only** on the gun position and shall be cancelled **only** by the originator of the order. STAND FAST is cancelled by CANCEL STAND FAST.

94. **TAKE POST.** The order TAKE POST may be used by the GPO/CPO or the detachment commander when detachments are required to assume their positions in action. TAKE POST is cancelled by the order STAND EASY or END OF MISSION.

95. **TARGET.** TARGET is used during laser adjusted fire missions and indicates that the direction and distance is a new target location and not a correction to be applied to the current gun data, e.g., TARGET, DIRECTION 1200, DISTANCE 1350, PATROL IN OPEN, THREE ROUNDS FFE. It is also used during the engagement of mobile targets.

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

96. **Target Grid Corrections.** Target grid corrections are ordered by the observer as RIGHT or LEFT and ADD or DROP. When a combined correction is given, the right or left correction shall precede the add or drop correction.

97. **VERIFY.** Attention is drawn to an obvious mistake or omission by the use of the prefix VERIFY, e.g., VERIFY DROP 800, VERIFY LAST ORDER, VERIFY ELEVATION. The response will be I VERIFY
.

98. **SAY AGAIN.** Confirmation of an order or report is demanded.

MISCELLANEOUS REPORTS

99. **General.** Various reports are made to the observer, the more common of which follow. The guiding principles are that:

- a. orders from the observer take priority over reports;
- b. information is reported which will enable the observer to relate the fall of shot to the gun(s) he is using and to the data at which they fired; and
- c. if a mistake has been made, or a situation exists which may cause the observer to draw a false conclusion from the fall of shot, e.g., guns loaded with incorrect ammunition, the details shall be reported immediately.

100. **Ammunition.**

- a. **BAD RAM.** A badly rammed round may cause the projectile to fall several hundred metres short. When a bad ram occurs, the report NUMBER __ BAD RAM will be made to the observer. The observer shall order the gun to fire into a safe area or to unload, e.g., NUMBER TWO ADD 800, NUMBER TWO FIRE, or order NUMBER TWO UNLOAD.

- b. **GUN(S) EMPTY.** A report to the originator of the order EMPTY GUN(S) stating that the guns are not loaded, e.g., 2, GUN(S) EMPTY.
- c. **Guns Loaded with Wrong Ammunition.**
 - (1) If guns are loaded with ammunition other than that detailed in the observer's ammunition orders, the GPO/CPO must inform the observer, e.g., NUMBER THREE LOADED SMOKE.
 - (2) The observer will give orders to clear the gun(s) loaded with the wrong ammunition bearing in mind the safety and tactical implications involved. Example orders to clear the gun(s) are:
 - (a) NUMBER THREE, EMPTY GUN;
 - (b) NUMBER THREE, UNLOAD; or
 - (c) NUMBER THREE, FIRE AS FIRST ROUND FFE.
 - (3) Once the report of guns loaded with the wrong ammunition has been sent and acknowledged by the OP, the guns shall fire on the receipt of an order (as per later paragraphs within this section) to clear the guns.
- d. **MISFIRE.** Misfire is reported by a detachment commander to the GPO/CPO that his gun has failed to fire due to faulty equipment or ammunition, e.g., NUMBER TWO MISFIRE. Misfires are not normally reported to the observer.
- e. **PREMATURE.** All prematures shall be immediately reported to the observer and to the next higher artillery CP together with an indication of where the premature took place. The GPO/CPO must provide the observer with an assessment of damage and other effects as

DUTIES AT REGIMENTAL HEADQUARTERS
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quickly as possible. The initial report including an assessment of the cause, shall be given in one of the forms illustrated in the following examples. A subsequent report shall be sent to the higher HQ as soon as possible.

- (1) PREMATURE, NUMBER TWO IN BORE, NUMBER TWO DESTROYED, FIVE CASUALTIES, PROBABLE CAUSE UNDER INVESTIGATION.
- (2) PREMATURE, NUMBER ONE AT MUZZLE. (Within 100 m of the muzzle.) NO CASUALTIES OR DAMAGE, PROBABLE CAUSE FAULTY FUZE.
- (3) PREMATURE, NUMBER TWO APPROXIMATELY 400 METRES FROM THE MUZZLE, NO CASUALTIES OR DAMAGE, PROBABLE CAUSE FAULTY FUZE.

101. **Equipment State.**

- a. **Gun Loaded and Hot.** This is a report to the observer that a round is loaded in a dangerously hot gun, e.g., NUMBER ONE LOADED GUN HOT.
- b. **Mechanical Failure.** When a gun is out of action for any reason, e.g., mechanical failure or enemy action, it must be reported to the BC, the observers and the RCPO, e.g., NUMBER TWO OUT OF ACTION. Normally this report shall be coupled with an estimate of the length of time that the gun will be out of action. When the gun is back in action, a report will be sent, e.g., NUMBER TWO BACK IN ACTION.

102. **Reports in Response to Orders.**

- a. **CRESTED.** When the observer's fire orders cannot be carried out because of an intervening crest, the

GPO/CPO will report CRESTED and await further orders. This report may be modified, e.g., CRESTED LOW ANGLE. By itself it means that the target cannot be engaged in either low or high angle.

- b. **NEGLECT.** NEGLECT is reported if a mistake has resulted in a gun being fired with wrong ammunition, at incorrect data or at an incorrect time (i.e., TOT, fire plans, AT MY COMMAND), e.g., NEGLECT, LAST ROUND WAS FIRED AT ADD 1000. Another round is fired at the correct data without any order from the observer unless AT MY COMMAND is in effect.
- c. **READY.** READY is reported when:
 - (1) a gun or fire unit is prepared to fire and awaiting the order to fire; or
 - (2) data not previously available becomes available.

NOTE

When a gun or fire unit has reported READY before the order CANCEL AMC, they must have received the order FIRE before firing.

- d. **ROUNDS COMPLETE.** ROUNDS COMPLETE is reported by the GPO/CPO on completion of FFE. The GPO/CPO may order the detachment commanders to report rounds complete, e.g., REPORT ROUNDS COMPLETE.
- e. **SHOT.** SHOT is reported by the CP to the OP.
 - (1) SHOT is sent for:
 - (a) each round of adjustment; and
 - (b) the first round of each method of FFE.
 - (2) SHOT __ (GUN NUMBER) is sent:
 - (a) on changing the adjusting gun; and

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- (b) when firing BATTERY RIGHT (LEFT).
 - (3) SHOT (TARGET OR SERIAL NUMBER). This is normally reported during fire plans and when firing DFs. For fire plans above battery level, the report may be made on regimental fire orders line to the RCPO who will make a collective call to all observers.
 - (4) The Time of Flight (TOF) and report LATE may be sent with any of the reports.
- f. **SPLASH.** SPLASH is a report to warn the observer of the imminent burst of a round. When used it shall be reported five seconds before the round is due to burst. SPLASH is used when:
 - (1) fire mission is being conducted by an air observer;
 - (2) target is being engaged at high angle; and
 - (3) observer specifically orders REPORT SPLASH.
- g. **TOF.** This shall be reported for every fire mission with the first report of SHOT, or READY if AT MY COMMAND is in effect, e.g., SHOT TWO, ONE EIGHT; READY, TWO THREE.
- h. **Unsafe.** When the observer deems a target unsafe for engagement due to the close proximity of friendly troops he shall report that target as unsafe, e.g. ZT 1000 UNSAFE. The guns will not fire on an unsafe target. If a change in the tactical situation requires the unsafe target to be re-engaged, the observer will use the prefix CANCEL with the unsafe target number, e.g., CANCEL ZT 1000 UNSAFE.

- i. **VERIFY SAFETY.** When the GPO plots the targets on his check map and sees that it may endanger friendly troops, he will send a message to observer to VERIFY SAFETY. This message is not necessary if the observer has included DANGER CLOSE in his call for fire.

103. **Meteorology (Met).**

- a. **MET AVAILABLE.** Is reported to the observers when met is in use.
- b. **MET NOT AVAILABLE.** When met information is not available, the CPO shall report to the observer MET NOT AVAILABLE (standard met in use).
- c. **MET READY.** When sent to the RCPO, means that the new met message has been received, computed and checked. Likewise, the RCPOs will report MET READY to their respective HQ, and shall not use it until ordered by that higher HQ. Once all C/S have reported MET READY, the RCPO will order ADOPT MET NOW or ADOPT MET AT _____HRS. Once met has been adopted, all C/S will report to the RCPO, MET ADOPTED. During fire planning, adoption of met will be controlled by the senior CP.

104. **Survey State.** The CO, BCs and observers shall be kept advised of the state of survey of the guns by the CPs making the following type of reports as necessary (see Chapter 3):

- a. STATE C EXPECTED IN ONE HOUR;
- b. CHANGING TO STATE C AT 2300 HOURS;
- c. STATE C NOW; or
- d. 2, READY, STATE B.

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SHELREPS, MORTREPS, BOMREPS

105. These reports must be forwarded as quickly as possible after enemy action commences. Ideally, at least two SHELREPs are sent from each battery when shelling lasts for more than a few minutes.

- a. A SHELREP should be sent as soon as the shelling starts, perhaps only containing time and bearing, to permit the artillery G2 staff to alert all relevant sources of information and to permit countermeasures.
- b. A second SHELREP is sent when the firing has stopped to summarize the incident as fully and as accurately as possible.

106. The calibre and type of gun firing can be judged roughly from the sound and appearance of the shell bursts and definite information can be obtained from fragments and unexploded projectiles or bombs. After the shelling has ceased, the craters should be examined and fragments sent to the Division Artillery Intelligence Officer (DAIO) along with a SHELREP form. The fuze, projectile base, rotating bands or contents of a carrier shell, and mortar fins are particularly valuable for this purpose.

SER	ITEM	REMARKS
(a)	(b)	(c)
1	Unit or origin	Use current call sign, address group or code name
2	Position of observer	Grid reference preferred, encode if this discloses the location of a headquarters or important observation post or if serial 6.1.b. below is used to give information on location
3	Direction (flash, sound or groove) angle of fall/descent	(Omit for aircraft) Grid bearing of flash, sound or groove of shell (state in mils unless otherwise specified)
4	Time from	
5	Time to	
6	Area bombed, shelled or mortared	1. Location to be sent as: <ul style="list-style-type: none"> a. Grid reference (to be sent in clear); and b. Grid bearing to impact point in mils (unless otherwise specified) and distance in metres from observer. This information must be encoded. (When this method is used, maximum accuracy possible is essential.) 2. Dimensions of the area bombed, shelled, mortared or mined to be given by: <ul style="list-style-type: none"> a. The radius (in metres); or b. The length and width (in metres).
7	Number and nature of guns, mortar, rocket launchers, aircraft of delivery	
8	Nature of fire	Adjustment, fire for effect, harassing etc. (may be omitted for aircraft)
9	Number, type and calibre of shells, rocket (or missile) bombs, etc.	State whether calibre is measured or assumed
10	Time of flash to bang	Omit for aircraft
11	Damage	Encode if required
12	Remarks	
13	Serial number	Each location which is produced by a locating unit is given a serial number
14	Target number	If the weapon/activity has previously been given a target number, it will be entered in this column by the locating unit
15	Position of target	The grid reference or grid bearing and distance of the location weapon/activity
16	Accuracy	The accuracy to which the weapon/activity is located, circular error probable in metres and the means of locating if possible
17	Time of location	The actual time the location was made
18	Target description	Dimensions if possible: <ul style="list-style-type: none"> 1. Radius of target (in metres); or 2. Target length and width (in metres).
19	Time fired	
20	Fire by	
21	Number of rounds, type of fuse and projectiles	

Figure 4 - 7 SHELREP, MORTREP, BOMBREP and Location Report Form

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TARGET ENGAGEMENT REPORTS

107. A report will be sent to higher HQ at the beginning and end of every fire mission; examples as follows:

a. **Target Engagement Report**

0, 95 THIS IS 1
ENGAGED BATTERY
GR 123 456
PLATOON DUG IN RADIUS 50.

b. **Availability Report**

0, 95 THIS IS 1
AVAILABLE
PLATOON NEUTRALIZED
ZT 1240 (IF APPLICABLE)
20

NOTE

In this example "20" refers to the total ammunition expended during this engagement. When there are different types of ammunition and propellants on the gun position, they must be specifically referred to in the AVAILABILITY REPORT, example: 15 TIME; 10 GREEN BAG; 15 TIME WHITE BAG; and 15 WP, 5 GREEN BAG, 10 WHITE BAG.

108. **READY STATE Report.** Sent to the observers, BC, RCPO and OPS O.

- a. CC31, 39 this is 3
READY STATE B
Grid 123 456
MET AVAILABLE (or MET NOT AVAILABLE)

- b. 0, 9-5 this is 3
 READY STATE B
 Grid 123 456

NOTE

READY STATE report sent on regimental command net does not include the met. The adoption of met is controlled by the RCPO on ring net.

FIRE PLAN MODIFICATIONS

109. The following orders are used to modify fire plan orders (see also Chapter 6).

110. **MODIFY (name of fire plan) or REQUEST MODIFY (name of fire plan).** These terms are used to indicate that a modification is being ordered or requested. Only the originator or a person authorized by him may order or approve modifications to a fire plan. Anyone may request a modification.

111. **AMEND TO READ.** This term is used when a simple modification is to be made to a fire plan. Examples are as follows:

- a. MODIFY HOT POTATO, 2, ZT 1285, AMEND TO READ RATE FOUR. (Rate Two had previously been ordered.);
- b. MODIFY BEAR TRAP, AMEND TO READ H-HOUR 1530; and
- c. REQUEST MODIFY RUBBER BOOT, ZT 3331, AMEND TO READ (BRAVO) 28123420, (CHARLIE) DF, PREDICT.

112. **CHECK FIRING.** This order is used to stop firing on all or part of a fire plan, e.g., CHECK FIRING TOP HAT. On receipt of this order firing is stopped on the whole fire plan. CHECK FIRING ZT 1469. On receipt of this order firing is stopped only on ZT 1469. The fire plan timings and fire continue with the exception of firing on ZT 1469.

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113. **CEASE LOADING.** This order is used to stop the guns from further loading with the bores clear. It can be used to stop loading on all or part of a fire plan, e.g., CEASE LOADING BARBER POLE or CEASE LOADING ZT 1764. The fire plan timings and fire continue with the exception of loading as indicated.

114. **DWELL AT (ON).** This order is used when a fire unit is required to continue the engagement for an unspecified length of time. The planned number of rounds lapses and the FFE ordered is substituted. This order may include a change in the rate of fire. A reference must be made to either the target number or to the timing as shown in the examples below:

- a. 2, MODIFY BARBER POLE, DWELL ON ZT 1764;
and
- b. MODIFY TOP HAT, DWELL AT PLUS ONE ZERO.

115. **ADD (SUBTRACT) __ MINUTES TO (FROM) ALL TIMINGS.** This order is used when a uniform amendment to all timings is required, e.g., MODIFY IRON HEEL, ADD FIVE MINUTES TO ALL TIMINGS. It is normally coupled with an order to dwell or restart, RESTART AT __ and follows the order CEASE LOADING, CHECK FIRING or DWELL AT/ON if the program is to continue. It can be used in two ways. e.g., MODIFY BIG TOP, ADD FOUR MINUTES TO ALL TIMINGS, RESTART AT PLUS TWO ZERO, (the four minutes does not apply to H-Hour or targets already engaged during the fire plan) or MODIFY BIG TOP, RESTART AT PLUS EIGHT AT 1130 HOURS. (The fire plan will recommence at 1130 hours on the targets scheduled to be fired at the +8 timing and will continue as if the fire plan was never modified.) A fire plan with modifications is shown in the following example:

- a. Below is a firing plan table with scheduled timings:

SCHEDULED TIMINGS (H)

		5	10	15	20
(F)	(G)	I I I I	I I I I	I I I I	I I I I I
		ZT 1234		ZT 1235	
1. 2 HA 2 BTYS		. . . I .	———	. . ———	. . I .

- b. On receipt of the following order, **MODIFY FIRE PLAN, DWELL AT PLUS SEVEN**, firing will continue as indicated on the fire plan table below:

SCHEDULED TIMINGS (H)

		5	10	15	20
(F)	(G)	I I I I	I I I I	I I I I	I I I I I
		ZT 1234		ZT 1235	
1. 2 HA 2 BTYS		. . . I .	———	. . ———	. . I .

↑

NOTE

Firing continues at the plus seven timings. Unless the observer changes the method to conserve ammunition, the method indicated in the original orders for the fire plan will continue.

- c. On receipt of the order **MODIFY FIRE PLAN, ADD FOUR MINUTES TO ALL TIMINGS, RESTART AT PLUS 11 AT 1351 HOURS**, the scheduled timings will be modified as indicated on the table below:

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	5	10	15	20
<hr/>				
	9	11	14	19
			19	24
(F)	(G)	I I I I	I I I I	I I I I
		I I I I	I I I I	I
<hr/>				
		ZT 1234	ZT 1235	
<hr/>				
1. 2 HA	2 BTYS	. I .	———	. . ———
			. . I .	

NOTE

Four minutes is added to all scheduled timings. The add four minutes does not affect H-Hour, nor does it affect any targets which have already been engaged. In this case, plus seven would now become plus 11 and plus 10 now becomes plus 14, etc.

116. **___ MODIFIED.** This report is sent to the originator of the modification order to indicate that the appropriate action has been taken, e.g., **BIG TOP MODIFIED.**

117. **CANCEL ___.** This order is used to cancel all or a portion of a fire plan, e.g., **CANCEL BARBER POLE.** On receipt of this order all targets on the fire plan lapse and the appropriate target records are struck out. **CANCEL BARBER POLE EXCEPT ZT 1379.** On receipt of this order the records for the specified targets will be maintained in the target record book.

118. **END OF MISSION.** This order must be given at the conclusion of a fire plan. It may be coupled with the order to cancel all or a part of that fire plan, e.g., **END OF MISSION ON BARBER POLE, CANCEL BARBER POLE EXCEPT ZT 1378 AND ZT 1379.**

FIRE RESTRICTIONS

119. Restrictions on fire may be ordered by an observer, a BC or the CO's tactical HQ. These restrictions may include areas or altitude bands, etc., and may be coupled with timings, e.g.:

- a. NO FIRING WEST OF DRUMMOND ROAD; or

- b. NO HIGH ANGLE FIRE FROM 1530 TO 1600 HOURS.

120. These restrictions are cancelled by the use of the order CANCEL, e.g., CANCEL NO HIGH ANGLE FIRE or at the expiration of the time specified.

CONVENTIONS REGARDING THE USE OF CALL SIGNS

121. When two or more batteries are engaged in the same fire mission, corrections that apply to all batteries will not be prefixed by any call sign (see Figure 4-8).

122. The conventions for the use of call signs during both adjustment and FFE in accordance with paragraph 121 of this section are as follows:

- a. if an order applies to one particular unit or sub-unit only, that order shall start by the mention of that unit’s/sub-unit’s call sign; and
- b. if part of an order applies to a particular unit or sub-unit, only that part shall start by the mention of that unit’s/sub-unit’s call sign.

123. During the conduct of simultaneous missions, all fire orders shall be prefixed with the fire unit the orders pertains to.

SER	OBSERVER’S ORDERS	MEANING TO THE GPO/CPO/RCPO
(a)	(b)	(c)
1	LEFT 50, ADD 100, ONE ROUND FFE	Applies to all fire units engaged in the fire mission
2	2, LEFT 100; 2, ADD 100; 2, ONE ROUND FFE	Applies only to call sign 2
3	1, LEFT 100; ADD 100; ONE ROUND FFE	LEFT 100 applies only to call sign 1. The remainder of the order applies to all fire units, including call sign 1

Figure 4 - 8 Examples of the Application of Call Signs to Fire Orders for Regimental and Higher Fire Missions

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124. Within the battery, all orders not immediately starting by the number of a particular gun or guns shall apply to all guns ordered to take part in the fire mission (see Figure 4-9).

125. Within a battery, the following conventions shall apply:

- a. **Observer.** When an observer is engaging two fire missions simultaneously, he will specify the number of guns to be used for each mission, e.g., FIRE MISSION LEFT/ RIGHT SECTION.
- b. **CPO.** The GPO/CPO may designate the guns by the use of the gun number(s).

SER	OBSERVER'S ORDERS	GPO/CPO'S ORDERS TO THE GUNS	ACTION BY THE DETACHMENT COMMANDER
(a)	(b)	(c)	(d)
1	RIGHT 50, ONE ROUND FFE	BEARING 4821, ELEVATION 270, ONE ROUND FFE	All guns apply the bearing and elevation ordered and all guns fire one round FFE
2	RIGHT 50, NUMBER 1, ONE ROUND FFE	BEARING 4821, ELEVATION 270, NUMBER 1, ONE ROUND FFE	All guns apply the bearing and elevation ordered but only Number 1 fires one round FFE
3	NUMBER 1 AND 2, RIGHT 50, ONE ROUND FFE	BEARING, NUMBER 1 AND 2, 1270, ELEVATION, NUMBER 1 AND 2, 285, ONE ROUND FFE	Number 1 and Number 2 apply the new bearing and new elevation; all guns fire one round FFE
4	NUMBER 1, RIGHT 20, ADD 50, ONE ROUND FFE	BEARING, NUMBER 1, 1270, NUMBER 2, 3, 4, 5, 1278, ELEVATION NUMBER 1, 285, NUMBER 2, 3, 4, 5, 282, ONE ROUND FFE	All guns apply the bearings and elevations ordered and all guns fire one round FFE

Figure 4 - 9 Examples of the Application of Call Signs for Battery Fire Missions

ORDERS DURING FFE

126. An order for FFE supersedes any such previous order whether or not the execution has been completed. For example, if after firing one

round in response to the order THREE ROUNDS FFE the order FIVE ROUNDS FFE is received, this new method of FFE takes effect immediately and a total of six rounds would be fired.

127. Orders concerning bearing, gun corrections, fuze, elevation or interval do not affect the number of rounds ordered. For example, if FIVE ROUNDS FFE, THREE ZERO SECONDS is being fired and if, after two rounds have been fired the order SIX ZERO SECONDS is received, the remaining rounds shall be fired at the new interval.

LOADING THE GUNS

128. During any fire mission a gun is loaded initially only on receipt of one of the following orders:

- a. LOAD, e.g., NUMBER ONE LOAD or LOAD;
- b. ADJUST FIRE, e.g., NUMBER ONE ADJUST FIRE;
- c. orders for FFE, e.g., FIVE ROUNDS FFE, FPF FIRE, or CONTINUOUS FIRE;
- d. ENGAGE, during a fire mission open action; or
- e. TANK ALERT.

129. If time or proximity fuzes are being used, guns shall not be loaded until given a fuze setting.

130. After the initial loading, guns shall be reloaded on the following orders:

- a. **During Adjustment.** The detachment commander of the adjusting gun shall order LOAD on receipt of an elevation or on the order LOAD from the GPO/CPO.
- b. **During FFE.** Guns shall be loaded on receipt of an individual elevation, the order __ ROUNDS FFE, FPF FIRE; CONTINUOUS FIRE or the order LOAD from the GPO/CPO.

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- c. **During Coordinated Illumination Missions.** The illumination gun(s) shall load on receipt of the HE gun(s) elevation.

131. To prevent overheating of the projectile and propellant, guns shall not be reloaded sooner than necessary.

FIRING THE GUNS

132. **Firing the First Round.** The GPO/CPO shall order the firing of the first round of a fire mission only on receipt of one of the following orders:

- a. ADJUST FIRE;
- b. FFE;
- c. ROUNDS FFE;
- d. FPF, FIRE;
- e. CONTINUOUS FIRE;
- f. CONTINUOUS ILLUMINATION;
- g. TOT __ HOURS, OR __ ROUNDS TOT __ HOURS;
- h. FIRE (when AT MY COMMAND is in effect);
- i. EMPTY GUN(S) or EMPTY GUN(S) AT (this order need not be preceded by the order FIRE MISSION nor are further orders required when AT MY COMMAND is in effect); and
- j. certain special orders for fire plans.

133. **Firing Subsequent Rounds.** After the first round of a fire mission has been fired, the GPO/CPO shall order the firing of subsequent rounds on receipt of any of the following orders:

a. **In Adjustment:**

- (1) a target grid correction;
- (2) an order changing the method of adjustment;
- (3) REPEAT;
- (4) FIRE (when AT MY COMMAND is in effect);
- (5) a correction to HOB or fuze setting;
- (6) EMPTY GUN(S) or EMPTY GUN(S) AT (a safe grid reference); or
- (7) COORDINATED ILLUMINATION.

NOTE

The adjusting gun(s) shall fire on receipt of an elevation from the GPO/CPO unless AT MY COMMAND is in effect.

b. **In FFE:**

- (1) FFE;
- (2) ROUNDS FFE;
- (3) CONTINUOUS FIRE;
- (4) CONTINUOUS ILLUMINATION;
- (5) COORDINATED ILLUMINATION;
- (6) FPF, FIRE;
- (7) TOT __ HOURS, OR __ ROUNDS FFE TOT HOURS;
- (8) FIRE (when AT MY COMMAND is in effect);
- (9) REPEAT;

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- (10) EMPTY GUN(S) or EMPTY GUN(S) AT (safe grid reference);
- (11) an order to revert to adjustment; or
- (12) certain special orders for fire plans.

134. **Open Action.** During the engagement of tanks, bunkers or other targets, the GPO/CPO shall normally pass the control of firing to the detachment commander by ordering ENGAGE.

LEAVING GUNS EMPTY

135. A gun should not be left loaded after prolonged firing, because of the danger that a high propellant temperature might lead to inaccurate shooting and a possibility that the projectile might detonate in the bore.

136. The GPO/CPO is responsible to ensure that hot guns are not left loaded and that they are not reloaded if there is a possibility that they might not be fired for some time. A gun is considered to be hot when it is painful to touch the exterior of the barrel with the hand, when paint blisters appear on the barrel, or when indicated by the spittle test.

137. When the GPO/CPO wishes to suspend the firing of a gun during a prolonged period of firing, he will first order NUMBER __ CEASE LOADING.

138. When the effect of an order from the observer is to leave a hot gun loaded, the GPO/CPO shall report NUMBER __ LOADED, GUN HOT. The observer will give appropriate orders to empty the gun.

CORRECTING MISTAKES IN ORDERS

139. When a mistake is noticed in an order which entails the immediate firing of a gun, CHECK FIRING must be ordered followed by an amendment to the order, followed by the order CANCEL CHECK FIRING.

140. If a mistake is noticed in a cumulative order, e.g., a target grid correction or an observer's correction to fuze, the order CANCEL followed by the wrong order shall be given and then a new order issued, e.g. if the observer orders L200 A400 and he actually requires a D400 correction instead of the A400, he shall order CANCEL A400, D400.

GUNS NOT FIRING

141. When a gun cannot comply with fire orders for any reason, the detachment commander shall report the cause, rectify the problem if possible, and report NUMBER __ BACK IN ACTION.

142. On receipt of the initial report from a detachment commander, the following action will be taken as appropriate. The GPO/CPO will order the offending gun to CHECK FIRING.

a. In Adjustment.

- (1) If the observer has not selected the adjusting gun or has not ordered a special procedure, the GPO/CPO shall change the gun by ordering (number of gun selected to continue the adjustment) ADJUST FIRE. The GPO/CPO shall report his action to the observer on his report of shot, e.g., SHOT FOUR.
- (2) If the observer nominated the adjusting gun or ordered DANGER CLOSE, REGISTRATION OR DESTRUCTION, the failure to fire shall be reported to him. The GPO/CPO shall then either act on further orders by the observer or report the gun ready when the trouble has been rectified.
- (3) If BATTERY RIGHT (LEFT) is in effect, the GPO/CPO shall order the offending gun to CHECK FIRING and the next gun in sequence to fire. When the trouble has been rectified the GPO/CPO shall report NUMBER __ READY to the observer.

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- b. **In FFE.**
- (1) **General.** On receipt of the report NUMBER READY from the detachment commander and FFE has not been completed, the GPO/CPO shall give the appropriate order to cause the gun to resume firing. If FFE by the other guns of the battery has been completed, the GPO/CPO shall not order FIRE.
 - (2) **During a Fire Plan.** As soon as his gun is ready at the correct data for the time shown on the gun programme, the detachment commander shall report NUMBER __ READY to the GPO/CPO. No attempt will be made to fire rounds from lapsed serials. Normally no report needs to be sent to the observer concerning the rounds that have been missed.

SECTION 5
ORDERS FOR THE DEFENCE OF THE GUN POSITION

GENERAL

143. This section deals with the orders and reports required for the defence of the gun position. When applicable, the normal fire discipline orders and reports shall be used in addition to the orders set out in the following articles.

PREPARATION

144. When an attack may develop on the gun position the GPO orders either:

- a. **PREPARE FOR TANKS** in the case of an attack by tanks or similar vehicles; or

- b. **PREPARE FOR OPEN ACTION** in the case of any other type of attack. It also includes emergency smoke withdrawal.
145. Preparations are made without interfering with the primary task of the guns.
146. The highest possible charge will be used.
147. These orders are cancelled by prefixing them with **CANCEL**.

ENGAGEMENT ORDERS

148. **General.** Engagement orders shall contain the following:

- a. warning order;
- b. location of the target;
- c. description of the target; and
- d. method of engagement.

149. **Warning Order.** A warning order is given by the GPO when an attack on the gun position is imminent. This order cancels all other fire orders. He shall report this action on the battery net:

- a. The warning order may be coupled with the number of guns to engage and will be given in the following terms:
 - (1) TANK ALERT; or
 - (2) FIRE MISSION __, OPEN ACTION.
- b. The order TANK ALERT is cancelled only by CANCEL TANK ALERT. FIRE MISSION__ OPEN ACTION is cancelled by END OF MISSION.

150. **Location.** The location of the target(s) may be indicated by:

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- a. reference to sectors, e.g., RIGHT SECTOR, CENTRE SECTOR, etc.;
- b. reference to a reference point, e.g., REFERENCE POINT GATE, RIGHT THREE O'CLOCK, FOUR ZERO MILS; or
- c. the GPO going to a gun and personally directing it at the target.

151. **Description.** Description may be ordered in the following manner:

- a. HULL DOWN, APCs INFANTRY, etc.;
- b. direction of movement, e.g., MOVING RIGHT, HEAD ON;
- c. position or size of group, e.g., NEAR GROUND, SMALL GROUP; or
- d. position in a group, e.g., LEADING TANK.

152. **Method of Engagement.** The GPO shall order the engagement to commence by ordering ENGAGE. This order may be coupled with the designation of the gun(s) to engage, e.g., NUMBER ONE ENGAGE. Detachment commanders shall then assume control of firing and shall fire as soon as possible on the target ordered.

153. **Termination of the Engagement.** Guns shall terminate the engagement as specified in Section 3, and later in this section.

154. Figure 4-11 shows examples of the GPO's engagement orders for the defence of the gun position. The drills and procedures for open actions are detailed in Chapter 5.

SER	ELEMENT	TANK ALERT	OPEN ACTION
(a)	(b)	(c)	(d)
1	WARNING ORDER	TANK ALERT	FIRE MISSION NUMBER ONE OPEN ACTION
2	LOCATION	RIGHT SECTOR	REFERENCE GRAVEL PIT, LEFT 9 O'CLOCK, 30 MILS
3	DESCRIPTION	APCS MOVING RIGHT	DISMOUNTED INFANTRY SECTION ADVANCING
4	METHOD OF ENGAGEMENT	ENGAGE	ENGAGE

Figure 4 - 10 The GPO's Orders for Defence of the Gun Position

155. A GPO's Open Action will utilize the GPO's initial sequence of orders. E.g.:

SER	ELEMENT	GPO OPEN ACTION
(a)	(b)	(c)
1	WARNING ORDER	FIRE MISSION OPEN ACTION
2	AMMUNITION	HE QUICK CHARGE SEVEN
3	BEARING	REFERENCE LONE POLE BEARING 0350
4	ELEVATION	ELEVATION 122
5	METHOD OF ENGAGEMENT	NUMBER ONE ADJUST FIRE
6	DESCRIPTION OF TARGET	PLATOON ATTACKING

Figure 4 - 11 A GPO's Open Action

**SECTION 6
THE FORM IN WHICH ORDERS ARE SPOKEN**

GENERAL

156. The spoken form of fire orders follows communications conventions as set out in ACP 125 CANSUP 1 with the following exceptions:

- a. the prowords I SPELL and FIGURES are omitted;

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- b. numbers which are exact multiples of a hundred or a thousand are pronounced as such and other numbers are pronounced digit by digit; and
- c. abbreviations such as HE and VT need not be spelled phonetically unless confusion is likely to arise.

157. Examples of the spoken form of common orders are given in Figure 4-13 of this section.

PASSAGE AND ACKNOWLEDGEMENT OF ORDERS

158. Orders and reports between the CP and the guns are normally passed and acknowledged through the gun position inter-communication system. If this system is not in operation, detachment commanders shall raise an arm above the head in order to acknowledge receipt of orders of if the guns cannot be seen from the CP, they will report in succession from the right NUMBER __ THROUGH.

159. If a detachment commander fails to acknowledge an order, it must be repeated by the GPO/CPO prefaced by the number of the offending gun. If it is a cumulative order, it must also be prefaced by the phrase LAST ORDER WAS __, e.g., NUMBER FOUR, LAST ORDER WAS, BEARING RIGHT THREE. Detachment commanders of neighbouring guns may assist in the passage of fire orders by relaying the GPO/CPO's orders if necessary.

SER	ORDER REQUIRED	ORDER AS SPOKEN
(a)	(b)	(c)
1	Alterations to Bearing. Left 3 mils Number 2, Right 10 mils	BEARING LEFT THREE. BEARING, NUMBER TWO RIGHT ONE ZERO
2	Alterations to Elevation. Add (drop) 25 mils	ELEVATION ADD (DROP) TWO FIVE
3	Alterations to Altitude. Up 50 metres. Down 30 mils	UP FIVE ZERO METRES. DOWN THREE ZERO
4	Ammunition. HE, Quick, Green Bag, Charge 4 HE, Time, White Bag, Charge 5 HE, VT, Charge 6 HE, Time M564, Charge 2 DPICM, Time, Red Bag, Charge 7 RAAMS, M718, Long Destruct, M577, White Bag, Charge 5 ADAM, M731, Short Destruct, M577, Green Bag, Charge 4 HE Rocket Assisted, Cap Off, Charge 8	HE, QUICK, GREEN BAG, CHARGE FOUR HE, TIME, WHITE BAG, CHARGE FIVE HE, VT, CHARGE SIX HE, TIME M FIVE SIX FOUR, CHARGE TWO DPICM, TIME, RED BAG, CHARGE SEVEN RAAMS, M SEVEN ONE EIGHT, LONG DESTRUCT, M FIVE SEVEN SEVEN, WHITE BAG, CHARGE FIVE ADAM, M SEVEN THREE ONE, SHORT DESTRUCT, M FIVE SEVEN SEVEN, GREEN BAG, CHARGE FOUR HE RAP, CAP OFF, CHARGE EIGHT
5	Angle from an Instrument. Aiming Point Director Number 2, 0125	AIMING POINT DIRECTOR NUMBER TWO, ZERO ONE TWO FIVE
6	Bearing. Bearing 3914 mils Bearing 2000 mils Bearing 0 mils Bearing 25 mils Bearing 800 mils	BEARING THREE NINE ONE FOUR BEARING TWO THOUSAND BEARING SIX FOUR HUNDRED BEARING ZERO ZERO TWO FIVE BEARING ZERO EIGHT HUNDRED

Figure 4 - 12 The Form in Which Orders are Spoken (1 of 3)

DUTIES AT REGIMENTAL HEADQUARTERS
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SER	ORDER REQUIRED	ORDER AS SPOKEN
(a)	(b)	(c)
7	Direction. Direction 2200 mils Direction 60 mils Direction 200 mils	DIRECTION TWO TWO HUNDRED DIRECTION ZERO ZERO SIX ZERO DIRECTION ZERO TWO HUNDRED
8	Elevation. Elevation 1000 mils Elevation 200 mils Elevation 31 mils Elevation 1147 mils Elevation 362 mils	ELEVATION ONE THOUSAND ELEVATION TWO HUNDRED ELEVATION THREE ONE ELEVATION ONE ONE FOUR SEVEN ELEVATION THREE SIX TWO
9	Fuze Corrections. Number 1 Lengthen 0.6 Number 2 Shorten 1.2	FUZE CORRECTION, NUMBER ONE, LENGTHEN POINT SIX FUZE CORRECTION, NUMBER TWO, SHORTEN ONE POINT TWO
10	Fuze Setting. Fuze 1.9 Fuze 10.0 Fuze 14.2	FUZE ONE POINT NINE FUZE ONE ZERO POINT ZERO FUZE ONE FOUR POINT TWO
11	Observer's Alteration to Fuze Setting. Shorten Fuze 1.0	SHORTEN FUZE ONE POINT ZERO
12	Interval. 30 seconds 1 minute 25 seconds	THREE ZERO SECONDS EIGHT FIVE SECONDS
13	Linear Measurement in metres. 400 825 1600 1850 11375	FOUR HUNDRED EIGHT TWO FIVE ONE SIX HUNDRED ONE EIGHT FIVE ZERO ONE ONE THREE SEVEN FIVE
14	Number of Rounds FFE. 12 rounds FFE One round FFE VT in Effect, Eight Rounds	ONE TWO ROUNDS FIRE FOR EFFECT ONE ROUND FIRE FOR EFFECT VT IN EFFECT, EIGHT ROUNDS

SER	ORDER REQUIRED	ORDER AS SPOKEN
(a)	(b)	(c)

Figure 4 - 12 The Form in Which Orders are Spoken (2 of 3)

15	Target Grid Corrections. Left 30 metres Add 50 metres Right 180 metres Drop 800 metres	LEFT THREE ZERO ADD FIVE ZERO RIGHT ONE EIGHT ZERO DROP EIGHT HUNDRED
16	Target Number. ZP 1700 ZT 2000 ZU 1983	ZULU PAPA ONE SEVEN HUNDRED ZULU TANGO TWO THOUSAND ZULU UNIFORM ONE NINE EIGHT THREE.
17	Time. TOT 1100 hours	TOT ONE ONE HUNDRED HOURS
18	TOF. Ready 27 seconds Number 3 Shot 1 minute 10 seconds	READY, TWO SEVEN SHOT THREE, SEVEN ZERO

Figure 4 - 12 The Form in Which Orders are Spoken (3 of 3)

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

CHAPTER 5 CONDUCT OF FIRE MISSIONS

SECTION 1 INTRODUCTION

GENERAL

1. This chapter sets out the procedures used at the gun position for the engagement of targets. Since it is impossible to provide ready-made solutions for every problem which might arise, RCPOs and CPOs must be prepared to adapt the fire mission procedures outlined in this chapter to meet prevailing circumstances.

PRINCIPLES

2. For the efficient application of the procedures stated in this chapter, CP officers at all levels must have a thorough knowledge of fire discipline, and an understanding of observation and communication procedures.

3. These procedures must be applied sensibly. If the meaning of an order is clear it shall be acted upon. The CPO must be capable of interpreting the observer's orders and fire must not be delayed simply because an order does not conform exactly to an explanation or procedure given in this manual.

4. Throughout this chapter, the terms observer and CPO are used in their generic sense and are used to designate all originators of calls for fires and personnel responsible for the production of firing data.

THE PRODUCTION OF GUN DATA

5. **General.** Gun data is produced in the battery CP. The primary means of calculating gun data will be a MiliPAC. The secondary means will be another MiliPAC. When both MiliPACs are non-serviceable, MAPS will be used. The CPO is responsible for the organization of work in the CP; during a fire mission he must personally supervise and check

the work of the CP staff and issue orders to the guns. All orders from the observer and reports from the CPO shall be recorded on the Artillery Fire Orders (AFO) pad. Orders necessary for the production of gun data shall be recorded. A printed record of gun data must be maintained by use of either a TTY printout or Gun Position Officer's Technician (GPOT) proforma.

6. **Altitude.** The altitude may be ordered by the observer. When it is not, it is determined by the CPO.

7. **Conventions.** The following conventions apply in the determination of gun data:

- a. adjusting guns shall be converged during adjustment for all missions except as stated in subparagraph 7d below;
- b. the CPO shall fire the guns during FFE with a circular fall of shot with a standard radius, e.g., 30 m for 105mm and 50 m for 155mm unless otherwise ordered or required;
- c. when using manual plotting devices in a dispersed position, all guns will be converged in both adjustment and FFE; and
- d. when using manual plotting devices in a close position the guns will fire with lines of fire parallel.

8. **Detailed Procedures.** The detailed procedures for determining the bearing, elevation, convergence, fuze settings, fuze corrections, drift and C of M for the engagement of a target are contained in B-GL-306-008/FP-001, *Instruments*. Subsequent paragraphs in this article give background discussion for an understanding of these procedures and their relationship to the instructions given throughout this chapter.

9. **C of M.**

- a. The elements that comprise the C of M and the method of calculating and circulating the corrections are explained in B-GL-306-006/FP-001, *Ballistics and Ammunition* and B-GL-306-008/FP-001, *Instruments*.

DUTIES AT REGIMENTAL HEADQUARTERS
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The methods of determining the met corrections are accurate only for targets at the same altitude as the guns and under stable met conditions.

- b. Artillery met sections are capable of obtaining accurate measurements of the atmosphere, but these measurements pertain only to one location and one instant in time. The values of wind, air density and air temperature continuously undergo a complex, inconsistent variation, both in time and space. Occasionally, these weather variables may change over a short distance or over a brief interval of time. On other occasions, the change may be extremely gradual with respect to both distance and time. Trajectories will always be some distance from where the weather elements were actually measured. In addition, some time will elapse between the measurement of atmospheric conditions and the firing of the guns. Generally, the validity of a met message will decrease with increasing distance from the met station. Local topography has a pronounced effect on the distance over which the met data may be reasonably extended. For example, mountainous terrain will affect wind speed and direction, causing large variations over short distances. The proximity of bodies of water will have an effect on both the time and space validity of met messages, because of the existence of land and sea breezes and the effect of humidity on density. It is impossible to determine a specific distance for every combination of weather and ground, but the following data may be used as a guide in determining the validity of a met message:

- (1) over fairly level terrain – valid up to 30 km;
- (2) along a coast line – valid up to 20 km; and
- (3) in mountainous terrain – the valid distance should be reduced by approximately 50%.

- c. Because of the changing nature of weather data, the validity of the met message will decrease as time passes. Under stable conditions a met message may be valid for up to 12 hours. It is difficult, with existing equipment, for artillery met sections to produce data much more frequently than at two-hour intervals. The met message includes the times for which the data is rated.

10. **Ammunition.**

- a. **Projectile and Fuze.** For unobserved fire, the best results will be obtained by using projectiles of the same ballistic performance as those which the firing table is compiled. In any case, projectiles of the same type and weight should be used throughout any one mission.
- b. **Charge Selection.** The observer will normally leave the selection of the charge to the CPO, who must consider the following factors:
 - (1) **The Range to the Target.** There must be a sufficient range margin to allow for adjustment by the observer.
 - (2) **Registration Data.** If a registration correction is available, its use will allow a more accurate correction for non-standard conditions than that obtained from met messages.
 - (3) **Probable Error.** Best results will be obtained by using the charge with the smallest probable error at the range concerned.
 - (4) **Crest Clearance.** The lower the charge the higher the trajectory and, therefore, the less likelihood of crest clearance problems.
 - (5) **Controlled Variable Time (CVT) Fuzes.** The higher the charge the smaller is the angle of fall. As CVT fuzes burst closer to the ground and are more effective at large angles

DUTIES AT REGIMENTAL HEADQUARTERS
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of fall, the lowest charge possible should be used.

- (6) **Mechanical Time (MT) Fuzes.** The higher the charge and consequently the higher the velocity of the projectile, the smaller will be the height zone of the fuze. The lower angles of fall which result from higher charges also produce a greater spread of fragmentation. Therefore, the highest charge possible should be used when firing HE time.
- (7) **Carrier Shells.** For the most effective ejection of the contents of the carrier shell, a low remaining velocity is required. Therefore, the lowest possible charge should be selected when using carrier shells.
- (8) **DPICM/Artillery-Delivered Scatterable Mines.** These projectiles are activated by a mechanical time fuze. At longer ranges the highest possible charge should be used to produce consistent dispersion of the submunitions.
- (9) **Barrel Wear.** Higher charges produce greater barrel wear.
- (10) **White Bag/Green Bag, Charges 3, 4 and 5.** There is an apparent choice between Green Bag and White Bag for charges 3, 4 and 5. In fact, Green Bag should always be used in preference to White Bag for these charges. This is because the burning rate of the White Bag is not fast enough at the lower pressures to ensure that the position of all-burnt is well back in the barrel. It is found that with White Bag charges 3 and 4, the position of all-burnt is often at, or outside, the muzzle; excessive muzzle flash occurs and fall of shot is erratic. When White Bag charge 3 is fired, there is a

danger of partially burnt propellant gases burning on exposure to air as the breach opens under its automatic action. This can cause a flash inside the cab. For these reasons, White Bag charges 3 and 4 should not be fired except in an emergency.

- c. **Propelling Charges.** The most important considerations in selecting and handling propelling charges are discussed below.
- (1) **Type of Propellant.** The same type of propellant must be used throughout the engagement of any one target.
 - (2) **Propellant Lots.** A single propellant lot should generally be used throughout the engagement of any one target.
 - (3) **Storage.** Propelling charges should be protected from the direct rays of the sun. They should be stored in conditions which ensure that changes in the surrounding temperature are kept to a minimum and that such changes are not rapid. The propelling charges should be stacked in their containers with the lids closed. If no permanent cover is available, the stack should be shielded by either a tarpaulin or an eight-cm layer of earth. There should be at least 15 cm of air space between the cover, top and sides of the ammunition pile. The containers should not be stacked more than six tiers high. Of equal importance is that all guns utilize the same method of ammunition storage to ensure uniformity of charge temperatures. Ammunition for unobserved fire should be in position for several hours.
 - (4) **Propellant Temperature.**
 - (a) Regular and careful measurements of propellant temperature must be made.

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Normally, measurements taken to coincide with the receipt of met messages are sufficient.

- (b) If the surrounding temperature is changing rapidly, the centre of the propellant may have a considerably different temperature from the surroundings. Therefore, it will be difficult or impossible to determine the effective propellant temperature, i.e., the propellant temperature to be used in calculating the C of M. Also, if the surrounding temperature is changing rapidly, different propelling charges in the same stack may be at appreciably different temperatures and a measurement made on one may give misleading results for the stack as a whole. If the surrounding temperature is changing very slowly, no part of the propelling charge will be seriously different in temperature from the immediate surroundings.
- (c) To measure the propellant temperature, one of the containers from the middle of the pile is opened, and the thermometer placed inside the cartridge case. The container is closed and the thermometer left in place for at least 10 minutes. The container is then opened and the thermometer read at once. The container in which the thermometer has been placed should be clearly marked in order to avoid damage to, or loss of, the thermometer.
- (d) Accurate measurement of propellant temperature is of vital importance

during the calibration of guns (see B-GL-306-007/FP-001, *Calibration*).

11. **Bearings and Convergence.**

- a. **Map Bearing.** The map bearing is the computed grid bearing measured from battery centre to the target location.
- b. **Bearing.** Bearings as read from the computing device include map bearing and convergence corrections. They are ordered to the guns as BEARING __.
- c. **Bearing Correction.**
 - (1) The bearing correction is the total correction to be applied to the map bearing to obtain the predicted bearing to the target. It may incorporate corrections to account for the effect of:
 - (a) projectile drift;
 - (b) prevailing met conditions;
 - (c) rotation of the earth; and
 - (d) errors in survey or orientation of the guns.
 - (2) Bearing corrections may be derived from:
 - (a) registration;
 - (b) witness point; or
 - (c) the sum of correction for drift, correction for met conditions computed from the met message, and correction for the rotation of the earth.

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(3) The bearing correction is ordered to the guns as a component of bearing or convergence.

d. **Convergence.** When CONVERGE is ordered or applied by convention, the convergence applied to the bearing will be the algebraic sum of:

(1) the bearing correction for non-standard conditions and drift; and

(2) the convergence for each gun (read from the CPFC graph or produced directly by the computing device).

12. **Range, Gun Corrections and Elevations.**

a. **Range Correction.**

(1) The range correction is the total correction to be applied to map range to obtain the predicted range. It may incorporate a correction for:

(a) prevailing met conditions;

(b) rotation of the earth;

(c) errors in survey;

(d) the difference between the firing table MV and the mean battery MV or individual gun MV; and

(e) non-standard projectile weight.

(2) The range correction may be derived from:

(a) registration;

(b) witness point; or

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- (c) the sum of met conditions, the difference between the firing table MV and the mean battery MV or individual gun MV, correction for rotation of the earth, and correction for non-standard projectile weight.
- b. **Gun Correction.**
 - (1) A gun correction is the total correction applied to compensate for:
 - (a) difference altitude between battery centre and target; and
 - (b) the range displacement and difference altitude from battery centre to individual guns.
 - (2) When unadjusted for range displacement, the gun correction will only include a correction for difference altitude.
 - (3) When converge is ordered or applied by convention, the gun correction applied will include a correction for both difference altitude and displacement.
- c. **Elevation.** Map ranges are read from the computing device, added to the gun correction and range correction by the computing device to produce a quadrant elevation. This may be ordered as ELEVATION __ as a separate gun correction and elevation.
- d. **Alterations to the Trajectory for HE Time .**
 - (1) A projectile follows a trajectory established by a given set of coordinates. When the projectile bursts in the air, it does so along the established trajectory but short of the point where it would have struck the ground. In order to compensate for this fact and place the

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air burst over the target at a correct height of burst (HOB), the trajectory is raised 20 m by applying a factor to the QE (see Figure 5-1). The CPO computes this factor using the formula: $20/R$, where R = Range to the target in thousands of metres. E. g.: Range 10,000 m, $20/R = 20/10 = 2$.

- (2) The factor is incorporated in the gun correction.
- (3) The factor is applied immediately before the first air burst round(s), except when high angle has been ordered.

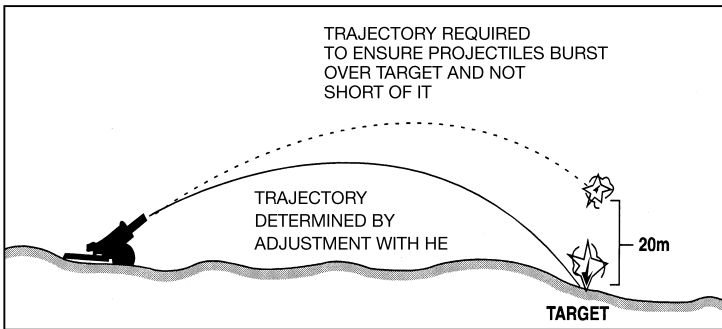


Figure 5 - 1 Raising the Trajectory by the Use of $20/R$

- e. **Projectile Weight Correction.**
 - (1) Firing tables are based on a projectile of standard weight. When ammunition other than standard weight is fired a correction to compensate for loss or gain of range must be applied.
 - (2) Normally the correction will be found at the setting-up range for each charge and applied to the range correction as part of total corrections. However, when a target has been adjusted with

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standard weight projectiles and a different weight projectile is to be used at FFE, e.g., WP, the correction is applied automatically by the computing device. In the manual solution it can best be applied by:

- (a) determining the correction at the last map range;
 - (b) adding the projectile weight correction; and
 - (c) producing an elevation for the new range.
- (3) Standard weight ammunition is desired. However, if a registration is conducted with non-standard weight ammunition, the correction must be removed before circulating the registration correction. This is accomplished by determining the projectile weight correction at the range to the registration point and subtracting it from the range correction for circulation. Computing devices do this automatically.

f. **Quadrant Laying.**

- (1) Quadrant laying shall be ordered when greater consistency of laying is required, if it is desirable to lay for fractions of a mil, or if there is mechanical damage to the range quadrant.
- (2) Whenever quadrant laying is ordered, elevations will be determined by normal procedures and ordered to the nearest mil. In order to calculate a small range correction, e.g., 10 m in a destruction mission, the CP will determine the elevation using mathematical interpolation and order it to the nearest 0.1 of a mil.

DUTIES AT REGIMENTAL HEADQUARTERS
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- (3) If quadrant laying is ordered at the beginning of the fire mission, no special action need be taken except that the CPO shall order QUADRANT LAYING in his initial orders to the guns. As gun corrections and C of M corrections have been added to the A/E by the computing devices to produce a QE it shall be ordered as produced.
- (4) If quadrant laying is ordered after firing has commenced, the CPO must also order report QE, e.g., QUADRANT LAYING, REPORT QE. The QE reported by the gun will be converted to a range. If there is a difference between this range and the range determined by the computing device, the CPO will order the range converted from the gun QE adopted for use in the computing device. If a target is subsequently ordered recorded, the final range must be reduced to a map range.

13. **Fuze.**

a. **Fuze Setting.**

(1) **Mechanical Time Fuzes.**

- (a) The fuze setting depends on TOF. The fuze setting corresponding to predicted range will not normally produce the correct HOB since the effects of non-standard conditions will result in a trajectory and a TOF that do not correspond to the ballistic trajectory that would have been produced by a given predicted elevation under standard conditions.
- (b) The total alteration to be applied to the fuze setting corresponding to predicted range is known as the fuze

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C of M. The alteration is determined by three methods: conducting a time registration. This is the simplest and most accurate method and is preferable to the other two because it automatically compensates for unmeasurable effects such as those resulting from storage conditions and manufacturer's tolerance; computation, using the current met message and applicable fuze correction factors from the firing table for given conditions of MV, wind, air temperature, air density and projectile weight; or noting the correction required for the adjustment of fuze length during the engagement of a target with HE time.

- (c) **CVT Fuzes.** The setting for CVT fuzes shall be determined by rounding down to the nearest full second the fuze setting corresponding to the predicted range or the setting for time fuzes, depending on which information is available. CVT fuzes are referred to as VT during all orders for a fire mission.

b. **Fuze Corrections.**

- (1) A fuze correction is the correction applied to the fuze setting to compensate for either the displacement between battery centre and individual guns and/or non-standard conditions.
- (2) Fuze corrections are applied only when mechanical time fuzes are in use.

DUTIES AT REGIMENTAL HEADQUARTERS
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OUTLINE CONDUCT OF A FIRE MISSION

14. **Stages.** A fire mission is normally conducted in five stages:
 - a. a call for fire by the observer (or higher HQ) and the production of opening gun data;
 - b. adjustment, if required;
 - c. FFE;
 - d. the recording of the target, if necessary; and
 - e. the termination or suspension of the fire mission.

15. **Call For Fire.**
 - a. The CPO shall order the gun detachments to take post by ordering FIRE MISSION ____.
 - b. The remaining initial orders shall be given by the CPO to the gun detachments in the correct sequence as data becomes available.
 - c. The CPO shall inform the RCPO when the battery or any part of it is engaging a target, eg., ENGAGED TWO GUNS, GRID 893242, MACHINE GUN DUG IN RADIUS 10.

16. **Adjustment.** Adjustment is the process of determining the correct bearing, range and HOB (when time fuzes are used) to a target by corrections obtained from the observation of the fall of shot. While these corrections may come from locating devices, they are normally sent by a ground or air observer. The procedures used by the observer are detailed in B-GL-306-003/FP-001, *Duties of the Battery Commander and the Observers*. The detailed procedures for applying these corrections and calculating gun data are given in B-GL-306-008/FP-001, *Instruments*. The size of a short bracket is dependent upon the number of guns (size of fire unit) to engage at FFE (see Figure 5 -2). FFE is normally opened at the split of the short bracket.

SER	NUMBER OF FIRE UNITS	SIZE OF SHORT BRACKET
(A)	(b)	(c)
1	BATTERY or Less	100 m
2	REGIMENT or Less	200 m
3	DIVISION or Less	400 m

Figure 5 - 2 Short Brackets

17. Fire For Effect.

- a. Once fire has been adjusted onto the target, the observer may order an appropriate volume and type of FFE.
- b. Observers may omit, in the call for fire, reference to the volume of ammunition required in FFE. The CPO or RCPO as applicable is then responsible for determining and reporting it in a message to the observer, as described in Chapter 4. The volume selected shall be based on the target and consideration of the quantity and types of ammunition available.
- c. In some cases, target engagement may commence with FFE with no preceding adjustment.

18. Recording of Target. When a target is to be recorded, the CPO shall follow the procedure outlined in Chapter 6.

19. Termination of a Fire Mission.

- a. On completion of a fire mission, the CPO shall order END OF MISSION when received from the observer and when all required action on the guns, e.g., recording, has been completed.
- b. The results of an engagement will be reported by the observer to the CP concerned. The CP will pass this information to higher headquarters and to the gun detachments.

20. A sequence of events within the battery CP for a battery fire mission is detailed in Figure 5 -3.

DUTIES AT REGIMENTAL HEADQUARTERS
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SER	CPO	CP TECH
(a)	(b)	(c)
1	Alerts the guns on receipt of fire orders	
2	Plots the grid reference of the target on the check map (Note 1)	
3		Enters information into the computing device and produces gun data. (Notes 2 and 3)
4	Transmits opening round data to the gun(s) (once checked for error)	(Note 4)
5	Orders FIRE or Reports READY as applicable	
6	Ensures that the RCPO is informed of the engagement	
7		Prepares the computing device for target grid corrections
8	Reacts to fire orders from the observer	
9		Enters corrections as ordered and produces gun data
10	Supervises the production of gun data and controls the firing of the guns	
11	Makes reports as necessary and takes all possible steps to avoid delay	
12	Conducts the fire mission in accordance with the full intentions of the observer	
13		Produces gun data as required
14	If the target is ordered recorded, ensure the data at which the gun has fired is used in the production of the target records	
15		If the target has been ordered recorded, passes data to other CPs as required (Notes 5, 6 and 7)

Figure 5 - 3 Sequence of Events Within the Battery CP for a Battery Fire Mission (1 of 2)

CONDUCT OF FIRE MISSIONS

SER	CPO	CP TECH
(a)	(b)	(c)
16	On receipt of END OF MISSION, terminates the mission and ensures necessary reports are sent to the next higher CP	
17	Ensures that the CP equipment is completely ready for the next mission	
<p>NOTES</p> <ol style="list-style-type: none"> 1. This is done to ensure that the target can be engaged without endangering our own troops and that there is no crest clearance problem; to determine the altitude of the target if not ordered and confirm the charge selected; and to check the data produced by the technicians. If the target appears to be unsafe, see Section 9. 2. During simultaneous missions using MilipAC, a single technician using one device will plot each mission with the CPO producing the check data for both. 3. During simultaneous missions using manual plotting devices, a single technician may be used on each mission with the CPO producing check data for both. 4. Opening round data is produced in the sequence of the CPO's orders to the guns. 5. The CPO will check the data before they are passed. 6. CPO ensures data are passed to other batteries and regimental CPs as applicable. 7. For missions utilizing more than one battery the CPO will ensure that the adjusting battery (whether his battery or another's) is entered in the target record book. The CPOs shall fire using the data from the printout only as long as the met remains current. 		

Figure 5 – 3 Sequence of Events Within the Battery CP for a Battery Fire Mission (2 of 2)

**DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION**

SER	DATA	OBSERVED FIRE
(a)	(b)	(c)
1	Bearing	10 mils
2	Range	100 m
3	Angle of Sight or Site	1 mil
4	Fuze Setting	Equivalent of 100 m of range
5	Elevation	Equivalent of 100 m of range
<p>NOTES</p> <ol style="list-style-type: none"> 1. If at any stage of a mission there is a disagreement between the data produced by the CP Technicians, the CPO shall order VERIFY followed by the element that is suspect, e.g., VERIFY BEARING, VERIFY ELEVATION. If this check does not eliminate the error, the CPO shall order REPLOT, and the CP Technicians shall replot from the last agreed data, repeating all subsequent steps. 2. The CPO's tolerance for checking on a 1:50,000 map is 20 mils for bearing and 200 m for range regardless of the means of computation of gun data. 		

Figure 5 - 4 Checking Limits for the Production of Gun Data Between Two Manual Systems

**SECTION 2
AREA NEUTRALIZATION (AN) WITH HE**

INTRODUCTION

21. The neutralization of an area with HE is the most common type of engagement and is the basic procedure. High Explosive Point Detonating (HEPD) is the basic projectile and fuze combination for adjustment and for FFE against targets that do not require special ammunition. HEPD is a bursting projectile which detonates on impact, causing casualties by blast and fragmentation.

22. An example of a battery fire mission using HEPD is shown at Figure 5-5.

CONDUCT OF FIRE MISSIONS

SER	OP	GPO/CPO	
	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 12 FIRE MISSION BATTERY	READ BACK ALL FIRE ORDERS	
2			FIRE MISSION BATTERY
3	GRID 167 321 ALTITUDE 350 DIRECTION 2300 PLATOON DIGGING IN RADIUS 80 SEVEN ROUNDS ADJUST FIRE		
4		(NOTE 1)	HE, QUICK, GREEN BAG, CHARGE 5, NUMBER 2 LOAD BEARING 2308 ELEVATION 532 NUMBER 2, ADJUST FIRE
5		SHOT 2, 34	
6	RIGHT 70 ADD 400		
7			BEARING 2352 ELEVATION 532
8	MISSION CONTINUES		
9	ONE ROUND FFE		
10			LOAD (NOTE 2)
11			BEARING NO 1 2362 NO 2 NO 3 NO 4 NO 5 NO 6
12			ELEVATION NO 1 524 NO 2 ... NO 3 ... NO 4 ... NO 5 ... NO 6 ...
13			ONE ROUND FFE
14		SHOT	
15		ROUND COMPLETE	
16	FFE		
17			SIX ROUNDS FFE
18		SHOT	
19		ROUNDS COMPLETE	
20	END OF MISSION		
21	PLATOON DISPERSING		
22		(NOTE 3)	END OF MISSION PLATOON DISPERSING
NOTES			
1. Sends engagement report to RCPO.			
2. Load may be ordered prior to the issue of bearing to speed up activity on the guns; however, this is not mandatory.			
3. Sends availability report to RCPO.			

Figure 5 - 5 Example of an AN Mission Using HEPD

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

HE AIR BURST

23. The types of HE air burst ammunition are as follows:
- a. **HE Time.** The time fuze has a clock-work mechanism controlled by a fuze setting. The HOB achieved with the time fuze is less consistent than that achieved with the VT fuze because of the probable error of its mechanism; therefore, it is normal to adjust for fuze length.
 - b. Under certain circumstances such as when other time targets have recently been fired and a correction has been calculated fuze settings may be predicted.
 - c. **HE Variable Time (VT).** The VT fuze is an electrical, battery-powered proximity fuze. The fuze will automatically cause detonation of the projectile at a predetermined height above the target. A time setting on the fuze prevents it from being armed until it is approximately three seconds from the expiry of the fuze setting, thus reducing susceptibility to premature detonation caused by intervening crests or active EW until these last three seconds of flight.
24. **Use of Impact Fuzes During Adjustment.** During adjustment, HEPD is normally used until a short bracket is achieved. The air burst fuze is used at the split of the short bracket or when a round has been seen to burst in the target area.
25. **Procedure.** The procedure at the gun position when using HE air burst varies from the basic HEPD procedure in the following respects:
- a. **Initial Orders.** The CPO shall always order the preparation of the number of air burst rounds to be used in FFE, e.g., PREPARE SIX ROUND HE TIME PER GUN.
 - b. **Adjustment With Time.**

CONDUCT OF FIRE MISSIONS

- (1) By convention three guns are used to adjust HE time. When the observer orders TIME coupled with REPEAT or a target grid correction during adjustment, the CPO shall:
 - (a) order the ammunition to the guns;
 - (b) apply the equivalent of 20/R to the gun correction of all guns taking part in the engagement. This is done automatically by computing devices; and
 - (c) order the fuze setting, e.g., FUZE TWO SEVEN POINT TWO.
 - (2) Subsequent corrections to the HOB shall be converted to a new fuze setting for CPs equipped with a manual device. MiliPAC will alter the QE.
- c. **Adjustment with VT.** Normally, no adjustment to the HOB is required for VT fuzes.
- d. **FFE** (see Figures 5-6 and 5-7).
- (1) When HE time is used in FFE, the CPO shall ensure that the equivalent of 20/R is applied unless this has been done during adjustment.
 - (2) If the observer orders a target grid correction during FFE in an air burst mission, the CPO shall order the correction in the normal manner, ensuring that he also orders a new fuze setting to compensate for any change in range.
 - (3) If the observer has adjusted the HOB prior to ordering a target grid correction during FFE, the new fuze setting ordered to the guns must incorporate this adjustment for HOB.

SER	OP	CPO
-----	----	-----

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY	READ BACK ALL FIRE ORDERS	
2			FIRE MISSION BATTERY
3	GRID 284 624 ALTITUDE 100 DIRECTION 0620 MGs DUG IN RADIUS 100 TIME IN EFFECT, FIVE ROUNDS AMC ADJUST FIRE		
4		(NOTE 1)	
5			HE, QUICK, CHARGE 6 PREPARE FIVE ROUNDS TIME PER GUN BEARING 1420 AMC ELEVATION 400 NO 4 ADJUST FIRE MGS DUG IN
6		READY 24	(GUNS REPORT READY TO CP)
7	FIRE		FIRE
8		SHOT 4	
9	CANCEL AMC ADD 400		CANCEL AMC BEARING 1430 ELEVATION 382
10		SHOT	
11	TIME DROP 50 (NOTE 2)		
12			TIME BEARING NO 3 1423, NO 4 1425, NO 5 1427 FUZE NO 3 16.0, NO 4 16.1, NO 5 16.2 AMC (NOTE 3) ELEVATION NO 3 389, NO 4 391, NO 5 393 NO 3, 4 AND 5 ADJUST FIRE (GUNS REPORT READY) FIRE

Figure 5 - 6 Example of an AN Mission Using HE Time (1 of 2)

13		SHOT ROUNDS COMPLETE	
14	UP 40		

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
15			FUZE NO 3 15.7, NO 4 15.8, NO 5 15.9 ELEVATION NO 3 389, NO 4 391, NO 5 393 (GUNS REPORT READY) FIRE
16		SHOT	
17	FFE		BEARING NO 1 1419, NO 2 1421, FUZE NO 1 15.5 ... CANCEL AMC ELEVATION NO 1 393 ... FIVE ROUNDS FFE
18		SHOT	
19		ROUNDS COMPLETE	
20	RECORD AS ZP 3762 END OF MISSION, MGs NEUTRALIZED		
21			RECORD AS ZP 3762, END OF MISSION, MGs NEUTRALIZED
22		ZP 3762 RECORDED	
23		(NOTE 4)	
NOTES			
<ol style="list-style-type: none"> 1. Sends engagement report to RCPO. 2. By convention three guns shall be used in adjustment. 3. The CPO shall control the moment of firing when more than one gun is used in adjustment. 4. Sends availability report to RCPO. 			

Figure 5 - 6 Example of an AN Mission Using HE Time (2 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SER	OP	CPO	
	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY	(READ BACK ALL ORDERS)	
2			FIRE MISSION BATTERY
3	FROM ZP 1738 DIRECTION 1220 RIGHT 400 DROP 200 MORTARS DUG IN RADIUS 100 VT IN EFFECT SIX ROUNDS ADJUST FIRE	(NOTE 1)	
4			HE, QUICK, GREEN BAG, CHARGE 4 NO 3 LOAD PREPARE SIX ROUNDS VT PER GUN BEARING 6101 AMC ELEVATION 468 NO 3 ADJUST FIRE MORTAR POSITION
5			FIRE
6		SHOT 3, 24	
7	LEFT 200 ADD 400		
8			BEARING 6010 ELEVATION 453
9	(MISSION CONTINUES)	SHOT	
10	DROP 50 ONE ROUND FFE		VT
11			BEARING NO 1 6015, NO 2 ... FUZE NO 1, 2 AND 3, 23.0 NO 4, 5 AND 6, 24.0 ELEVATION NO 1 457, NO 2 ... ONE ROUND FFE

Figure 5 - 7 Example of an AN Mission Using HE VT (1 of 2)

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
12		SHOT	
13		ROUNDS COMPLETE	
14	FFE		
15			FIVE ROUNDS FFE
16		SHOT	
17		ROUNDS COMPLETE	
18	END OF MISSION MORTARS STOPPED FIRING		
19		(NOTE 2)	END OF MISSION MORTARS STOPPED FIRING
NOTES			
1. Sends engagement report to RCPO. 2. Sends availability report to RCPO.			

Figure 5 - 7 Example of an AN Mission Using HE VT (2 of 2)

**SECTION 3
HIGH ANGLE FIRE**

GENERAL

26. High angle fire is fire delivered at elevations greater than the elevation corresponding to the maximum range for each charge. It will often be required when guns fire out of a deep defilade, from a built-up area, from woods or over high terrain features and when targets are located directly behind hill crests, in jungles, or in deep gullies or ravines.

27. The fundamental difference between low and high angle fire is that in high angle fire, an increase in elevation will cause a decrease in range and an increase in TOF.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

PREPARATIONS

28. **Site (Manual System Only).**

- a. The angle of sight shall be determined and converted to site using the complementary site factors.
- b. In high angle fire, an increase in angle of sight will result in a decrease in QE. The complementary site factor is always greater than 1.0 and always has a sign opposite to that of the angle of sight.

29. **Drift.** At high angle the correction for drift will be large and will change rapidly with changes in range.

30. **Corrections for Non-Standard Conditions.**

- a. The instability of the projectile at the maximum ordinate of a high angle trajectory and the resulting imprecise firing table data, mitigate against the use of predicted fire in high angle engagements. Registration under stable weather conditions will produce good results, but the value of the results is limited by the small zone covered by each charge.
- b. The corrections for non-standard conditions which shall be applied in high angle fire are indicated below; these are automatically applied by the computing device:
 - (1) current high angle registration data, if available;
 - (2) drift;
 - (3) complementary angle of sight; and
 - (4) MV.

31. **Warning Order .**
- a. The CPO may receive a warning from an observer to prepare for a high angle mission, e.g., PREPARE FOR HIGH ANGLE AT GRID 123 456.
 - b. On receipt of this order, if the characteristics of the guns in the battery require recoil pits to be dug, the CPOs will plot the grid reference and produce a bearing. The CPO will then order TAKE POST, PREPARE FOR HIGH ANGLE AT BEARING ___ to the guns.

PROCEDURE

32. The CPO shall use the basic procedure with the following exceptions:

- a. **Initial Orders.** HIGH ANGLE shall be ordered as part of the initial orders to the guns.
- b. **Charge.** The CPO shall select the charge which is least likely to require changing as a result of observer's corrections.
- c. **Drift.** With the manual system, a fresh drift correction shall be determined after each target grid correction and added algebraically to the bearing. The resultant sum shall be ordered to the guns as a new bearing. In computing devices this is done automatically.
- d. **Site.** A fresh site shall be determined whenever the charge is changed when using manual procedures.
- e. **20/R.** The HOB shall not be raised by 20/R when firing HE air burst.
- f. **SPLASH.** The report SPLASH shall always be sent to the observer.

SECTION 4

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

REGISTRATION

GENERAL

33. The aim of registration is to determine by shooting, the corrections required to map bearing and map range to compensate for the total effects of non-standard conditions, i.e., weather, equipment, ammunition and survey errors. In general, the corrections obtained from a registration mission are more valid than those derived from a met message, because the former compensates for all non-standard conditions.

34. Under normal climatic and terrain conditions in the temperate zone, the corrections established by a registration are valid for approximately two hours and may be transferred throughout the regiment for use on targets along the same general line of fire within registration limits (see Figure 5-8).

35. Registration may be conducted in both high and low angle. A registration conducted in high angle will be of limited value because of the comparatively small range covered by one charge.

REGISTRATION LIMITS

36. The registration point should be located as close to the probable target area as tactical requirements will permit. The following limits should be used in the application of corrections from the registration for the engagement of targets:

- a. **Range.** 2,000 m plus and minus of the map range to the registration point.
- b. **Bearing.** 500 mils left and right of the bearing of the adjusting gun to the registration point.
- c. **Altitude.** Between the registration point and the target, no limit.

37. Corrections determined from a registration carried out by one fire unit may be used by other fire units provided that the following conditions are satisfied in relation to the adjusting gun (see Figure 5 -8):

- a. the guns must be of the same type, i.e., using the same firing tables;
- b. the same type of propellant of the same lot and charge must be used;
- c. the guns must be on the same grid;
- d. the altitude of the guns must be within 200 m; and
- e. the guns must be within 15,000 ms.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

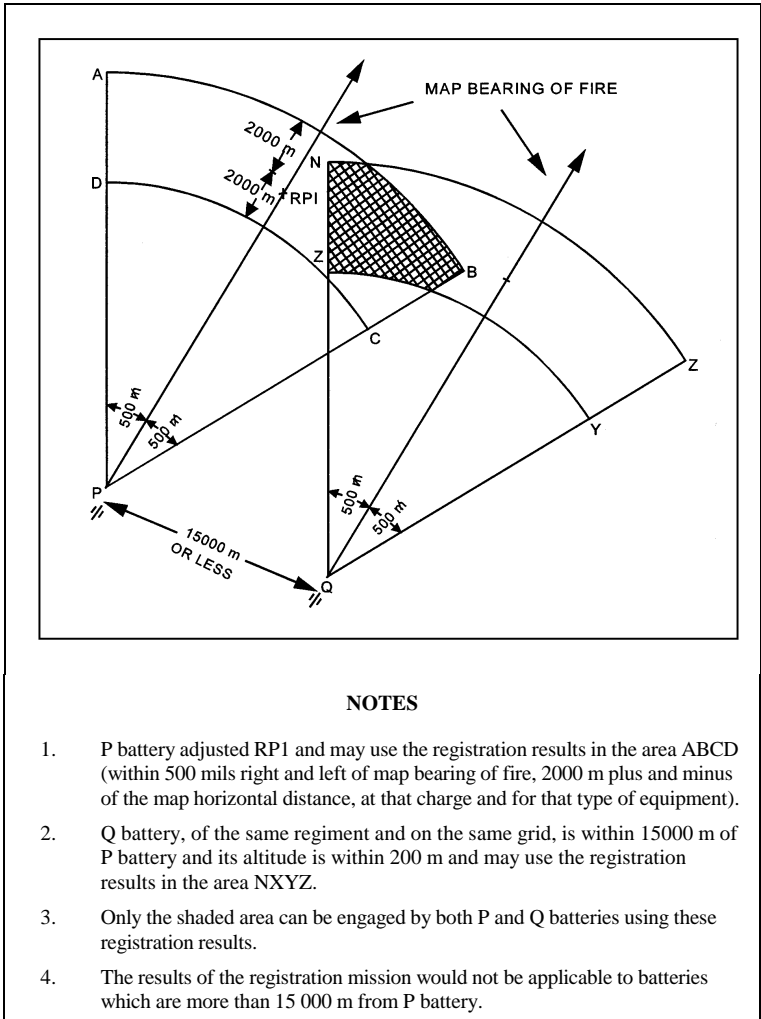


Figure 5 - 8 Registration Limits

CONDUCT OF FIRE MISSIONS

SER	DETAIL	DATA	REMARKS
(a)	(b)	(c)	(d)
1	CENTRE TO CENTRE MAP BEARING		OPENING
2	CENTRE TO CENTRE MAP BEARING FIRED		FINAL
3	BEARING CORRECTION (2- 1)		
4	OLD MET BEARING CORRECTION		
5	BEARING CORRECTION FOR ADJUSTING BTY AND CIRCULATION (3 + 4)		
6	CENTRE TO CENTRE MAP RANGE		OPENING
7	RANGE CORRESPONDING TO ELEVATION FIRED		FINAL
8	RANGE CORRECTION ADJUSTING BTY (7-6)		
9	RANGE CORRECTION FOR MUZZLE VELOCITY AND PROJ WEIGHT FOR RANGE SERIAL 6		
10	RANGE CORRECTION FOR CIRCULATION (8-9)		
11	FUZE SETTING CORRESPONDING TO RANGE SERIAL 7		OPENING
12	FINAL FUZE SETTING FIRED		FINAL
13	FUZE CORRECTION ADJUSTING BTY (12-11)		
14	FUZE CORRECTION FOR MUZZLE VELOCITY AND PROJ WEIGHT FOR RANGE SERIAL 6 (TABLE J)		
15	FUZE CORRECTION FOR CIRCULATION (13-14)		

Figure 5 - 9 Deduction of Manual Registration

38. The correction at the registration point shall be determined as shown in Figure 5-9. When the correction at the registration point has been determined, the CPO shall circulate the corrections, as required, in the form shown in Figure 5-10.

39. The time limit between the registration and the engagement of targets should not exceed two hours, if met was not available when the registration was fired. If met was available, the registration correction is valid as long as the met is updated.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

40. Corrections deduced from a registration mission shall be taken into effect when ordered by the RCPO/CPO.

SER	HEADING	EXAMPLE OF MESSAGE
(a)	(b)	(c)
1	Nature of equipment	105MM HOWITZER C1
2	Charge	6
3	Types and lot of propellant	DUAL GRAN (LOT Z)
4	Low or high angle	LOW ANGLE
5	Time of firing	0730 HOURS
6	Map bearing of fire	3316
7	Map horizontal distance	5950
8	Bearing correction	RIGHT 8
9	Range correction (to the nearest 10 m)	ADD 330
10	Fuze correction and fuze lot (if applicable)	(FUZE LOT 6X)
11	Grid reference and altitude of adjusting gun(s)	0985 7873 ALTITUDE 38

Figure 5 - 10 Form for Reporting and Circulating the Correction Derived from a Registration

CONTROL OF REGISTRATION

41. The RCPO shall normally control the implementation of the registration policy within the regiment, detailing to the batteries the:

- a. location of the registration point or points;
- b. time at which registration will take place;
- c. method of registration; and
- d. charges, propellant, lot, and the types of ammunition to be used.

42. The CPO shall inform the BC of the requirement for registration. The BC shall then order one of his observers to conduct the registration.

43. When insufficient met or registration data are available to ensure accurate fire during a fire plan, an artillery commander may decide to carry out a registration. He shall then specify the:

- a. observer,
- b. location of the registration point,
- c. time of the fire mission,
- d. method of registration,
- e. charges and types of ammunition to be used, and
- f. type of guns to be used.

METHODS

44. There are two methods of registration, either of which may be conducted using air or ground bursts. They are:

- a. **Adjustment Onto a Fixed Point.** Three guns are adjusted onto a point of known coordinates by a special adjustment procedure.
- b. **Fixation of the Mean Point of Impact/Mean Point of Burst (MPI/MPB).** A single gun is fired at constant gun data. The MPI or MPB is fixed by the accurate observation of three usable rounds, using either two observers viewing the fall of shot from different viewpoints, e.g., cross-observation, or a radar set measuring bearing and distance to the bursts. Note that the OP and guns should be on a common grid.

45. The point onto which the MPI is adjusted in the first method, or the grid reference of the MPI or MPB in the second method, is called the registration point.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

REGISTRATION BY ADJUSTMENT ONTO A FIXED POINT

46. Three guns will be used for the fire mission (see Figure 5 -9). Allied observers may order only one gun for the fire mission. In this case, great care must be taken to avoid errors since there will be no check on the validity of the registration.

47. REGISTRATION will be ordered as the type of engagement.

48. The CPO shall:

- a. obtain the accurate location of the registration point and, if necessary, inform the observer;
- b. order the ammunition, etc., in accordance with the orders he has received from the RCPO or the artillery commander; and
- c. carry out the registration.

49. The CPO shall:

- a. by convention, fire the guns converged in adjustment and FFE;
- b. pass the necessary fire orders to the guns. All available corrections should be used in computing the data for these orders, including old met if available, in order to save rounds in the adjustment onto the fixed point. They will have no effect on the registration calculation since all known non-standard conditions are removed prior to circulation;
- c. increase the elevation by 20/R before the first round of HE time, if a time registration is to be carried out; and
- d. compute the registration correction as described in B-GL-306-008/FP-001, *Instruments*.

50. An example of a Registration Mission using HEPD and Time is shown in Figure 5-11.

CONDUCT OF FIRE MISSIONS

SER	OP		CPO	
	ORDERS TO THE CP (BATTERY NET)		ORDERS TO THE OP (BATTERY NET)	
(a)	(b)		©	
(d)				
1	1 THIS IS 11 FIRE MISSION 3 GUNS			
2			(NOTE 1)	FIRE MISSION NO 1, 2 AND 3
3	GRID 6392 4786 ALTITUDE 150 DIRECTION 4790 REGISTRATION HE FOLLOWED BY TIME ADJUST FIRE			
4				REGISTRATION HE, QUICK, GREEN BAG, CHARGE 5 PREPARE THREE ROUNDS TIME PER GUN BEARING 4985 ELEVATION 461 NO 2 ADJUST FIRE
5			SHOT 2, 24	
6	RIGHT 70 ADD 200			
7				BEARING 4981 ELEVATION 501
8			SHOT	
MISSION CONTINUES				
9	ADD 50 ONE ROUND FFE			
10				BEARING NO 1 4995, NO 2 NO 3 AMC ELEVATION NO 1 488, NO 2 ... NO 3 ... ONE ROUND FFE (GUNS REPORT READY) FIRE
11			SHOT, ROUNDS COMPLETE	

Figure 5 - 11 Example of a Registration Mission Using HEPD and Time (1 of 3)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SER	OP	CPO	
	ORDERS TO THE CP (BATTERY NET)	ORDERS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	©	(d)
12	DROP 50 REPEAT (NOTE 2)		
13			BEARING NO 1 4989, NO 2 ELEVATION NO 1 484, NO 2 ... ONE ROUND FFE FIRE
14		SHOT, ROUNDS COMPLETE	
15	RECORD AS REGISTRATION POINT ONE AT A25 (NOTE 3)		
16			RECORD AS REGISTRATION POINT ONE
17	TIME, REPEAT		
18			TIME FUZE NO 1 29, NO 2 .. ELEVATION NO 1 484, NO 2 ... ONE ROUND FFE FIRE
19		SHOT, ROUNDS COMPLETE	
20	UP 40, REPEAT		
21			FUZE NO 1 29.2, NO 2, NO 3 ELEVATION NO 1 494, NO 2, NO 3 ... ONE ROUND FFE FIRE
22		SHOT, ROUNDS COMPLETE	
23	RECORD AS TIME REGISTRATION POINT ONE, END OF MISSION		

Figure 5 – 11 Example of a Registration Mission Using HEPD and Time (2 of 3)

NOTES

1. Sends engagement report to RCPO.
2. The FFE in Serial 9 all impacted plus of the registration point.
3. OP had indication of all minus rounds. It is only required to record gun data as Registration Point if using manual means, otherwise record gun data as Time Registration Point One as per Serial 23.
4. Sends availability report to RCPO.
5. CPO passes registration data to the RCPO and other batteries as applicable.
6. The observer may give a target number to the registration point.

Figure 5 - 11 Example of a Registration Mission Using HEPD and Time (3 of 3)

REGISTRATION BY VISUAL CROSS-OBSERVATION

51. **General.** This procedure may be used as an alternative to radar when the MPI or MPB method of registration is being carried out. Air bursts or ground bursts may be used. It is based on intersection, i.e., the fixation of an unknown point by observations taken at known points. Two observers are required. They must each have an optical instrument which has been fixed and oriented on the same grid as the gun to be used. The most suitable instrument is the BC's telescope; however, an aiming circle, theodolite or Laser Range-Finder (LRF) will give satisfactory results. The observers will be referred to as OP one and OP two.

52. **Procedure.**

- a. The observers' positions must be surveyed and their accurate grid references passed to the CP.
- b. When communications are established with both observers, the CPO shall indicate the area in which the registration is to be conducted. The observers will select an appropriate point within the designated area and will inform the CPO of its location by giving him either an eight-figure grid reference or their individual bearings to it.
- c. The point selected should be in such a location that the triangle formed by it and the two OPs are as close to being equilateral as possible.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- d. The CPO shall order OP one to report vertical angles and both OPs to report when they are ready to observe. When the observer receives orders or reports from the CPO, OP one shall read back and OP two shall acknowledge.
- e. The CPO shall issue complete fire orders to the adjusting gun, to include:
 - (1) the opening round data including convergence and position corrections;
 - (2) REGISTRATION;
 - (3) AT MY COMMAND;
 - (4) FUZE SETTING (if fuze C of M is to be determined); and
 - (5) ADJUST FIRE.
- f. When the observers have reported READY TO OBSERVE and the gun has reported READY, the CPO shall give the order FIRE.
- g. Each observer shall lay the centre of the reticle of his instrument on the point of impact of the first round.
- h. The CPO shall then order the firing of successive rounds with each observer reporting, after each round, the bearing observed and OP one reporting the angle of sight. If a round was not usable, REPEAT shall be ordered. A round is not usable if either observer considers that the burst is at the extreme end of the zone of the gun.
- i. When three usable rounds have been observed, the observers shall each determine the mean of the three bearings they have recorded and OP one shall determine the mean of the vertical angles. These means shall be reported to the CPO as a check on his computations.

CONDUCT OF FIRE MISSIONS

- j. If the originator's orders specified that fuze C of M must also be determined, the following additional step shall be carried out using OP one only. The CPO shall fire single rounds of HE time, after raising QE by 20/R, until the MPB of three rounds fired at the same data is 20 m above the registration point. (Allied observers may order a fourth round)
- k. Following the order from the observer to record the target, the CPO shall order RECORD AS ___, END OF MISSION to the guns.
- l. Map data to the registration point shall be determined using the computer or manually as follows:
 - (1) grid a sheet of graph paper to 1:25,000 or larger scale;
 - (2) plot the observer's locations;
 - (3) calculate the mean bearings and angles of sight received from the observers and check the results with these means sent by the observers;
 - (4) draw rays at the observers' mean bearings;
 - (5) the point of intersection of the two rays represents the registration point; the grid reference is read from the graph;
 - (6) measure the distance from OP one to the registration point;
 - (7) using the WORM rule deduce the difference in altitude; and
 - (8) apply this difference to the altitude of OP one to determine the altitude of the MPI.
- m. The CPO shall determine the registration correction.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- n. The CPO shall circulate the registration correction to the RCPO and other batteries as applicable.

RADAR REGISTRATION

53. **General.**

- a. Registration using a radar is a fast and accurate method of registration. The radar must be on the same grid as the guns to be used. The radar may only be used for this task when it can be freed from its primary role of target acquisition. The procedure does not require the radar to move from its normal deployment area, as a direct line of sight to the registration point is not necessary.
- b. The radar locates the MPI of three rounds from one gun or one round each from three guns by tracking the projectiles in flight to the point of impact. If the actual point of impact cannot be observed, the radar's computer will extrapolate the trajectory to the ground.

54. **Preliminary Procedure.**

- a. The RCPO shall determine whether or not a radar is available to conduct the registration. The RCPO will pass to the CPO of the adjusting battery and the officer controlling the radar all the details of the task, including:
 - (1) the location of the registration point, charge to be used and registration point number;
 - (2) the time at which the registration will be conducted;
 - (3) the call sign of the radar and the adjusting battery;
 - (4) whether or not air burst registration is required; and

CONDUCT OF FIRE MISSIONS

- (5) communications arrangements; normally the radar will join the battery net.
- b. For example: 2 THIS IS 0. CONDUCT RADAR REGISTRATION AT 1400 HOURS. GRID 09307210, RADAR REGISTRATION POINT ONE. GREEN BAG CHARGE FIVE. AIR BURST REGISTRATION REQUIRED. CALL SIGN_ WILL JOIN YOUR NET, OVER.
- c. The officer controlling the radar will select the most suitable radar and pass the radar registration point data to the radar. If the radar cannot observe the area and the other radar(s) are unable to observe, the radar CP may suggest to the RCPO an alternate location for the registration point that meets the technical requirements of the radar. This could occur in very rugged terrain.
- d. The radar will not be redeployed to accomplish the registration mission as this would interfere with its primary role of mortar location.

55. **Conduct of the Registration.**

- a. At the time specified by the RCPO, communications will be established.
- b. The fire mission will be ordered by the radar.
- c. The initial gun data produced will include corrections for drift, MV, abnormal projectile weight (if applicable) and met (when available).
- d. The radar detachment commander will order REPORT TIME OF FLIGHT and AT MY COMMAND.
- e. Three usable rounds, as determined by the radar detachment commander, will be required to complete the registration.
- f. On completion of the mission, the radar detachment commander will pass the grid reference and altitude of

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

the radar registration point as any MPI and the altitude of the MPB when time registration has been fired. The CPO is responsible for determining the map data to the registration point using the procedures outlined in B-GL-306-008/FP-001, *Instruments*.

LASER REGISTRATION PROCEDURE

56. **General.** A registration may be done quickly and efficiently utilizing the laser, provided the observer has been previously oriented and fixed on the same grid as the guns. It is conducted in much the same way as a radar registration.

57. **Conduct of the Registration.**

- a. At the time specified by the RCPO, the observer will order the fire mission. Polar coordinates will be used.
- b. The initial gun data produced will include corrections for drift, MV, abnormal projectile weight (if applicable) and met (if available).
- c. After the initial adjusting round has been observed and corrections ordered, the observer shall order AT MY COMMAND, BATTERY RIGHT, (APPROPRIATE INTERVAL), ONE ROUND FFE.
- d. The observer will lase each round, compute the mean direction and distance and send the information to the CP in the form DIRECTION___ DISTANCE ___ and any alteration in altitude (if applicable). He will then order END OF MISSION only if the MPI is less than 25 m from the target centre; if not, proper corrections followed by repeat will be used until successful MPI is achieved.
- e. The CPO is responsible for determining the registration data to be passed using the procedures outlined in B-GL-306-008/FP-001, *Instruments*.

SECTION 5
LINEAR FIRE MISSIONS

GENERAL

58. When it is necessary to engage a target of specified length and attitude but with little depth, e.g., a defile, road, railway track, embankment or the forward edge of a wood, the linear target procedure is used. As its name implies, this procedure distributes fire evenly along a straight line.

59. The observer will include in his call for fire the:

- a. location of the target's centre point;
- b. length and attitude of linear will be included in the target description; and
- c. order LINEAR as the distribution of fire.

PROCEDURE

60. The following are planning figures for the linear lengths:

- a. battery 105mm – 200 m or less; and
- b. battery 155mm – 300 m or less.

61. The OP will determine how many batteries are required to engage the linear by dividing the length of the linear by the distance of a battery coverage, e.g. 105 mm - length 800, $800/200 = 4$ batteries. The OP shall then order FIRE MISSION REGIMENT (four batteries regiment).

62. The RCPO shall coordinate the spread of the regiment on the linear. The RCPO shall divide the length of the linear by the total number of batteries ordered. The battery's aim points will then be moved according to the attitude ordered. For example, if two batteries are required to engage the linear. The OP orders LENGTH 600 ATTITUDE 1600. The RCPO (155 mm) shall divide 600 m by two batteries and give

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each battery a length of 300 m and a spread between battery aim points of 300 m. The RCPO shall order to the batteries: DIRECTION 1600, LENGTH 300, 1 ADD 150, 2 DROP 150. Linear with lengths greater than the 800 m (105 mm) and 1200 m (155 mm) must be engaged by more fire units or broken up into parts and engaged sequentially.

63. The basic procedure is used for determining and checking the gun data to the aiming point ordered.
64. When FFE is ordered each battery will spread its fire over the length of the linear as ordered.
65. See Figure 5-12 for an example of a linear fire mission.

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY		
2			FIRE MISSION BATTERY
3	GRID 124 836 ALT 180 DIRECTION 1380 ATK POSN 200 ATTITUDE 1850 EIGHT ROUNDS LINEAR AMC ADJUST FIRE		
4		(NOTE 1)	HE, QUICK, WHITE BAG, CHARGE 5 PREPARE EIGHT ROUNDS PER GUN BEARING 2193 ELEVATION 362 NO 3 ADJUST FIRE
5		SHOT 3, 24	
6	DROP 400		
7			BEARING 2183 ELEVATION 358
8		SHOT	
9	(MISSION CONTINUES) AMC FFE	(NOTE 2)	
10			BEARING NO 1 2179, NO 2 NO 3 AMC ELEVATION NO 1 354, NO 2 ... ETC. EIGHT ROUNDS FFE
11		READY	
12	FIRE		
13			FIRE

Figure 5 - 12 Example of a Linear Fire Mission (1 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
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SER	OP	CPO	
	ORDERS TO THE CPs (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
14		SHOT	
15		ROUNDS COMPLETE	
16	END OF MISSION ENEMY DISPERSING		
17		(NOTE 3)	END OF MISSION, ENEMY DISPERSING
NOTES			
<ol style="list-style-type: none"> 1. Sends engagement report to RCPO. 2. In this case the observer has ordered AMC to control the time of arrival of the rounds. 3. Sends availability report to RCPO. 			

Figure 5 - 12 Example of a Linear Fire Mission (2 of 2)

**SECTION 6
FIRE MISSIONS USING SMOKE**

GENERAL

66. Smoke is primarily used for blinding the enemy or screening the activities of our own troops. In addition, it can be useful in marking a target or as a signal. Smoke is currently available in two forms, Base Ejection (BE) canisters and bursting White Phosphorus (WP). Smoke BE is contained in canisters and is ejected over the target from a carrier projectile upon activation of a time fuze. Smoke WP is contained in a bursting projectile and is activated by a PD fuze, producing fragmentation and incendiary effects in addition to smoke.

67. Two separate procedures may be ordered for the creation of smoke screens:

- a. the quick smoke procedure, where several guns are fired with the normal distribution of fire; and
- b. the deliberate smoke procedure, where each gun is directed at a separate point along a predetermined line.

THE QUICK SMOKE PROCEDURE

68. The quick smoke fire mission is carried out using the area neutralization procedure. HEPD is used in adjustment, with one smoke/WP round fired if necessary to confirm the target location and the effects of local weather conditions. Once confirmed, the ordered number of guns will engage with smoke/WP.

69. The procedures for the quick smoke mission also apply when smoke is required for signals or target indication, i.e., mark missions.

THE DELIBERATE SMOKE PROCEDURE

70. Introduction.

- a. The deliberate smoke procedure is used when the area to be blinded or screened has a longer frontage than can be covered by the fire of a battery using the quick smoke procedure.
- b. Guns are directed at different points of origin which are placed in line. Adjustment is carried out onto the upwind point of origin — Point one.
- c. The length of the screen is governed by the area to be screened and/or the area to be blinded.
- d. The number of guns required will be ordered by the observer based on the length of the screen required.
- e. The distance between points is determined by dividing the length of the screen by the number of guns taking part.

71. Call for Fire. The call for fire will include:

- a. the number of guns to take part;
- b. the order DELIBERATE SMOKE; and

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- c. the length and attitude of this type of mission refers to weapons effects and are not used to describe the target. Therefore, it shall be included in the distribution of fire.

72. **Procedure.**

- a. When using manual means to produce firing data for BE smoke, the fuze setting ordered shall be the predicted fuze setting reduced by 2.0 seconds, e.g., predicted fuze setting 24.3, fuze setting ordered as 22.3. Computing devices produce fuze settings incorporating the 2.0 second reduction. This allows the fuze to function far enough back along the trajectory to allow the smoke canisters to eject from the carrier shell and land on the target.
- b. Any necessary corrections for non-standard projectile weight will be applied by the computing devices.
- c. For a regimental deliberate smoke mission, the RCPO shall divide the length of the linear by the number of guns engaging. He shall then split up the linear and shift the batteries along the linear based on the number of guns in each fire unit, usually keeping the adjusting battery at the upwind point.

E.g., the observer orders DELIBERATE SMOKE 900, ATTITUDE 4800. All batteries have six guns. The RCPO shall order on the ring net: DIRECTION 4800, LENGTH 300, 2 ADD 300, 3 ADD 600.

CONDUCT OF FIRE MISSIONS

SER	OBSERVER'S ORDERS	REPORT TO OBSERVER	ORDERS TO GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION FOUR GUNS		
2			FIRE MISSION NOS 1, 2, 3 AND 4
3	GRID 123 456 ALTITUDE 120 DIRECTION 5240 SCREENING WITHDRAWAL SMOKE IN EFFECT 15 ROUNDS DELIBERATE SMOKE 800 ATTITUDE 1250 ADJUST FIRE		
4		(NOTE 1)	HE QUICK CHARGE 5 PREPARE 15 ROUNDS SMOKE PER GUN BEARING 2342 ELEVATION 342 NO 1 ADJUST FIRE
5		SHOT 1, 24	SCREENING WITHDRAWAL
6	LEFT 100, DROP 200 AMC 2 ROUNDS FOLLOWED BY 13 ROUNDS FFE, 20 SECONDS		
7			SMOKE BEARING NO 1 2336, NO 2 2334, NO 3 2330, NO 4 2328 FUZE NO 1 14.8, NO 2 14.6, NO 3 14.4, NO 4 14.2 AMC ELEVATION NO 1 338, NO 2 336, NO 3 335, NO 4 331 2 ROUNDS FOLLOWED BY 13 ROUNDS FFE 20 SECONDS

Figure 5 - 13 Example of a Deliberate Smoke (1 of 2)

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SER	OBSERVER'S ORDERS	REPORT TO OBSERVER	ORDERS TO GUNS
(a)	(b)	(c)	(d)
8		READY	
9	FIRE		
10			FIRE
11		SHOT	
12		ROUNDS COMPLETE	
13	END OF MISSION SCREEN EFFECTIVE		
14		(NOTE 2)	END OF MISSION SCREEN EFFECTIVE
NOTES			
1. Sends engagement report to RCPO.			
2. Sends availability report to RCPO.			

Figure 5 - 13 Example of a Deliberate Smoke (2 of 2)

**SECTION 7
ILLUMINATION FIRE**

INTRODUCTION

73. The illuminating projectile is a carrier type, fitted with a time fuze and containing an illuminating canister attached to a parachute. When the projectile is activated at the optimum HOB, a large area of the battlefield is illuminates for about 60 to 120 seconds, depending on weather conditions and the projectile in use (see Figure 5 -14).

SER	CHARACTERISTIC	105MM	155MM	81MM
(a)	(b)	(c)	(d)	(e)
1	HOB	750 M	600 M	300 M
2	BURNING TIME	60 SECONDS	120 SECONDS	30 SECONDS
3	RATE OF DESCENT	10 M/S	5 M/S	4 M/S
4	ILLUMINATING DIAMETER	800 M	1,000 M	1,000 M

Figure 5 - 14 Illuminating Shell Characteristics

THE ILLUMINATION FIRE MISSION

74. **Procedure.** The basic procedure is followed except that adjustment for range and line will be carried out in 200-m increments while corrections to HOB are carried out in 50-m increments.

75. **Gun Data.** Gun data shall be determined with the following points in mind:

- a. When calculating firing data, the illumination gun(s) will always be placed in the Left Section.
- b. The lowest charge possible must be used to reduce the possibility of malfunction of the parachute assembly.
- c. Using manual means, the fuze setting and elevation shall be found in the firing tables on the optimum HOB line opposite the range to the target, calculated to the nearest 100 m. Corrections for met conditions, etc., shall not be applied.
- d. On completion of adjustment, the method of distribution of fire ordered by the observer may be any of the following:
 - (1) **One (or Two) Gun Illumination.** No special orders are given by the observer and fire is delivered at the location ordered.
 - (2) **Lateral Spread.** Two guns are used for this mission. When LATERAL SPREAD is ordered in the call for fire, during FFE the bearing for the right gun is increased and for the left gun decreased, by a distance equal to one-half the illuminating diameter of the projectile. The range used is determined by adjustment. Some allied observers may order this as DEFLECTION SPREAD.
 - (3) **Range Spread.** Two guns are used for this mission. When RANGE SPREAD is ordered during FFE, the range for the right gun is

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increased and the range for the left gun decreased by a distance equal to one-half the illuminating diameter of the projectile. The bearing used is that determined by adjustment.

- (4) **Diamond Illumination.** Four guns are used for this mission. Two guns are fired at LATERAL SPREAD and two at RANGE SPREAD.

NOTE

Illuminating shells ammunition should not be used in high angle because of the large probable error in fuze function.

76. **Fire For Effect.**

- a. The observer may order CONTINUOUS ILLUMINATION___ ROUNDS FIRE FOR EFFECT, or FFE, along with an interval.
- b. If an interval is not ordered, the CPO will order an interval of one-half the burning time of the illuminant.

COORDINATED ILLUMINATION

77. **General.** The coordinated illumination procedure is used to illuminate a target so that it may be engaged with other types of ammunition. It is usually conducted with one gun firing illuminating shells while another gun is adjusting with HE. The gun firing the illuminating ammunition is fired at an ordered interval ahead of the gun firing HE so that the target will be illuminated when the HE round(s) burst. On occasion, the observer may order the illuminating gun to provide continuous illumination. If the observer requires the fire of more than one battery, both illuminating adjustment and initial HE adjustment shall normally be conducted by the same battery. The observer will control the fire of the illumination for the adjustment of the other batteries.

78. **Battery CP Procedure** (See Figure 5-14). On receipt of the call for fire the CPO shall:

- a. select an illuminating gun if the observer has not already designated one;
- b. order the data to the illuminating gun following the normal procedure for an illuminating mission;
- c. order the corresponding HE data to the other guns; and
- d. report the battery engagement to the RCPO.

79. After the illuminating gun has been adjusted, the observer shall order COORDINATED ILLUMINATION__ SECONDS, or use AT MY COMMAND to coordinate the firing of the guns. When COORDINATED ILLUMINATION with an interval is ordered, the interval is the time between the firing of the illuminating gun and the other gun(s).

80. Once COORDINATED ILLUMINATION has been ordered, HE or the ammunition ordered shall be fired at the grid ordered in the initial orders unless specifically directed otherwise.

81. The CPO shall order COORDINATED ILLUMINATION and select a gun for adjustment with HE. He shall then coordinate the firing of the HE with the firing of the illuminating, or if AT MY COMMAND has been ordered, report READY with the TOF.

82. If the observer orders CANCEL COORDINATED ILLUMINATION, the CPO shall issue orders for the illuminating gun to apply HE data and fire HE.

83. If less than five guns are fired on any mission requiring the standard circular fall of shot, no attempt will be made to cover off the gap(s) in the pattern of the fall of shot.

84. **Action at the Guns.** The illuminating gun shall fire one round each time it is ordered to fire until it is given:

- a. CEASE LOADING;

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- b. new method of FFE; or
- c. orders for termination of the mission.

85. **Conventions Between the CPO and the Guns.** On receipt of the order COORDINATED ILLUMINATION:

- a. the illuminating gun shall load only after the HE guns have received an elevation or orders for FFE, which would cause them to be loaded; and
- b. the illuminating gun will ignore all subsequent fire orders, unless prefixed by the number of the illuminating gun.

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CP	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY		
2			FIRE MISSION BATTERY
3	GRID 245 361 ALT 100 DIRECTION 1210 MGs DUG IN RADIUS 50 ILLUMINATION IN ADJUSTMENT VT IN EFFECT 10 ROUNDS ADJUST FIRE		
4		(NOTE 1)	NO 1 ILLUMINATING, GREEN BAG, CHARGE 4 PREPARE 8 ROUNDS (NOTE 2) NO 2, 3, 4, 5 AND 6 HE, QUICK, GREEN BAG, CHARGE 4 PREPARE 10 ROUNDS VT PER GUN BEARING 1281 (NOTE 3) NO 2, 3, 4, 5 AND 6 REST FUZE 25.7 ELEVATION 560 NO 1 ADJUST FIRE
5		SHOT 1, 26	
6	LEFT 400 UP 50		
7			BEARING 1202 FUZE 25.2 ELEVATION 555
8		SHOT	

Figure 5 - 15 Example of an Illuminating Mission Using the Coordinated Illumination Procedure (1 of 3)

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SER	OP	CPO	
	ORDERS TO THE CP	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
(ADJUSTMENT WITH ILLUMINATING SHELLS CONTINUES)			
9	DROP 200 COORDINATED ILLUMINATION 60 SECONDS (NOTE 4)		
10			BEARING 1236 FUZE 24.6 CANCEL REST AMC ELEVATION NO 1 560 COORDINATED ILLUMINATION ELEVATION 275 NO 2 ADJUST FIRE (NOTES 5 AND 6) (NO 1 AND 2 REPORT READY) NO 1 FIRE
11		SHOT 1	
12			(60 SECONDS INTERVAL) (CPO WILL CONTROL FIRE OR ISSUE INTERVAL)
13		SHOT 2	
14	ONE ROUND FFE		
15			VT BEARINGS NO 2 1248, NO 3 FUZE NO 2 24.6, NO 3 ELEVATIONS NO 2 560, NO 3 ... ONE ROUND FFE (GUNS REPORT READY)
16			NO 1 FIRE
17		SHOT	NO 2, 3, 4, 5 and 6 FIRE

Figure 5 - 15 Example of an Illuminating Mission Using the Coordinated Illumination Procedure (2 of 3)

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CP	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
18		ROUNDS COMPLETE	
19	CANCEL COORDINATED ILLUMINATION RIGHT 50 ADD 50 FFE		
20			CANCEL COORDINATED ILLUMINATION NO 1 VT GREEN BAG CHARGE 4 BEARING NO 1 1293, NO 2 FUZE NO 1 23.0, NO 2 CANCEL AMC ELEVATION NO 1 382, NO 2 ... 9 ROUNDS FFE
21		SHOT	
22		ROUNDS COMPLETE	
23	END OF MISSION MGs STOPPED FIRING		
24	(NOTE 7)		END OF MISSION MGs STOPPED FIRING
NOTES			
<ol style="list-style-type: none"> 1. Sends engagement report to RCPO. 2. CPO prepares sufficient illuminating rounds required for the mission. 3. This negates the requirement to take post to lay later in the mission. 4. By convention the initial round in the adjustment shall be HE unless otherwise ordered and will be fired at the grid ordered in the initial orders unless specifically directed otherwise. 5. By convention, after the order COORDINATED ILLUMINATION has been issued, all further target grid corrections apply only to HE unless specifically directed otherwise. 6. Following the order COORDINATED ILLUMINATION, the illuminating gun ignores all orders not prefixed by his number. 7. Sends availability report to RCPO. 			

Figure 5 - 15 Example of an Illuminating Mission Using the Coordinated Illumination Procedure (3 of 3)

SECTION 8
IMPROVED CONVENTIONAL MUNITIONS (ICM)

GENERAL

86. ICM are found in two types: Dual Purpose Improved Conventional Munitions (DPICM) and Anti-Personnel Improved Conventional Munitions (APICM). These munitions are delivered by a carrier projectile fitted with a time fuze. Once ejected, each submunition is stabilized in flight by a vane or ribbon so as to ensure it strikes the target upright. Once it strikes a target, an APICM grenade fires a steel fragmentation ball upwards, detonating 1.5 to 2 m above the target. DPICM contains a mix of AP and armour defeating grenades. ICM is a very effective munition when employed against personnel, equipment or vehicles that do not have overhead protection.

PROCEDURE

87. **Call for Fire.** The call for fire will include the type of ICM required (APICM or DPICM).

88. ICM may be fired by use of the following four procedures in order of priority:

- a. **Predicted Fire.** Predicted fire with current registration or met is most desirable in order to achieve surprise.
- b. **Adjustment with HE.** MiliPAC and manual systems allow the observer to adjust with HE/Q and FFE with ICM.
- c. **Adjustment with ICM.** This is the least preferred method because of the large amount of ICM ammunition expended and the loss of surprise.
- d. To produce registration data, the ICM round can be fired in the point detonating mode. To accomplish this the fuze will be ordered as PD.

89. The procedures for the firing of ICM are similar to HE, with the following exceptions:

- a. **During Adjustment and FFE.** During adjustment with a battery or regiment, the short bracket for ICM munitions is 200 m. The short bracket for higher fire units is unchanged. Because of the size of the effects pattern, line corrections of less than 50 m and range corrections of less than 100 m should not be made.
- b. **HOB.** Because of the reliability of the round, no adjustment for HOB is normally required. However, if a large number of duds are observed or if the effects pattern is too small, the observer should send an UP correction. The UP correction should not exceed 100 m, and should be given in 50 m-intervals.

90. **Gun Data.** Because DPICM is heavier than HE, it requires its own setting up ranges.

SER	CHARGE	LOW ANGLE	HIGH ANGLE
(a)	(b)	(c)	(d)
1	3	4,600	5,000
2	4	5,400	6,500
3	5	7,500	8,000
4	6	10,000	9,500
5	7	12,500	11,500

Figure 5 - 16 DPICM Setting Up Ranges

91. Gun data is determined in accordance with the drills identified in B-GL-306-008/FP-001, *Instruments*.

92. **Conduct of the Mission.** Missions using ICM will be conducted as shown in Figure 5-17.

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SER	OP	CPO	
	ORDERS TO THE CP	REPORTS TO THE OP	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY		
2			FIRE MISSION BATTERY
3	DIRECTION 1230 DISTANCE 2630 DOWN 10 MILS PLATOON DIGGING IN WITH 2 APCS RADIUS 50 DPICM IN EFFECT THREE ROUNDS, ADJUST FIRE		
4		(NOTE 1)	HE QUICK, GREEN BAG CHARGE 5, NUMBER 2 LOAD PREPARE THREE ROUNDS DPICM PER GUN BEARING 1674, ELEVATION 416 NUMBER 2 ADJUST FIRE
5		SHOT 2, 32	
6	DIRECTION 1270 DISTANCE 2570 DOWN 15 MILS FIRE FOR EFFECT		

Figure 5 - 17 Example of a Fire Mission Using DPICM (1 of 2)

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CP	REPORTS TO THE OP	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
7			DPICM BEARINGS, NUMBER 1 1720, NUMBER 2 1702 ... FUZE SETTINGS, NUMBER 1 32.6, NUMBER 2 32.8 ... (AT MY COMMAND) THREE ROUNDS FIRE FOR EFFECT (THE GUNS REPORT READY)
8			FIRE
9		SHOT	
10		ROUNDS COMPLETE	
11	END OF MISSION ONE APC DESTROYED, SOME CASUALTIES REMAINDER WITHDRAWING NE INTO WOOD LINE	(NOTE 2)	END OF MISSION, ONE APC DESTROYED SOME CASUALTIES
NOTES			
1. Sends engagement report to RCPO. 2. Sends availability report to RCPO.			

Figure 5 - 17 Example of a Fire Mission Using DPICM (2 of 2)

**SECTION 9
ARTILLERY-DELIVERED SCATTERABLE MINES**

GENERAL

93. Artillery-Delivered Scatterable Mines (ADSM) play an important part in denying the enemy mobility on certain areas of the battlefield.

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DEFINITIONS

94. The following definition is pertinent to this section:

Remote Anti-Armour Mine System (RAAMS). RAAMS is an anti-armour mine activated by a vehicle signature activating a magnetic sensor. Nine mines are delivered from a carrier projectile to deny or delay access to a desired area for a specific period of time.

RAAMS

95. **Types of Minefields.** Three types of RAAMS minefields are used to ensure conformance with the commander's plan and to minimize the risk to friendly troops:

- a. **Planned Minefields.** These minefields are initiated through a target list to support barrier/obstacle plans and are fired as scheduled or on-call targets. They require extensive coordination between operations, artillery and engineer staff and need extensive logistical support. They consist primarily of long self-destruct mines. Safety zones are computed prior to firing.
- b. **Target of Opportunity Minefields.** These are initiated through the observer's call for fire and normally consist of one battery firing at one aim point. They cover a 400 by 400 m area and consist of 24 RAAMS. Normally short self-destruct mines are employed.
- c. **Interdiction Minefields.** These are minefields used in conjunction with other munitions. They are used to delay, isolate, disrupt, harass and deny the enemy the ability to manoeuvre. They can be initiated through a target list or a call for fire. RAAMS are fired as the last rounds of FFE. They normally consist of short self-destruct mines only.

96. **Selection of Mines.** The types of mines used are determined by the observer/requester. RAAMS minefields are used against armoured

vehicles. If the enemy has a dismounted breaching capability, ADAM mines should be delivered on top of the RAAMS minefield.

97. **Selection of Mine Density.** Mine density is dependent on the purpose of the minefield as shown in Figures 5-18 and 5-19. These tables are used for planned minefields only.

	TYPE OF MINEFIELD		
	HARASSMENT	MINEFIELD COVERED BY HEAVY DIRECT FIRE	MINEFIELD COVERED BY LIGHT DIRECT FIRE
Density Designation for Minefield Planning Sheet	Low	Medium	High
Density of Mines per Square Metre	0.001	0.002	0.004

Figure 5 - 18 Recommended Minefield Density for RAAMS

98. **Selection of Self-Destruct Time.**

- a. Long self-destruct times are normally used for planned minefields. Ammunition should be dumped on the gun positions to ensure responsiveness.
- b. Target of opportunity minefields usually consist of short self-destruct mines only.
- c. Factors affecting the selection of self-destruct times are:
 - (1) commander’s manoeuvre plan,
 - (2) type of minefield (interdiction, planned, opportunity),
 - (3) minefield location,
 - (4) tactical situation,
 - (5) nature of enemy,
 - (6) availability of ammunition,

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- (7) time available, and
 - (8) command authority to emplace mines.
- d. Actual self-destruct times are as follows:
- (1) long self-destruct times - 48 hours, and
 - (2) short self-destruct times - four hours.

99. **Target Location.**

- a. **Moving Targets.** The aim point for a moving target is placed directly in front of the enemy axis of advance 1,000 m in front of the target for every 10 kph. This allows enough time for mine delivery and arming.
- b. **Stationary Targets.** The aim point for a stationary target is placed directly over the target centre. If adjustment is required, it will be conducted with HE/Q or in an emergency DPICM in the PD mode.

100. **Call for Fire.**

- a. The call for fire is ordered in the normal manner.
- b. Predicted missions will not be ordered if the centre of the minefield is less than 700 m from friendly troops. Adjustment for minefields will not be done if the centre of the minefield is less than 425 m from friendly troops.
- c. Minefields may be adjusted with HE or ICM PD.

SER	OP	CPO	
	ORDERS TO THE CP (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY	(ALL ORDERS READ BACK)	
2			FIRE MISSION BATTERY

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CP (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
3	DIRECTION 1230 DISTANCE 2630 DOWN 10		
4	COMPANY ASSEMBLY AREA RADIUS 200 HIGH ANGLE		
5	FOUR ROUNDS RAAMS SHORT FFE		
6	(NOTES 1 and 2)		HIGH ANGLE RAAMS SHORT GREEN BAG CHARGE 5 PREPARE FOUR ROUNDS RAAMS SHORT
7			BEARING NO 1 1293, NO 2 1297, NO 3
8			FUZE NO 1 23.1, NO 2 23.3, NO 3

Figure 5 - 19 Example of Mission Using RAAMS (1 of 2)

9			ELEVATION NO 1 455, NO 2 458, NO 3 ...
10			FOUR ROUNDS RAAMS FFE
11			COMPANY ASSEMBLY AREA RADIUS 200
12		SHOT 23	
13		ROUNDS COMPLETE	
14	END OF MISSION COMPANY DESTROYED		
15	(NOTE 3)		END OF MISSION COMPANY DESTROYED

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SER	OP	CPO	
	ORDERS TO THE CP (BATTERY NET)	REPORTS TO THE OP (BATTERY NET)	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
NOTES			
<ol style="list-style-type: none"> 1. Sends engagement report to RCPO. 2. Targets of opportunity minefields are normally fired with short self-destruct times. 3. Sends availability report to RCPO. 			

Figure 5 - 19 Example of Mission Using RAAMS (2 of 2)

COMPUTATIONS FOR DETERMINING MINEFIELD SIZE AND TYPE

101. Listed are the procedures used to calculate aiming points and the number of rounds for minefields of various sizes.

102. Target of opportunity minefields are initiated through the observer’s call for fire. They may be either adjusted or predicted. They are a standard 400 X 400 m module (200 X 200 RAAMS Low Angle).

103. Planned minefields have a normal depth of 400 m (200 m RAAMS Low Angle). If a greater depth is required, then separate minefields must be fired one behind the other to achieve the depth.

104. The width of a minefield is the distance between the two end points. The width of the minefield and the aim point selection tables will determine the number of aim points.

105. **Aim Point Selection Tables.** In order to select the proper table, the RCPO/CPO must determine:

- a. If the mission will be predicted or adjusted, and whether the density is low, medium or high (unless ordered).
- b. Trajectory (RAAMS High Angle — depth 400 m, RAAMS Low Angle — depth 200 m).

- c. **The Battery Minefield Angle (BMA) and Range.** The BMA is the smaller angle T between the Line GT to the centre point of the minefield and the minefield centre line that runs between the end points (see Figure 5 -20).

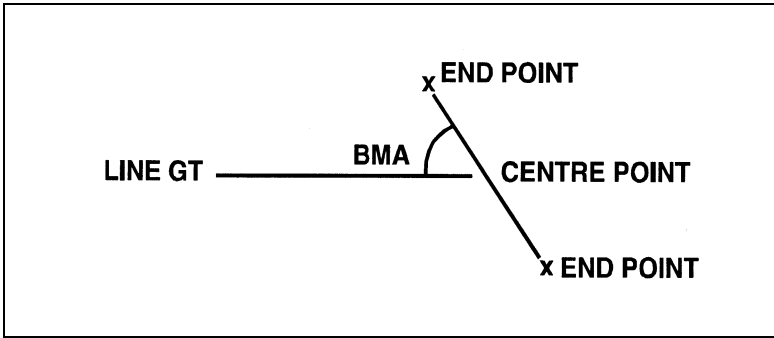


Figure 5 - 20 Battery Minefield Angle (BMA)

- d. Enter the appropriate Minefield Table, 4 or 5, to determine which mine employment table to use.
 - e. Determine the number of aim points from the mine employment table.
 - f. Calculate ammunition requirements, Table 3, and order appropriate preparation orders. Table 3 lists rounds, not rounds per gun.
 - g. Plot the aim points on the map and produce gun data.
106. The following is an example of the call for fire to the RCPO:

a. **Orders Issued:**

0 this is 95	Ident
Warning Order	Wng O
Prepare to close obstacle ZU 5730	Tgt No
Minefield 400 x 1200	Size
GR 1500 5500 GR 1500 5380	End Points
RAAMS	Ammo, Density,

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

Duration

Predict On Call from 0400

Time of Delivery

b. **RCPO Determines the following:**

- (1) If High Angle will achieve the 400-m depth for RAAMS.
- (2) If by plotting the end points of the minefield, the centre of the minefield and the guns produce an average BMA greater than 800 mils, and an average range of 6,000 m. The case that produced the most aim points is used (see Figure 5-21).

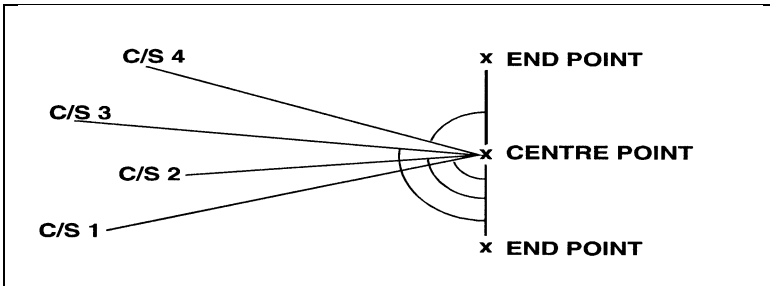


Figure 5 - 21 Regimental BMAs

- (3) Enters the applicable table:
 - (a) Planned Minefield,
 - (b) RAAMS HA,
 - (c) ADAM HA, and
 - (d) BMA greater than 800 mils.
- (4) Enters the Mine Employment Table at range 6 000 m. A width of 1 000 m requires three aim points. A width of 200 m requires one. A total of four aim points are required for a 1 200-m width.

CONDUCT OF FIRE MISSIONS

- (5) Enters Figure 5-22 for ammunition requirements. Medium density .002. Forty-eight rounds of RAAMS Long Self-Destruct (L) and six round of ADAM (L) are required per aim point. This translates to eight rounds RAAMS (L) and one round ADAM (L) per gun per aim point. With four batteries at his disposal he issues the following warning order:

CC 1 THIS IS O
 WARNING ORDER
 MINEFIELD
 ZU 5730, FOUR POINTS, HIGH ANGLE
 PREPARE EIGHT ROUNDS RAAMS (L),
 ONE ROUND ADAM (L) PER GUN
 PREDICT ON CALL FROM 0400.

HIGH ANGLE RAAMS			
Desired Density Rounds per Aim Point	0.001 24	0.002 48	0.004 96
LOW ANGLE RAAMS			
Desired Density Rounds per Aim Point	0.001 6	0.002 12	0.004 24
LOW ANGLE/HIGH ANGLE ADAM			
Desired Density Rounds per Aim Point	0.0005 3	0.001 6	0.002 12

Figure 5 - 22 M718/M741 RAAMS and M692/M731 ADAM Rounds per Aim Point

- (6) The RCPO then plots the aim points along the centre line of the minefield so they are equal distance apart so that there is no more than 400 m (200 m RAAMS Low Angle) between each other and the end points. He then reads the grid reference to each point and allocates a

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

number. He then orders them as target records under ZU 5730 with the Call Sign to engage:

CC 1 THIS IS 0

ZU 5730

C/S 1 AIM POINT 1 GR 1500 5400 ALT 190

C/S 2 AIM POINT 2 GR 1500 5425 ALT 200

C/S 3 AIM POINT 3 GR 1500 5455 ALT 200

C/S 4 AIM POINT 4 GR 1500 5480 ALT 1704

HIGH ANGLE

EIGHT ROUNDS RAAMS LONG FOLLOWED BY ONE
ROUND ADAM LONG

PREDICT ON CALL FROM 0400.

- (7) On the order to fire, the batteries fire on their appropriate aim point(s). The order to fire can take various forms, including:
 - (a) CC 1, THIS IS 0, FIRE MISSION REGIMENT ZU 5730 FIRE; and
 - (b) CC 1, THIS IS 0, FIRE MISSION REGIMENT ZU 5730 TOT 0400.

c. CPO on receipt of the necessary target information:

- (1) issues warning order to the guns;
- (2) records target information for ZU 5730 in the target record book (see Figure 5-23);
- (3) prepares gun data for their appropriate aim point(s). All minefields are converged;
- (4) issues gun programme if applicable and reports ready. ADAM is always fired as the last round of FFE; and

CONDUCT OF FIRE MISSIONS

- (5) if the target is not fired right away, upgrades gun data with changes of met, registration or survey states.

A	B	C	D	E	F	G	H	I	J	K
ZT 5730						HIGH ANGLE				
AP 1	1500	5400	190	R	C/S 1	EIGHT RDS RAAMS (L)				
AP 2	1500	5425	200	R	C/S 2	FOL BY ONE RD ADAM (L)				
AP 3	1500	5455	200	R	C/S 3	PREDICT ON CALL FROM				
AP 4	1500	5480	170	R	C/S 4	0400				

Figure 5 - 23 Example of Target Record Book Entry

SAFETY ZONE TABLES

107. FSCCs at all levels must advise the supported arms commanders of the safety zones. Approximately 99% of all the mines will be inside the safety zone. To determine the minefield safety zones, Figure 5-24 must be used.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

RANGE (KM)	PREDICTED	ADJUSTED
4	700 X 700	700 X 700
7	750 X 750	700 X 700
10	900 X 900	750 X 750
12	1050 X 1050	750 X 750
14	1200 X 1200	850 X 850
16	1250 X 1250	850 X 850
17.5	1400 X 1400	850 X 850

ADAM LOW ANGLE

RANGE (KM)	PREDICTED	ADJUSTED
4	500 X 500	500 X 500
7	550 X 550	500 X 500
10	700 X 700	550 X 550
12	850 X 850	550 X 550
14	1000 X 1000	650 X 650
16	1050 X 1050	650 X 650
17.5	1200 X 1200	650 X 650

RAAMS LOW ANGLE

RANGE (KM)	PREDICTED	ADJUSTED
4	750 X 750	700 X 700
7	900 X 900	700 X 700
10	1050 X 1050	750 X 750
12	1200 X 1200	750 X 750
14	1400 X 1400	850 X 850
16	1500 X 1500	850 X 850
17.5	1400 X 1400	850 X 850

RAAMS/ADAM HIGH ANGLE

Figure 5 - 24 Scatterable Mine Safety Zone Tables

108. The safety zone tables are entered with the following data:
- a. projectile type;
 - b. trajectory;
 - c. range to centre of minefield; and
 - d. predicted or adjusted fire.
109. The procedure for determining the safety zone is as follows:
- a. enter the appropriate tables at the closest range, e.g.: RAAMS and ADAM — High Angle, Rge 12 500, Predicted;
 - b. determine safety zone, e.g.: 1200 x 1200; and
 - c. draw a safety square around each aim point aligned with the width and depth of a planned minefield (see Figure 5-25).

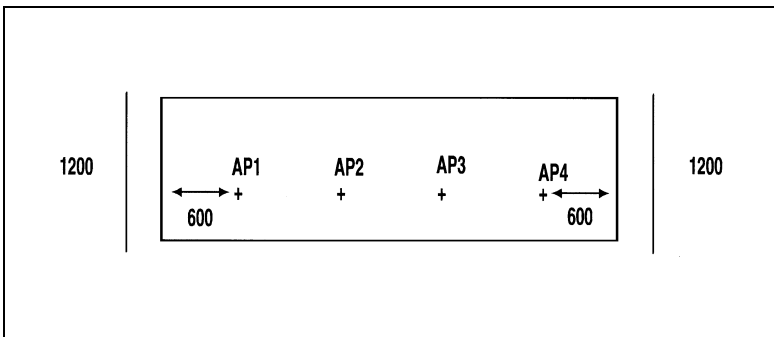


Figure 5 - 25 Example of Safety Zone for a Planned Minefield

SECTION 10
SNIPING GUN PROCEDURE

INTRODUCTION

110. The engagement of small targets, e.g. pillboxes, road blocks, fortified OPs or fortified anti-tank guns is best accomplished through the use of the integral direct fire weapon systems of the supported arms. If these weapons systems are unable to engage targets for any reason, a special procedure can be used to destroy small targets by direct or indirect fire.

111. The procedure is based on the following points:

- a. Only one gun is normally used.
- b. An officer, WO, or technically trained senior NCO should accompany the detachment as CPO/observer if the task involves indirect fire. An observation party may be tasked to provide the observation of fire by the artillery commander ordering the deployment of the gun.
- c. Great accuracy is required and this implies that:
 - (1) a large calibre gun firing at a high charge is preferable;
 - (2) the gun, preferably self-propelled, should normally be deployed as close to the target as possible to increase accuracy; and
 - (3) very accurate laying is required. This may be achieved by the use of a gunner's quadrant, thus permitting corrections of one tenth of a mil for elevation.
- d. Deliberate preparations are required for the occupation of the gun position, the engagement of the target and the withdrawal of the gun.

PROCEDURE

112. **Preparations.** The CPO/observer and detachment commander shall ensure that they:

- a. know the task, route and RV;
- b. know the originator of the task;
- c. know with whom to effect liaison on arrival;
- d. have the necessary stores for the completion of the task, i.e., binoculars, prismatic compass, firing tables, the correct type and amount of ammunition, radios or telephones, etc.; and
- e. have instructions on where to report or who to contact on completion of the task.

113. **Preparations on Arrival.** On arrival the CPO/ detachment commander shall carry out the following actions:

- a. effect liaison with any troops in the area;
- b. conduct a careful reconnaissance of the area to select:
 - (1) the best possible gun platform,
 - (2) a covered route in,
 - (3) a reference point, and
 - (4) a good route for fast withdrawal;
- c. determine a method of orienting the gun:
 - (1) deduce the bearing to the target;
 - (2) select one of the following methods of orientation:

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- (a) aiming point method,
 - (b) reference point,
 - (c) prismatic compass; and
- (3) if the target is visible from the selected platform, direct laying may be used;
- d. produce initial gun data:
 - (1) find the range to the target:
 - (a) by estimation,
 - (b) by measurement having plotted the selected gun platform and the target on a map, or
 - (c) by laser range finder, and
 - (2) convert this range to an elevation using the firing tables;
- e. select and establish communications with his OP. The OP should be selected along or close to the line GT;
- f. brief the detachment on all aspects of the operation;
- g. deploy and orient the gun;
- h. order the initial sequence of orders to the gun, excluding the order ADJUST FIRE; and
- i. finally, occupy the OP if required.

114. **During the Mission.**

- a. Corrections to bearing and elevation will be ordered by the observer in mils, following the normal rules for

CONDUCT OF FIRE MISSIONS

adjustment of fire (i.e., correct for line, then bracket for range).

- b. Adjustment is carried out until a target round is attained.
- c. FFE is ordered with any necessary corrections.
- d. Confirmation is obtained from the originator of the task that the mission has been satisfactorily completed and then the mission is ended.

115. **On Completion of the Task.** The CPO/detachment commander shall:

- a. withdraw by the selected route;
- b. return to the selected RV; or
- c. carry out any further orders received.

**SECTION 11
MOVING TARGETS**

GENERAL

116. The moving target is not specified as a special type of engagement in the call for fire. The description of the target is used by the observer to indicate that he is engaging a target that is moving or likely to move. The engagement of a mobile target follows the basic procedure, but the requirement for speed often precludes the use of the normal adjustment procedure, and the engagement may be carried out by use of bold corrections during FFE in order to get the fire in front of or onto the target. Changes in direction will often be ordered during the mission.

117. There is no special procedure necessary at the gun position other than a concerted effort to produce fire as quickly as possible. Any orders which will cause delay, e.g., corrections for non-standard ammunition, should be avoided. An example of a mobile target fire mission is shown at Figure 5-26.

SER	OP	CPO
	B-GL-371-004/FP-001	259

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

	ORDERS TO THE CP	REPORTS TO THE OBSERVER	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION BATTERY		
2			FIRE MISSION BATTERY
3	DIRECTION 1510 DISTANCE 4600 TROOP OF TANKS MOVING EAST AMC FIVE ROUNDS FFE		
4	(NOTE 1)		HE CHARGE 5, QUICK, GREEN BAG, BEARING NO 1 2921, NO 2, 2926, NO 3
5			AMC
6			ELEVATION NO 1 394, NO 2 397, NO 3 ... FIVE ROUNDS FFE
7		READY 24	
8	FIRE		
9			FIRE
10		SHOT	
11		ROUNDS COMPLETE	
12	TARGET DIRECTION 1720 DISTANCE 3600 UP 20 AMC FIVE ROUNDS FFE		(NOTE 2)
13			LOAD BEARING NO 1, 3162, NO 2 3165, NO 3

Figure 5 - 26 Example of Engagement of a Mobile Target Using LRF (Sheet 1 of 2)

14			ELEVATION NO 1 362, NO 2 367, NO 3 ...
15			FIVE ROUNDS FFE
16		READY 20	
17	FIRE		

CONDUCT OF FIRE MISSIONS

SER	OP	CPO	
	ORDERS TO THE CP	REPORTS TO THE OBSERVER	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
18		SHOT	
			FIVE ROUNDS FFE
19		ROUNDS COMPLETE	
20	END OF MISSION TWO TANKS DESTROYED REMAINDER WITHDRAWING INTO WOODLINE		
21	(NOTE 3)		END OF MISSION, TWO TANKS DESTROYED, REMAINDER WITHDRAWING INTO WOODLINE
NOTES			
<ol style="list-style-type: none"> 1. Sends engagement report to RCPO. 2. Since the target is still mobile, the prefix of target to a new direction, distance and angle of sight indicate to the CPO that the observer is ordering a new target location. 3. Sends availability report to RCPO. 			

Figure 5 - 26 Example of Engagement of a Mobile Target Using LRF (Sheet 2 of 2)

SECTION 12 QUICK ACTIONS

INTRODUCTION

118. A quick action is a rapid deployment ordered when the battery is not in action and circumstances require a speed of deployment that will not permit normal procedures.

119. Units must develop and continually practise a quick action procedure to include:

- a. rapid deployment of the guns from a harbour or while on the move; and
- b. quick deduction of gun data for the engagement.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

OUTLINE PROCEDURE

120. **General.** While moving, the CPO must confirm his location by constant reference to the map, and watch for suitable gun areas in anticipation of a quick action.

121. **Preparation.** The standard order of march for tactical moves from one gun position to another must be designed for possible quick actions. A suggested SOP is as follows:

- a. movement of the battery in the following configuration:
 - (1) main CP,
 - (2) one gun (pistol gun),
 - (3) gun line TSM, and
 - (4) remainder of the battery;
- b. two technicians shall travel with the CPO. One technician should have the director on its stand, ready for immediate deployment. The other should have the plotting device and necessary equipment and forms prepared for quick action;
- c. visual or audible signals for quick action should be arranged and practiced between the CPO and the remainder of the guns;
- d. ammunition should be easily accessible;
- e. no attempt should be made to establish a normal position until the completion of the mission.

122. **Deployment.** The observer shall order ACTION, followed immediately by the initial orders of the call for fire. The following action will take place:

CONDUCT OF FIRE MISSIONS

- a. the first possible gun position shall be selected by the CPO and the guns shall be deployed either by hand signals or by an SOP;
- b. the CPO shall prepare one gun to fire as quickly as possible;
- c. as each tactical packet arrives, the CPO shall bring the remaining guns into action; and
- d. the CPO shall ensure that correct line is passed and current orders received by the remaining guns.

123. **Preparations for Opening Fire.**

- a. The CPO shall plot the location of the target and of the gun position on the map, determine the bearing and range to the target, pass the map to the technician and proceed to orient the first gun.
- b. The technician shall check the plot, bearing and range, produce a QE and prepare the gun data.
- c. The technical WO will check the initial gun data. The checking limits are 20 mils for bearing and 200 m for range.

124. **Subsequent Action.** The CPO must be prepared to complete the preparation of the position to the normal degree or to continue the advance immediately, depending on the situation and the orders received.

DETERMINATION OF GUN DATA

125. The initial gun data are normally obtained from the map. The computation required should be kept to a minimum; the firing of guns must not be delayed by the determination and application of corrections for non-standard conditions.

126. After the initial data are obtained, any of the following methods may be used to determine subsequent corrections, in order of preference:

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

- a. the computing device in use;
- b. the target grid template in conjunction with the map;
- c. the CPFC graph; and
- d. the WORM rule, when the angle between the line OT and the line GT is less than 300 mils.

ESTABLISHING PARALLELISM

127. After the pistol gun has fired, other guns must receive parallelism as soon as possible by either:

- a. the aiming point method;
- b. the modified aiming point method;
- c. the modified individual angle method;
- d. by passing parallel line from gun to gun; or
- e. by prismatic compass.

128. **The Aiming Point Method.** This is the quickest method if a distant aiming point can be located on the flank, preferably in the general prolongation of the line of guns. If such an aiming point is available, the CPO shall determine the bearing to the aiming point and subtract from it the bearing to the target. The guns shall then be ordered to lay on the aiming point at this angle (see Figure 5-27).

129. **Modified Aiming Point Method.** This method is similar to the Aiming Point Method in that it requires a distant aiming point located on the flank, preferably in the general prolongation of the line of guns. If such an aiming point is available, the CPO shall initially orient the pistol gun by compass, ordering the gun to record C of A at the bearing to the target rounded to the nearest 100 mils. The pistol gun is then ordered to lay on the distant aiming point and read the main scale. The remaining guns are then ordered the C of A bearing for application to the slipping scales and the angle to lay on the distant aiming point.

130. **Modified Individual Angle Method.** This method is used when the CPO directs the pistol gun onto the target by compass. Two methods are available when utilizing this procedure:

- a. Using his compass, the CPO selects a reference point on the bearing to the target and directs the gun onto the reference point. If a suitable point is not available, he uses the compass to direct the gun onto the bearing to the target. After the first round is fired, parallel line is passed from the gun to the director. The technician at the director places the angle ordered under the eyepiece and orients the remaining guns. All subsequent angles are read from under the eyepiece. If at all possible, the director should be placed to the left flank or rear of the gun.
- b. With his compass, the CPO measures the bearing over the sight of the adjusting gun to the director. He converts the bearing to a grid bearing and subtracts the bearing to the target. The resultant angle is then ordered to both the gun and the director. The gun and director lay on each other and the director orients the remaining guns. This method is normally slower than the previous one.

131. In both methods, the guns need only record a single GAP, preferably one considerably more distant than the director. GAP two need not be recorded. The guns are recorded at the closest 100 mils to the bearing of fire.

132. **Parallel Line.** The first gun is placed on the bearing to the target using a prismatic compass. After it fires the first round, parallel line is passed from it to the other guns. This method is time consuming for the adjusting gun.

133. **Orienting All Guns by Compass.** The CPO shall place each gun on the bearing to the target using a prismatic compass, making due allowance for magnetic variation. This is the slowest method and is subject to error. Accurate parallelism must be established as soon as possible by using the director.

SECTION 13

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

OPEN ACTIONS

INTRODUCTION

134. Open actions are used to engage targets which are visible from the gun position or targets that the battery may encounter while on the move. The target may be engaged by direct or indirect fire, using the highest possible charge.

PROCEDURE

135. **Guns in Action.**

- a. **Indirect Fire.** The target may be engaged using normal indirect fire methods with the CPO acting as the observer.
 - (1) The CPO determines the bearing to the target by prismatic compass, or finds the angle between the C of A and the target by the hand span method and converts this to a bearing to the target.
 - (2) The CPO estimates the range to the target and converts this range to an elevation.
 - (3) Direction GT is used for subsequent corrections.
 - (4) Corrections to line are ordered as observed, e.g., if the first round lands 30 mils to the left, the CPO orders BEARING RIGHT 30.
 - (5) Corrections to range follow the normal bracketing procedure. These corrections will be added or subtracted to the previous range fired and the new range converted to an elevation.

CONDUCT OF FIRE MISSIONS

- b. **Direct Fire.** If the target is clearly visible from the gun platforms, FIRE MISSION OPEN ACTION may be ordered.
 - (1) Indication of the target may be by:
 - (a) description (see Chapter 4, Section 5),
 - (b) the CPO going to the gun and aligning the gun onto the target by ordering TRAILS RIGHT/LEFT or TRAVERSE RIGHT/LEFT, or
 - (c) laying the gun on the target himself.
 - (2) The remaining guns shall lay on the target as indicated by the fall of shot of the first gun.
 - (3) The CPO may then normally turn the engagement over to the detachment commander(s) by ordering ENGAGE.

136. **Guns Not In Action.**

- a. The battery is brought into action in the nearest suitable position.
- b. If the target is not clearly visible from the gun platforms, the battery is prepared for indirect fire using one of the following methods:
 - (1) **Reference Point.** The CPO selects an unmistakable reference point to the flank of the position and measures the angle between the reference point and the target. Care must be taken in the selection of reference points to ensure that they are not obscured by smoke during firing. If the reference point is to the left of the target, the angle found is ordered as a bearing to the gun. If the reference point is to the right of the target, the angle found is subtracted from 6400 mils and the result is

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

ordered to the guns as a bearing. This method aligns all the guns onto the target. The CPO then gives the remaining orders to the guns for the mission. Example:

FIRE MISSION BATTERY (see Figure 5-27)

HE QUICK GREEN BAG CHARGE

REFERENCE POINT TOWER

BEARING 0300

etc.

The mission continues and subsequent corrections are determined and ordered to the guns as mentioned earlier in this section.

- (2) **The Individual Angle Method.** The director method is used for orientation. The guns shall then be ordered to RECORD AT __. The remainder of the mission is conducted as mentioned earlier in this section.
- c. If the target is visible from all guns, it may be engaged by direct fire as described earlier in this section. However, a GAP should be recorded as soon as possible as it is likely that the target will become obscured.

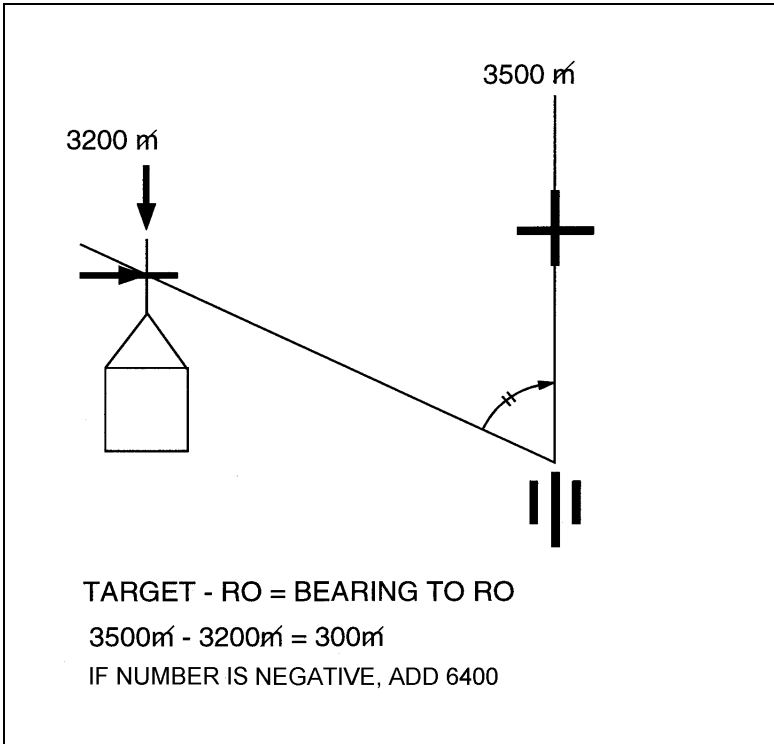


Figure 5 - 27 Reference Point Left of the Target

**SECTION 14
 DESTRUCTION BY INDIRECT FIRE**

INTRODUCTION

137. The destruction of point targets such as a pillbox, bunker, small building or dug-in anti-tank gun can be accomplished by the use of artillery. However, the most effective method of engagement is by direct fire using the integral direct fire weapon systems of the supported arms, e.g. tank and TOW weapon systems. If indirect fire must be used, then it is best accomplished by the use of precision guided munitions. When these munitions are not available, HE will be used with a delay or concrete piercing fuze. Larger calibre guns are better suited for this task,

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

although the end result may not be guaranteed and an impressive amount of ammunition may be fired.

PROCEDURE

138. The observer will order DESTRUCTION as the type of engagement in his call for fire and use a single gun.

139. The CPO shall report to the observer when one PE_r is greater than 25 m.

140. The observer may order DIRECTION GT in the final stages of adjustment. Subsequent firing data may be determined for bearing and range by mathematical computation as follows when using the manual system. Computing devices can apply the corrections as ordered.

a. Example: OP orders L20, A50

Data at which gun last fired:

3342 Bearing -

Range -

6220

Computation: 20/6.2

3

Line Correction/Range GT Factor

3342 Old Bearing

Bearing Correction

L3

CONDUCT OF FIRE MISSIONS

3339 New Bearing

6220 Old Range

A50 Correction

6270 New Range

b. Example: Charge 6 W, Range 7350 m, Elevation 278.
OP orders DIRECTION GT after the split of the 100 m
bracket.
CPO orders QUADRANT LAYING REPORT QE.

277.2 Gun Reports QE

278.0 Old Elevation

Difference

OP Orders D10

7350 m Old Range

CONDUCT OF FIRE MISSIONS

SER	OBSERVER'S ORDERS	CPO	
		REPORTS TO OBSERVER	ORDERS TO GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MISSION ONE GUN	(READS BACK ALL ORDERS)	
2			FIRE MISSION NUMBER 4
3	GRID 723 459, ALTITUDE 120 DIRECTION 1680 BUNKER DESTRUCTION ADJUST FIRE (NOTE 1)		
4			DESTRUCTION HE, QUICK, WHITE BAG, CHARGE 5 BEARING 0993, ELEVATION 357 ADJUST FIRE
5		SHOT 4, 20 (NOTE 2)	
6	RIGHT 40, ADD 200		
7			BEARING 1078, ELEVATION 388
8		SHOT	
9	DROP 100		
10			BEARING 1057, ELEVATION 362
11		SHOT	
12	ADD 50		
13			BEARING 1068, ELEVATION 375
14		SHOT	
15	DROP 25 (NOTE 3)		
16			BEARING 1062, ELEVATION 368
17		SHOT	
18	REPEAT		
19			ELEVATION 368
20		SHOT	
21	ADD 25		
22			BEARING 1068, ELEVATION 375
23		SHOT	

Figure 5 - 28 Example of a Destruction Mission (Sheet 1 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SER	OBSERVER'S ORDERS	CPO	
		REPORTS TO OBSERVER	ORDERS TO GUNS
(a)	(b)	(c)	(d)
24	DROP 10 DELAY THREE ROUNDS FIRE FOR EFFECT, 20 SECONDS (NOTE 4)		
25			DELAY BEARING 1065, ELEVATION 372 THREE ROUNDS FIRE FOR EFFECT, 20 SECONDS
26		SHOT ROUNDS COMPLETE	
27	LEFT 10. REPEAT		
28			BEARING 1063, ELEVATION 373 THREE ROUNDS FIRE FOR EFFECT, 20 SECONDS
29		SHOT ROUNDS COMPLETE	
30	REPEAT		
31			ELEVATION 373 THREE ROUNDS FIRE FOR EFFECT, 20 SECONDS
32		SHOT SHOT	
		SHOT ROUNDS COMPLETE	
33	END OF MISSION BUNKER DESTROYED		
34		(NOTE 5)	END OF MISSION BUNKER DESTROYED
NOTES			
<ol style="list-style-type: none"> 1. Sends engagement report to RCPO. 2. If one PE_r is greater than 25 m, it should be reported at this point. 3. The observer verifies the short bracket. 4. FFE is applied in three round groups with an interval to allow for the proper lay of the gun. 5. Sends availability report to RCPO. 			

Figure 5 - 28 Example of a Destruction Mission (Sheet 2 of 2)

SECTION 15
DANGER CLOSE FIRE MISSIONS

INTRODUCTION

144. By definition and by international agreement, a danger close target is one within 600 m of friendly troops.

145. The engagement of a target near our own troops might endanger them because of the splinter pattern of the projectiles and the zone of the guns. This hazard will be considered by the observer when he undertakes the fire mission. The orders he issues will be dependent upon the urgency of the mission and the degree of risk involved. If the risk is great, he will confirm the requirement for the mission with the supported arm commander before he orders fire.

146. Under some conditions, a cautious but precise adjustment procedure known as DANGER CLOSE may be used. This procedure reduces the risk of casualties to our own troops but takes more time and ammunition than does normal target grid procedure.

147. When the CPO plots the target on his check map and sees that it may endanger friendly troops, he will send a message to the observer to VERIFY SAFETY. This message is not necessary if the observer has included DANGER CLOSE in his call for fire, thus showing that he is aware of the hazard. In either case, once the observer indicates that fire is positively required, the CPO will always provide it since to do otherwise would interfere with the supported arm commander's wishes.

PROCEDURE FOR DANGER CLOSE TARGETS

148. The observer will order DANGER CLOSE in his call for fire. Upon receipt of this order, the CPO shall ensure that the technical work and the laying of the guns is checked as closely as possible.

149. The CPO shall select the charge with the smallest range probable error.

150. The CPO will ensure that the ADD correction is applied before firing the initial round.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

151. The CPO shall not, without authority from the observer:
- a. change the charge, propellant lot or projectile weight; or
 - b. change the adjusting gun.
152. Following the initial round, the observer will order BATTERY RIGHT, ONE RD FFE to see which gun fires the closest to friendly troops and also determine the individual corrections.
153. Once the observer reverts to the adjustment, the distribution of fire must stay in CIRCULAR RADIUS, and the observer will order which gun will carry on the adjustment.
154. If the target is to be recorded, the completed GPOT proforma/printout will be placed in the target record book. This procedure is necessary as individual gun data must be recorded. Individual grid references will not be recorded in the target record book.

CONDUCT OF FIRE MISSIONS

NO	OP ORDERS	CPO	
		REPORT TO THE OP ALL ORDERS ARE READ BACK	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	1 THIS IS 11 FIRE MSN BTY GRID: 123 456 ALT: 150 DIRECTION: 3200 ADJUSTING ZP1240 ADD 400 DANGER CLOSE ADJUST FIRE (NOTE 1 and 2)		
2			FIRE MSN BTY ADJUSTING ZP 1240 DANGER CLOSE HE QUICK GREEN BAG CHARGE 5 NO 3 LOAD BEARING: 4521 ELEVATION: 430 NO 3 ADJUST FIRE
3		SHOT 3, 28	
4	R50 D200 BATTERY RIGHT, ONE RD FFE (NOTE 3)		
5			LOAD BEARINGS: NO 1 4267, NO 2 4259, ETC AMC ELEVATION: NO 1 435, NO 2 440, ETC BATTERY RIGHT ONE RD FFE
6		SHOT 1, SHOT 2, SHOT 3, ETC	
7	NO 1 R20, NO 1 ADD 50, NO 5 D50 D50, NO 5 ADJUST FIRE (NOTES 4 and 5)		

Figure 5 - 29 Example of a Danger Close Mission (Sheet 1 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

NO	OP ORDERS	CPO	
		REPORT TO THE OP ALL ORDERS ARE READ BACK	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
8		SHOT	
9	D50		NO 5 LOAD BG: 4260 ELEVATION: 445
10			NO 5 LOAD BG: 4266 CANCEL AMC ELEVATION: 441 NO 5 ADJUST FIRE
11	D50 ONE RD FFE (NOTE 4)		
12			LOAD BG: NO 1 443, NO 2 457, ETC ONE RD FFE
13		SHOT, RDS COMPLETE	
14	RECORD AS TARGET END OF MISSION (NOTE 6)		
15			RECORD AS TARGET END OF MISSION
NOTE			
<ol style="list-style-type: none"> 1. The target location is always sent with an accurate grid reference, but with a target grid correction to a minimum of 600 m from own troops. 2. Engagement report is sent to 0 and 95. 3. Distribution of fire CIRCULAR RADIUS unless otherwise ordered. 4. Distribution of fire stays, CIRCULAR and individual corrections will be applied only at FFE. 5. When rounds are within 400 m of own troops, the OP will use 50 m correction unless Sp Arm Comd orders otherwise. The OP will not bracket, but will creep towards the target. He will continue the adjustment using the most dangerous gun. 6. Availability report is sent to 0 and 95. 			

Figure 5 - 29 Example of a Danger Close Mission (Sheet 2 of 2)

SECTION 16
WITNESS POINT ENGAGEMENT PROCEDURE

GENERAL

155. A procedure known as the witness point engagement procedure may be used to determine differences which have occurred in met conditions. The procedure entails the re-engagement of a point which has been previously engaged. On completion of the first engagement, the target and its associated gun data are recorded. On completion of the second engagement, the gun data are again recorded. The differences in gun data between the two engagements represent the changes which have occurred in met conditions since the first engagement. The change in gun data can be applied to any target which was also engaged at the time of the first engagement of the witness point, provided it is within registration limits.

156. In effect, the witness point procedure is a modified form of registration. It is used for the re-engagement of previously adjusted targets when it is desired to achieve surprise or to determine changes in met which have occurred.

NOTE

The witness point engagement may be one of the targets to be engaged in a fire plan.

PROCEDURE

157. Immediately after the original engagement of a target, a point known as the witness point is adjusted. When several targets are being adjusted, e.g., a fire plan or a group of DF targets, the adjustment of the witness point should be carried out midway in the adjustment of the targets in order to minimize the effects of changing met conditions. The gun data of the targets and of the witness point are recorded. The order WITNESS POINT is included in the call for fire under type of engagement and again in the orders for the recording of the target, e.g., RECORD AS WITNESS POINT ZT 5362.

158. As closely as possible in time before the re-engagement of the target(s), fire is again adjusted onto the witness point. The gun data of the second engagement are then compared with those of the first. The

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

difference between the two sets of gun data represents the change in bearing and range caused by changes in the met conditions between the two adjustments. The corrections so derived are then applied to the recorded gun data for the other targets, once the observer orders the witness point adopted, e.g., ADOPT WITNESS POINT ZT 5362.

NOTE

The witness point procedure may also be used in high angle fire.

LIMITATIONS

159. The target(s) and witness point must be adjusted and subsequently re-engaged by the same battery from the same position using the same charge and ammunition.

160. Witness point data may be circulated to guns on a common grid only.

161. The guns using the witness point correction must be on a common grid.

SECTION 17 ADJUSTMENT FOR FUTURE ENGAGEMENT

INTRODUCTION

162. Adjustment for future engagement is undertaken so that subsequent FFE may be more accurately applied than by unobserved predicted fire.

163. Two situations may arise that will determine the procedure to be used:

- a. **Adjustment to Determine Current Gun Data.** This procedure is carried out to determine, by firing, the gun data necessary to engage the target within the current met period.

- b. **Adjustment to Determine Coordinates.** This procedure is carried out to determine, by firing, the coordinates of the target for circulation to other fire units.

ADJUSTMENT TO DETERMINE CURRENT GUN DATA

164. **Number of Guns.** Ideally, all the guns that will eventually engage the target at FFE should be used during the initial engagement with a minimum of three guns from each fire unit.

165. **Call for Fire.** The call for fire shall be ordered in the normal manner except for the following points:

- a. The observer may specify in the warning order the exact number of guns required from each fire unit, e.g., FIRE MISSION 2 AND 3, THREE GUNS. (If conducted on the regimental fire orders net there is no requirement to indicate two batteries when 2 and 3 will accomplish the same result.)
- b. The observer shall indicate the type of engagement by specifying one of the following:
 - (1) ADJUSTING FIRE PLAN (NICKNAME);
 - (2) ADJUSTING (TARGET NUMBER);
 - (3) ADJUSTING WITNESS POINT __; or
 - (4) ADJUSTING LASER POINT __.
- c. When adjusting with more than one fire unit, each fire unit, in sequence, shall be adjusted onto the target, ordered to record the target and then given END OF MISSION. If the fire units are being adjusted onto different points in the target area, a different target number will be assigned to each point.

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ADJUSTMENT TO DETERMINE COORDINATES

166. **General.** This procedure shall be used when it is necessary to determine accurate coordinates of the target for circulation to other fire units. These fire units may later determine predicted gun data using the current registration or met corrections at the time of engagement. The size of the fire unit to adjust the target will be three guns.

167. **Call for Fire.** The call for fire shall be ordered in the normal manner except that the observer shall:

- a. indicate the aim of the mission by specifying one of the following:
 - (1) ADJUSTING FIRE PLAN (NICKNAME);
 - (2) ADJUSTING (TARGET NUMBER); or
 - (3) ADJUSTING LASER POINT (NUMBER);
and
- b. order CONVERGE.

168. **Procedure.** The mission is carried using the registration procedure.

SECTION 18
MISSIONS USING THE LASER RANGE-FINDER (LRF)

GENERAL

169. All missions can be fired using an LRF or polar coordinates procedure.

PROCEDURE

170. The procedure for firing any mission using an LRF remains the same except:

- a. target location is indicated using the polar coordinates procedure; and
- b. the order TARGET will be used to show that a direction and distance is a new target and not a correction to be applied to the current gun data (see Figure 5-30).

SER	OP	CPO	
	ORDER TO THE CP	REPORTS TO THE OP	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
1	FIRE MISSION BATTERY	(ALL ORDERS READ BACK)	
2			FIRE MISSION BATTERY
3	DIRECTION 1510 DISTANCE 4600 DOWN 20 (NOTE 1) PLATOON DIGGING IN RADIUS 100 VT IN EFFECT FIVE ROUNDS ADJUST FIRE		
4		(NOTE 2)	HE QUICK, GREEN BAG, CHARGE 5, BEARING 2901, ELEVATION 335 NUMBER 1, ADJUST FIRE PREPARE FIVE ROUNDS VT PER GUN
5		SHOT 1, 26	
6	DIRECTION 1520 DISTANCE 4550 FFE		

Figure 5 - 30 Example of a Fire Mission Using LRF (Sheet 1 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SER	OP	CPO	
	ORDER TO THE CP	REPORTS TO THE OP	ORDERS TO THE GUNS
(a)	(b)	(c)	(d)
7			VT FUZE BEARINGS NO 1 2919, NO 2 FUZE SETTINGS NO 1 26.0, NO 2 LOAD ELEVATION NO 1 320, NO 2 ... FIVE ROUNDS FFE
8		SHOT	
9		ROUNDS COMPLETE	
10	PLATOON WITHDRAWING NW INTO DEFILE TARGET (NOTE 3) DIRECTION 0220 DISTANCE 3800 UP 15 (NOTE 1) SECTION POSITION WITH 2 HMGS RADIUS 70, ADJUSTING ZP 4820 ADJUST FIRE (NOTE 2)		
11		(NOTE 4)	HE QUICK, GREEN BAG, CHARGE 5, BEARING 3390, ELEVATION 285, NUMBER 2, ADJUST FIRE
NOTES			
<ol style="list-style-type: none"> 1. When polar coordinates are used in adjustment the change in altitude will be mils by convention. 2. Sends engagement report to RCPO. 3. Observer acquired a new target and has commenced adjustment of it. 4. The adjustment/mission continued. 			

Figure 5 - 30 Example of a Fire Mission Using LRF (Sheet 2 of 2)

LASER POINT

171. The LRF and goniometer can produce accurate data for predicted targets by way of the laser point procedure. A Laser Point (LP) mission is conducted to determine corrections for non-standard conditions to be applied to specific targets fired by the same observer using polar coordinates that meet registration criteria, less projectile and propellant types. It is a similar form of the laser registration procedure except that the target location is not as accurately known and is used to produce a LP correction. Normally one gun is used in the initial adjustment but three guns must be used to confirm the LP MPI. Three guns can be used throughout depending on the observer's decision based on terrain, visibility and zone.

172. If more than one fire unit is to be used, it may be conducted as follows:

- a. if all batteries are within registration parameters, one battery adjusts onto the LP, and then circulates the data. The observer can then call for check rounds from the other fire units; and
- b. each battery is adjusted and recorded individually onto the LP. This requires more time, but gives a greater guarantee of accuracy.

173. **Numbering LPs.** LPs are allocated a number from the observer's target block, e.g., RECORD AS LP 4601. A LP may also be one of the targets to be engaged later, e.g., RECORD AS LP ZT 4601.

PROCEDURE

174. After the adjustment of the LP, the CPO shall:

- a. record the LP at the final gun data as ordered by the observer, e.g., RECORD AS LP 5000 or RECORD AS LP ZT 5000;
- b. compute the difference between the initial and final gun data and produce a LP correction following the procedure according to the computation device; and

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- c. apply this LP on the order of the observer and only to targets in the area of validity of that specific observer, e.g., ADOPT LP 4601.

175. When an observer wishes a particular LP applied to a group of targets, for instance in a fire plan, he shall order ADOPT LP 4601 FOR IRON LUNG. If the LP is outside the appropriate limits, the CPO shall inform the observer of this fact. Upon cancellation of the fire plan, application of the LP lapses.

176. The area of validity of LP data is limited to:

- a. bearing of 500 mils left and right of the LP as measured from the OP's location;
- b. normal registration limits if OP and guns are on the same grid; and
- c. a period of validity equal to the current met message.

SER	OP	CPO
	ORDERS TO THE CP	REPORTS TO THE OBSERVER
(a)	(b)	(c)
1	FIRE MISSION REGIMENT, THREE GUNS DIRECTION 1080 DISTANCE 3870, UP 30 (NOTE 1) COMPANY DUG IN RADIUS 200 ADJUSTING LP ZT 4600 1 ADJUST FIRE (NOTES 1 and 2)	
2		1 SHOT 1, 34 (NOTE 3)
3	1 DIRECTION 1090, 1 DISTANCE 3800, 1, ONE RD FEE	

Figure 5 - 31 Example of OP/CP Orders and Reports for a LP Fire Mission (Sheet 1 of 2)

4		1 SHOT, RC (NOTE 4)
5	1 RECORD AS LP ZT 4600, 2 ADJUST FIRE	
6		2 SHOT 1

CONDUCT OF FIRE MISSIONS

SER	OP	CPO
	ORDERS TO THE CP	REPORTS TO THE OBSERVER
7	2 RECORD AS LP ZT 4600, 3, THREE GUNS RIGHT ADJUST FIRE	
8		3 SHOT 1, 31, 3 SHOT 2, 3 SHOT 3
9	3 DIRECTION 1070, 3 DISTANCE 3760, 3 ONE RD FEE	
10		3 SHOT, RC
11	3 RECORD AS LP ZT 4600, 4 ADJUST FIRE	
12		4 SHOT, 1, 26
13	4 RECORD AS LP ZT 4600	
14	ADOPT LP FOR IRON LUNG, END OF MISSION	
NOTES		
<ol style="list-style-type: none"> 1. When polar coordinates are used in adjustment the change in altitude will be mils by convention. 2. Observers may use one or three guns in adjustment and will specifically state this in the method ordered. 3. The observer can adjust the LP with three guns depending on the conditions stated in para 3 of this section. 4. Observer lases MPI of the three rounds. 		

Figure 5 - 31 Example of OP/CP Orders and Reports for a LP Fire Mission (Sheet 2 of 2)

177. **Cancellation of a LP.** A LP shall be cancelled under the following circumstances:

- a. on receipt of order CANCEL LP ___;
- b. when the battery moved; and
- c. change of grid.

178. If an observer cancels a target record which is also a LP, the LP remains in effect. If the LP only is cancelled, the target record remains in effect. Examples of each situation are as follows:

- a. LP cancelled by CANCEL LP 4600;
- b. target record cancelled by CANCEL ZT 4600; and

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- c. both LP and target record cancelled by CANCEL LP ZT 4600.

179. A LP Chart shall be completed for the use of the CPO in determining the validity of current LP and the corrections to be applied when they are ordered adopted by an observer. An example is shown in Figure 5-32.

SER	OP	LASER POINT	VALIDITY				CORRECTION	
			DIRECTION		TIME		BEARING	RANGE
			MAX RIGHT	MAX LEFT	FROM	TO		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)

Figure 5 - 32 Example of a LP Chart

SECTION 19
MORE THAN ONE BATTERY FIRE MISSIONS

GENERAL

180. The procedure within the battery CP for more than one battery fire mission is similar to that for a battery fire mission as described in Section 1. The differences for these higher missions lie in the:

- a. degree of authority of the observer to order the engagement and the weight of fire; and
- b. procedure for controlling the fire of several fire units.

181. If direction GT is used by convention or ordered by the observer, the direction will remain constant at the initial map bearing to the target (rounded to the closest 10 mils) from the adjusting battery. This bearing

will be circulated by the adjusting battery to the RCPO and the other batteries.

182. Corrections to fire that are to be applied by one fire unit only are prefixed with the call sign for that fire unit.

OBSERVER'S AUTHORIZATION TO CALL FOR FIRE

183. **General.** Two distinct levels of authority to order fire are vested in observers as described below.

184. **Ordinary Observer.** An ordinary observer is one who has not been given special authority to engage targets with fire units other than his own battery. If he wishes to engage a target with other fire units, permission must be obtained from the artillery HQ or CP concerned. Depending upon the description of the target and the availability of guns and ammunition, the HQ/CP requested may direct some or all of its units to engage the target. The ordinary observer in his call for fire may indicate the fire units and the type and amount of ammunition desired, but this is treated as a request and is subject to the approval of the appropriate HQ/CP. RCPOs must bear in mind, however, the realities of the observer's situation; modifications or denials must never be arbitrary and fire support should be provided if possible.

185. **Authorized Observer.** An authorized observer is one who has been given a special allocation of fire units, ammunition and target numbers, usually for a specific operation or period of time. The authorized observer shall issue his orders to the RCPO and the fire units that he is authorized to fire. The observer shall normally specify in his call for fire, the fire units to engage and the type and amount of ammunition to be fired. He is normally assigned a call sign on the artillery net controlling the fire units he is authorized to fire if he is not already a member of that net. A call for fire from an authorized observer is treated as an order and the fire will be provided in the manner desired unless he exceeds his authority, (e.g., he uses all his allotted ammunition).

186. Chapter 7 of this book gives examples of voice and fire discipline procedures for more than one battery fire mission conducted on the regimental net. These illustrate the normal procedure of the observer sending his orders. An authorized observer shall give fire orders in

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sufficient detail that a message to observer is unnecessary and shall select the adjusting battery.

187. The RCPO shall control the fire of the batteries by using a regimental fire orders net or line. If the observer does not designate the adjusting battery, it shall be designated by the RCPO based on ammunition available, the requirement to set fuzes and other factors or by accepting the first battery to report ready.

188. The GPO of the adjusting battery shall:

- a. circulate the altitude of the target if it is not sent in the call for fire; and
- b. if direction GT has been ordered, circulate the direction.

MORE THAN ONE BATTERY FIRE MISSION

189. The authorized and ordinary observer shall direct his orders to the RCPO and, if possible, to the battery CPs as well. If addressed in the initial call by the observer, the batteries shall acknowledge the observer's orders and make preparations to fire. They shall not fire, however, unless directed to do so by the RCPO. When the observer has not specified an adjusting battery in his call for fire, the first round shall not be fired until the RCPO has designated a battery to carry out adjustment. The RCPO may either:

- a. designate the adjusting battery, as part of his message to observer; or
- b. order AT MY COMMAND and nominate the first battery to report ready.

190. The RCPO, on receipt of the ordinary observer's call for fire, shall assess the circumstances and send to the observer and to the batteries a message to observer specifying the batteries to engage, the type and amount of ammunition and the target number in accordance with the CO's direction. Any of these items already specified by the observer in his call for fire may be omitted from the message to observer, provided that the observer's requirements can be met — otherwise it must be included.

CONDUCT OF FIRE MISSIONS

191. During fire missions requiring more than one battery, it is advisable that the RCPO shall always include the designation of the fire units to engage, e.g., TWO BATTERIES, 1 AND 2, 10 ROUNDS, ZT 1234. The message to observer is the executive order for the designated batteries to take part in the mission.

192. Chapter 7 of this manual gives examples in which the observer has addressed the RCPO and the batteries in his initial call.

193. During fire missions requiring more than one battery, the observer will direct his call for fire to the RCPO for onward transmission to Divisional Artillery HQ so that the regimental net is kept free for reports of any allotted units.

SECTION 20 MARK MISSIONS

GENERAL

194. The mark mission procedure shall be used to indicate targets to the land forces or to facilitate the acquisition of targets by Close Air Support (CAS).

195. Two types of procedures shall be used for the marking of targets:

- a. mark missions utilizing smoke (BE/WP); and
- b. mark missions utilizing illumination.

196. Regardless of the type of mission, there is no change to the drills used in the CP or on the guns from normal missions.

197. Given the timeliness of most CAS missions, once the mark round is adjusted, it is best to let the FAC control the moment of fire. It should therefore be included in the fire plan as an "on-call" target rather than as a scheduled timing. In most fire plans, the CAS target will also be engaged by artillery and/or mortars firing HE (or other munitions). In order to prevent confusion in the artillery CP, separate target numbers shall be assigned to the area neutralization and mark data.

DUTIES AT REGIMENTAL HEADQUARTERS
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SMOKE MARK MISSION

198. The smoke mark mission shall be conducted in accordance with the GPO’s initial sequence of orders. HE shall be used in adjustment.
199. See Figure 5-33 for an example of a smoke mark mission.

SER	OBSERVER ORDERS	REMARKS
(a)	(b)	(c)
1	FIRE MISSION ONE GUN	
2	GR 123 456 ALT 100	
3	DIRECTION 4800	
4	PLATOON DIGGING IN RADIUS 75	
5	MARK	
6	WP IN EFFECT	
7	ADJUST FIRE	
8	LEFT 100, ADD 100	
9	RECORD AS TARGET ZT 1234	MARK MISSION TO BE INCLUDED AS AN ON-CALL TARGET ON THE FIRE PLAN

Figure 5 - 33 Example of a Smoke Mark Mission

ILLUMINATION MARK MISSION

200. The call for fire is similar to that of other illumination missions. Where possible, the target should be adjusted and recorded using HE followed by illumination.
201. The HOB of 300 m for 155mm projectiles and 200 m for 105mm projectiles achieves the best accuracy while maintaining maximum burn time on the ground. This may have to be adjusted somewhat depending on local meteorological and terrain conditions. Corrections to the HOB of less than 50 m shall not be ordered.

SER	OBSERVER ORDERS	REMARKS
(a)	(b)	(c)
1	FIRE MISSION ONE GUN	
2	ZT 1234, DIRECTION 1600	FOO HAS ALREADY ENGAGED AND RECORDED THE TARGET WITH HE.

CONDUCT OF FIRE MISSIONS

3	DOWN 300	TO ADJUST HOB TO 300 m FOR 155mm ("DOWN 550") TO ADJUST HOB TO 200 m FOR 105mm)
4	PLATOON DIGGING IN RADIUS 75	
5	MARK	
6	ILLUMINATION	
7	ADJUST FIRE	
8	LEFT 100, DOWN 50	
9	RECORD AS TARGET ZT 2135	MARK MISSION MAY BE INCLUDED AS AN ON-CALL TARGET ON THE FIRE PLAN

Figure 5 - 34 Example of an Illumination Mark Mission

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

CHAPTER 6
TECHNICAL DUTIES

SECTION 1
GENERAL

CP OPERATION

1. Introduction.

- a. CPs are established for efficient staff work and they must be maintained for this purpose. Separate eating and sleeping areas will be designated to keep these activities out of the CP. Casual visitors should be met and briefed away from the working area whenever possible.
- b. CPs will be fully manned at all times.
- c. Stationery and reference books will be stowed away, but still readily available. Essential information, such as CEOs, log sheets, etc., must be prominently displayed. CPs must be kept clean and neat.
- d. When personnel come on duty, they must be fully briefed on the current situation before the outgoing duty personnel leave the CP.
- e. There must be a constant flow of information to higher and lower HQ and CPs. The GPO must keep members of the battery informed of the tactical situation.
- f. Reconnaissance parties must always be prepared to move at short notice.

2. **The Regimental CP.**

- a. **General.** The RCPO is responsible for the efficient operation of the regimental CP.
- b. **Personnel.** The staff required to man the CP and the regimental message centre will vary with circumstances, but should include the following personnel:
 - (1) **CP:**
 - (a) duty officer,
 - (b) artillery technician(s).
 - (2) **Message Centre:**
 - (a) one NCM,
 - (b) exchange operator(s), and
 - (c) Signal Dispatch Service (SDS) staff.
- c. **Internal Operation.**
 - (1) **Artillery Planning Map.** An artillery planning map (traces/ overlays) shall be maintained. On it shall be displayed the:
 - (a) forward positions of friendly troops;
 - (b) fire support coordination measures such as boundaries, Fire Support Coordination Lines (FSCLs), No-Fire Lines (NFLs) and fire coordination areas;
 - (c) important recorded regimental or higher targets;

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- (d) positions, arcs of fire and planning ranges of all batteries of the regiment and any batteries under command; and
 - (e) positions and zones of observation of all OPs within the area of the supported formation.
- (2) **Operations Map.** An operations map shall be maintained at all times showing the positions of our own and enemy troops, boundaries, obstacles and related information. All tactical information shall be recorded and circulated to higher and lower HQ.
- (3) **Layout of the Regimental CP.** Some requirements are:
- (a) the duty officer must be within easy reach of the divisional artillery and regimental fire orders nets;
 - (b) the operations and tactical maps must be accessible to the duty officer when he is speaking on the telephone or radio;
 - (c) target records, overlays, fire plan tables, target lists and other technical data must be filed or displayed in readily accessible locations; and
 - (d) entry to the working area of the CP must be strictly controlled.
- (4) **Office Routine.** The duty officer in the CP must routinely:
- (a) keep the CO's tactical HQ and Divisional Artillery HQ informed of changes in the location of OPs and the

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locations, arcs of fire and planning ranges of the batteries;

- (b) maintain a capability chart;
- (c) ensure that the results of all fire missions are passed immediately to the CO's tactical HQ and Divisional Artillery HQ, and that target adjustment reports on Hostile Batteries (HBs) and locating devices are passed immediately to the DAIO; and
- (d) ensure that all MORTREP, SHELREP, BOMREP, NUCREP and related tactical information are passed immediately to the DAIO.

3. **The Battery CP.**

- a. **Layout of the Battery CP.** The layout of the CP must be such that:
 - (1) personnel can perform their duties efficiently and comfortably;
 - (2) the GPO/CPO can see the computing devices, the communicators' message pads, operations map and use his check map;
 - (3) all forms, instruments, technical data and records are readily available; and
 - (4) space is provided for technicians engaged in C of M computation, preparation of gun programmes, etc. (usually in the alternate CP).
- b. **Setting Up the Battery CP.** The instruments in the CPs are set up using the procedures outlined in B-GL-306-008/FP-001, *Instruments*. The following checks shall be carried out:

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- (1) the GPO/CPO checks the set-up of all computing device(s);
 - (2) the GPO/CPO causes the set-up of all computing device(s) to be verified by ordering VERIFY SET-UP AT GRID _____ ;
 - (3) the GPO/CPO sets up and verifies his check map at this time (check map checking limits are 20 mils for bearing and 200 m for range);
 - (4) the GPO/CPO checks the set-up of the CPFC graph; and
 - (5) the alternate CP must be set up and checked in a similar manner.
- c. **Computation of C of M.** It is the GPO/CPO’s responsibility to ensure that the C of M is computed and checked whenever a met message is received. It will be checked by a comparison of gun data produced by the main and alternate CPs. It is reported to the RCPO when ready and adopted on order.
- d. Verification limits between manual plotting devices are shown in Figure 6-1.

SER	ITEM	OBSERVED FIRE
(a)	(b)	(c)
1	Bearing	10 mils
2	Angle of sight	1 mil
3	Range	100 metres
4	Fuze Setting	Equivalent to 100 metres
5	Elevation	Equivalent to 100 metres

Figure 6 - 1 Verification Limits Between Manual Plotting Devices

UTM GRID ZONE OVERLAP

4. When operations take place astride the junction line between two UTM grid zones, problems will occur when calls for fire against a target in one zone are answered by fire units in the other. To resolve this problem, three principles are followed:

- a. to avoid confusion, observers will always use the grid marked on the map sheet in their area;
- b. fire units will use a common grid zone for deployment and survey, and any adjustment to gun data will always be made in the CPs; and
- c. the senior artillery commander of the affected formation will order the grid zone to be used for survey and fire control based on the:
 - (1) direction of movement of the formation,
 - (2) type of operation,
 - (3) number of fire units in each zone,
 - (4) areas most likely to be used as gun positions, and
 - (5) likely target areas.

5. Maps of areas within 40 km of a grid junction show the adjacent (overlapping) UTM grid by ticks on the margin in addition to showing the primary grid. The overlapping grid when ordered adopted is used only for fire control and survey, and must not be used for giving a grid reference.

6. On receipt of the commander's direction, all maps in the CPs and within the survey section will be examined. Those which are printed with the grid to be adopted are left unchanged; those printed with the grid to be excluded will have the grid lines of the adopted grid drawn in using the marginal ticks. Only the adopted grid will be used for fire control and survey.

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

7. Calls for fire will use the grid printed on the observer's map sheet. If this grid is also the one ordered adopted, normal plotting for gun data can be carried out. If it is the wrong grid, the target location must be plotted on the GPO's check map and converted to a false grid reference using the newly drawn adopted grid lines. This false grid reference is then used to produce gun data. A false direction may also be required.

SECTION 2 TARGET NUMBERS

GENERAL

8. Targets are assigned individual numbers so that all levels of command and control will have a ready reference to them for planning and engagement.

9. There is not a common ABCA target numbering system. The CA/UK/AS system is described in paragraphs 10 to 14 of this section and the US method is described in paragraphs 15 and 16 of this section. Both are illustrated in Figure 6-2. Although the two systems differ, they are compatible and no duplication of the entire target number is possible.

TECHNICAL DUTIES

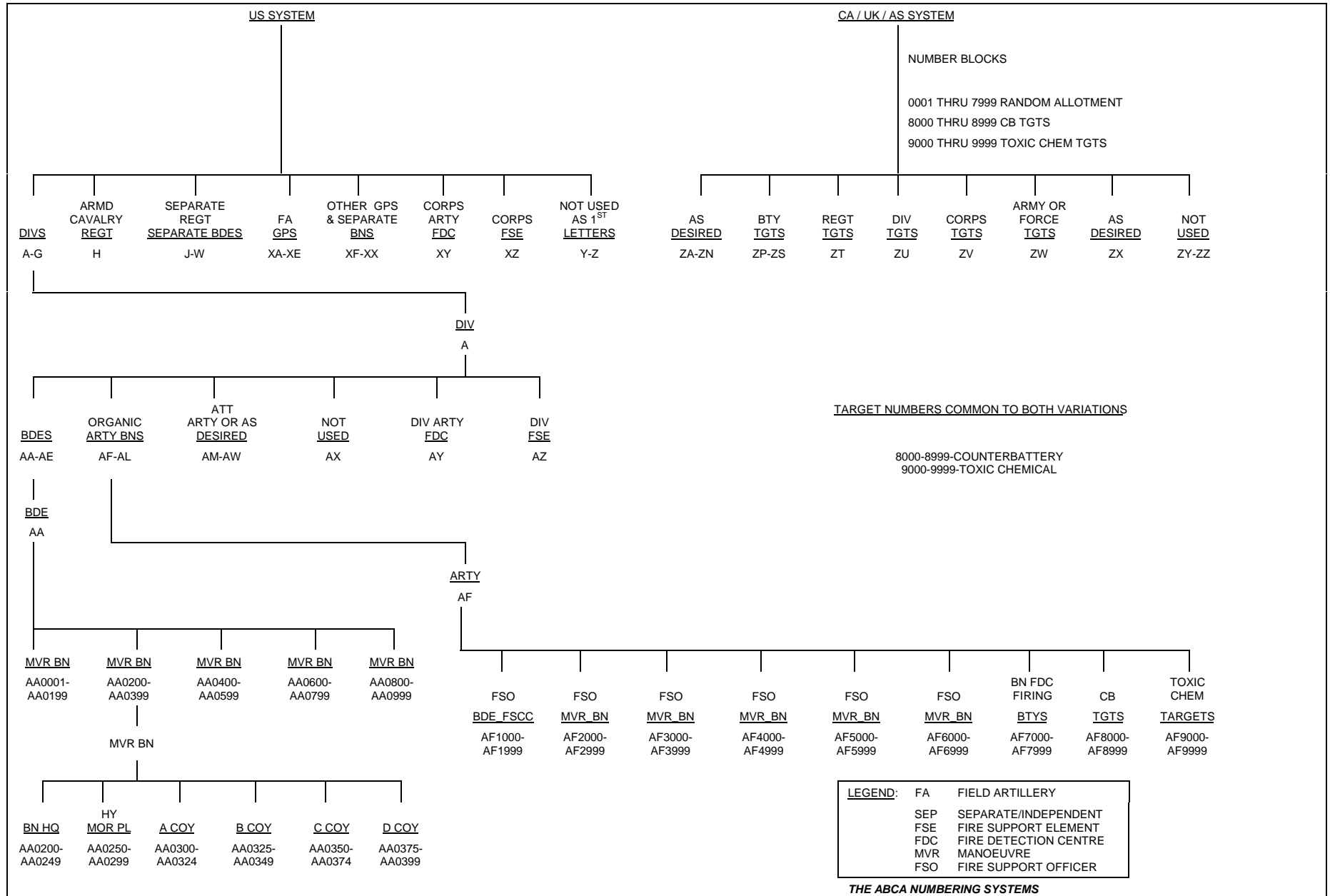


Figure 6 - 2 The ABCA Target Numbering System

CA/UK/AS SYSTEM

10. A target is designated by six characters consisting of two letters and four digits as follows:

- a. **Letters.** The letters indicate the level to which records of a target are kept. The first of the letters is always Z and indicates this target numbering system (the US does not use Z as a first letter). The second letter indicates the level of classification as follows:
 - (1) as desired - ZA through ZN (I and O are not used);
 - (2) battery targets by seniority in the regiment:
 - (a) A Battery (Senior Battery) - ZP,
 - (b) B Battery - ZQ,
 - (c) C Battery - ZR, and
 - (d) Z Battery - ZS;
 - (3) regimental targets - ZT;
 - (4) divisional artillery targets - ZU;
 - (5) corps artillery targets - ZV;
 - (6) army (or force) targets - ZW;
 - (7) as desired - ZX; and
 - (8) not used - ZY and ZZ.
- b. **Target Number Blocks.** These are randomly selected blocks of numbers. Classified blocks, each of ten consecutive four-digit numbers and designated by the first number in the block (which always ends in zero,

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

e.g., 1430, 2160, 7790), are allotted to the regiments by the CDA, and are sub-allotted to batteries by the RCPO.

11. **Reserved Blocks.** The 8000 to 8990 numerical blocks are reserved for CB targets and controlled by the DAIO. The 9000 to 9990 numerical blocks are reserved for toxic chemical targets.

12. **Assignment of Target Numbers to Targets.**

- a. Target numbers are normally assigned to targets by the observer; however, in the message to observer, the CP of the fire unit conducting the fire mission may assign a target number. If target numbers are assigned by both the CP and the observer, the target number ordered by the observer will be adopted.
- b. However, for fire planning, the officer making the plan, i.e., a CO, BC or observer, shall assign numbers to targets before passing them to the CPs so that the supported arms may be informed of the target numbers as the plan is being made. Blocks will be sub-allotted to these officers for this purpose as required by the CP concerned.
- c. A target, once assigned a number, retains the same numerical characters throughout its life, although it may originally be recorded as a battery target and subsequently passed to all in the corps artillery. For example, target ZQ 1575, originally recorded by Q Battery of Z Regiment, may successively become ZT 1575, ZU 1575 and possibly ZV 1575.
- d. Requests for nuclear and chemical targets are passed to higher HQ via normal artillery channels. The authority which grants a request will also assign a target number and include it in its granting message.

13. **Target Numbers for Defensive Fire (DF) Targets.**

- a. DF and FPF tasks are numbered by the artillery whether they are chosen by the supported arms or by the

artillery. The officer making the plan shall assign these numbers from his allotted blocks.

- b. It may occur that a target that has already been recorded is selected as a DF task. Such a target retains its original number but may be upgraded, e.g., if target ZT 4973 is selected as a DF task, it may become ZU 4973.
- c. During the coordination of DF tasks, it may occur that one target has been assigned two different numbers by different originators. The coordinator shall resolve this duplication by assigning one target number to this task and cancelling the other.

14. **Nicknames.**

- a. A nickname is a name used for convenience when security cover is not required. It consists of two words, neither of which may be a colour.
- b. Fire plans and groups of targets not requiring security cover shall be assigned nicknames and not code words. Nicknames should not bear any relation to each other, such as a common initial or subject, as this assists enemy intercept staffs. For this reason, it is advisable for formation HQ to issue lists of nicknames to regiments. A nickname should be short and readily understood over radio and telephone, e.g., BEARDED CLAM or TENNIS HILL.
- c. For the purpose of target records, all nicknames shall be regarded as additional to target numbers and should appear with target numbers in the target record book.
- d. When nicknames are used, an alphabetical list shall be maintained showing associated target numbers.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION
US SYSTEM

15. In the US system, the target is also designated by two letters and four digits. The two letters designate the originator of the target and the numbers identify the specific target assigned by that originator.

16. A detailed explanation of the US system is given in B-GL-306-002/FP-001, *Artillery Staff Duties*.

SECTION 3
TARGET RECORDS

INTRODUCTION

17. The aim of recording a target is to enable it to be re-engaged quickly.

18. A target record is obtained in one of two ways:

- a. the target is successfully engaged or adjusted and the data at which the gun(s) fired are recorded in such a way that the record may be used for re-engagement; or
- b. CPs concerned are given target locations which may have been obtained from map spotting, air photographs, a target acquisition device, or from the records of a unit which has already engaged and recorded the target.

POLICY ON RECORDING TARGETS

19. There is a limit to the number of targets that the CP is capable of maintaining — usually about 60 to 100. If this limit is exceeded, it may take longer to find the record than to determine map data from a computing device. G3 Artillery, RCPOs and GPOs/CPOs may establish priorities for the production of gun data. In the absence of such priorities, the following is a guide when a large number of targets are involved:

- a. **FPFs.** The battery FPF should be issued to each detachment commander on a gun programme with

complete predicted data and all other orders required for engagement. These programmes must be replaced or amended as new met or registration data becomes available. Guns should be laid on the FPF when not engaged in other firing.

- b. **Target Lists.** Target numbers from target lists should be entered in the target record index and cross-referenced to the target lists. Although one list from a particular HQ normally supersedes another, a CP may often have several, including DF target lists and HB lists. Further data for these targets shall be determined and entered in the target record book only if:
 - (1) the targets are included on a fire plan table and not cancelled at the conclusion of the fire plan; or
 - (2) targets from a DF list are ordered adopted.

- c. **Artillery Fire Plans.** At the conclusion of a fire plan, only those targets that are not cancelled shall be entered in the target record book. The fire plan, if successful, will probably render most of the targets unsafe and the fire planner may cancel the unsafe targets or those he no longer requires.

CLASSIFICATION OF TARGETS

20. Recorded targets are classified as battery, regimental, divisional targets, etc., according to how widely the records are held or circulated. This classification often does not correspond to the level at which the target was originally engaged or adjusted for future engagement, nor to the level at which it may be subsequently engaged. For example, a target that is to be engaged by a battery in a fire plan may be adjusted for coordinates, or predicted by the observer and ordered recorded as a regimental target.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION
RECORDS TO BE KEPT

21. In general, each CP keeps records of all targets recorded at its own and higher level.
22. Within the regiment, the responsibilities are as follows:
- a. The GPO/CPO shall keep records of his own battery and higher targets including gun data, and shall provide the RCPO with details of all regimental and higher targets (exclusive of gun data) adjusted and recorded by this battery.
 - b. The RCPO shall keep records, exclusive of gun data, of all regimental and higher targets. He shall ensure that the batteries receive the necessary details of such targets.
23. The GPO/CPO is responsible for the determination of target record data and for the accuracy of entries in the target record book. He ensures that all data is independently checked. The computing device is checked against his check map.
24. If all batteries have engaged the fire mission and it is subsequently ordered recorded, the adjusting fire unit, or one nominated by the RCPO, will circulate the target record.

RULES

25. **Entries in the Target Record Book.** Only targets ordered recorded or adopted shall be entered in the target record book, except that FPF tasks shall always be entered. The following rules apply:
- a. Only map data shall be entered in the target record book and circulated to other fire units. When no met or registration data are available, the process of reduction to map data shall be carried out except for the extraction of C of M.

- b. Except for DANGER CLOSE, no individual corrections shall be recorded. The treatment of targets requiring individual corrections is shown below:
 - (1) In his initial call for fire the observer ordered CONVERGE. A record shall not be kept of the convergences and position corrections. In subsequent engagement of this target, the guns shall be fired with a circular fall of shot unless the observer again orders CONVERGE.
 - (2) If, during the engagement of a target other than DANGER CLOSE, the observer ordered an individual correction to one or more guns and subsequently ordered the target recorded, no record of the individual corrections shall be maintained. In a future engagement, no individual correction shall be applied unless the observer so orders.
 - (3) If a DANGER CLOSE target is ordered recorded, the completed printout will be placed in the target record book and kept up to date as required.

26. **Future Engagement.** When a target has been engaged and recorded, the GPOT proforma shall be saved. If re-engagement is required within two hours, the gun data as read from the proforma or printout shall be used. After two hours, the GPOT proforma shall be destroyed. As noted in paragraph 25b(1) of this section, fall of shot shall always be circular during re-engagement unless the OP specifies another distribution of fire.

27. **Deliberate Smoke Missions.** Smoke screens shall not be entered in the target record book. If the observer has reason to record a smoke screen, he shall indicate to the GPO/CPO his reasons and the circumstances of likely re-engagement. The GPO/CPO shall maintain the applicable GPOT proforma until the requirement lapses.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION
THE TARGET RECORD BOOK

28. The Target Record Book (CF 1192) is used by the RCPO, GPO/CPOs and their technical assistants. It consists of a target record index, pages for recording target data and pages for recording battery centre survey data (see Figures 6-3, 6-4 and 6-5).
29. **Registration Point/Laser Point.** If the registration point/laser point is also a target, enter target number in column A, and enter registration point number or laser point in remarks column G.
30. Whenever a target is recorded in the body of the book, the page on which its record has been made is entered in the index against the target number. Targets from a target list whose data are not recorded in the body of the book shall have the target list number entered in the index (see Figure 6-3).
31. When a target is to be recorded, the map data is entered on the first line of the first available group of lines. The remaining lines are for fresh data relating to the same target for a change of grid. The right portion of the page is for map data from a new or alternative position (see Figure 6-5).
32. The last pages in the book are for recording battery centre survey data. The battery call sign will be shown in the first column under "Battery". Additional lines are available for fresh data resulting from a change of grid (see Figure 6-4).

TECHNICAL DUTIES

2000			2100			2200			2300			2400						
	Page			Page			Page			Page			Page		Page		Page	
00		50		00		50		00		50		00		50		00		50
01		51		01		51		01		51		01		51		01		51
02		52		02		52		02		52		02		52		02		52
03		53		03		53		03		53		03		53		03		53
04		54		04		54		04		54		04		54		04		54
05		55		05		55		05		55		05		55		05		55
06		56		06		56		06		56		06		56		06		56
07		57		07		57		07		57		07		57		07		57
08		58		08		58		08		58		08		58		08		58
09		59		09		59		09		59		09		59		09		59
10		60		10		60		10		60		10		60		10		60
11		61		11		61		11		61		11		61		11		61
12		62		12		62		12		62		12		62		12		62
13		63		13		63		13		63		13		63		13		63
14		64		14		64		14		64		14		64		14		64
15		65		15		65		15		65		15		65		15		65
16		66		16		66		16		66		16		66		16		66
17		67		17		67		17		67		17		67		17		67
18		68		18		68		18		68		18		68		18		68
19		69		19		69		19		69		19		69		19		69
20		70		20		70		20		70		20		70		20		70
21		71		21		71		21		71		21		71		21		71
22		72		22		72		22		72		22		72		22		72
23		73		23		73		23		73		23		73		23		73
24		74		24		74		24		74		24		74		24		74
25		75		25		75		25		75		25		75		25		75
26		76		26		76		26		76		26		76		26		76
27		77		27		77		27		77		27		77		27		77
28		78		28		78		28		78		28		78		28		78
29		79		29		79		29		79		29		79		29		79

Figure 6 - 3 Target Record Index Page (1 of 2)

TECHNICAL DUTIES

2000			2100			2200			2300			2400			
	Page		Page		Page		Page		Page		Page		Page		Page
30		80		30		80		30		80		30		80	
31		81		31		81		31		81		31		81	
32		82		32		82		32		82		32		82	
33		83		33		83		33		83		33		83	
34		84		34		84		34		84		34		84	
35		85		35		85		35		85		35		85	
36		86		36		86		36		86		36		86	
37		87		37		87		37		87		37		87	
38		88		38		88		38		88		38		88	
39		89		39		89		39		89		39		89	
40		90		40		90		40		90		40		90	
41		91		41		91		41		91		41		91	
42		92		42		92		42		92		42		92	
43		93		43		93		43		93		43		93	
44		94		44		94		44		94		44		94	
45		95		45		95		45		95		45		95	
46		96		46		96		46		96		46		96	
47		97		47		97		47		97		47		97	
48		98		48		98		48		98		48		98	
49		99		49		99		49		99		49		99	

Figure 6 - 3 Target Record Index Page (2 of 2)

TECHNICAL DUTIES

TARGET RECORDS - *REGISTRES DE TIR*

Target Number and Nickname <i>Numéro d'objectif et sobriquet</i>	GRID REFERENCES – <i>COORDONNÉES</i>					POSITION <i>(Nickname - Sobriquet)</i>				
	Eastings <i>Abscisses</i>	Northings <i>Ordonnées</i>	Altitude <i>Altitude</i>	Grid <i>Quadrillage</i>	How Observed Date/Hour <i>Comment obtenues Date/Heure</i>	Remarks and Basic Data <i>Remarques et données de base</i>	Charge <i>Charge</i>	Bearing <i>Azimuth</i>	Site <i>Site</i>	Range <i>Portée</i>
A	B	C	D	E	F	G	H	I	J	K
ZR 3282	5865	7370	300'	BTY BIE	31 W 3 061500					
	5864	7368	300'	REGT RÉGT						
	5864	7368	300'	THEATRE THÉÂTRE						
ZR 4150	5506	7229	325'	REGT RÉGT	32 061800					
ZT 2126	5312	6904	325'	REGT RÉGT	TGT LIST #3 LISTE #3 OBJ					
BIG ACE										
ZT 2129	5778	6827	300'	REGT RÉGT	2 061830					
ZR 3283	5777	7063	300'	THEATRE THÉÂTRE	31 061900					
REG PT 1 RÉG PT 1										

Figure 6 - 5 A Sample Page from C/S 2's Target Record Book

ENTRIES IN THE TARGET RECORD BOOK

33. Types of entries in the target record book are depicted in Figure 6-5.
34. **Target Number and Nickname — Column (a).**
- a. Enter the target number.
 - b. If the target is one of several targets that are grouped tactically under a nickname, enter the nickname also.
 - c. If the registration point is also a target, enter target number in column A, and registration point number in the remarks column G.
35. **Eastings — Column (b).** Enter the five-figure eastings of the grid reference as determined from the plotting device or target list.
36. **Northings — Column (c).** Enter the five-figure northings of the grid reference as determined from the plotting device or target list.
37. **Altitude — Column (d).** Enter the altitude of the target as determined from the map for the grid reference in columns (b) and (c).
38. **Grid — Column (e).**
- a. If the grid reference of the target has been determined by firing, the grid entered in column (e) will be that of the guns which carried out the firing.
 - b. If the grid reference is obtained from a target list, i.e., not by shooting, enter the grid of the level of the originating HQ unless it is annotated otherwise.
 - c. If the target is a fixed point registration, the grid is that ordered or indicated by the source of fixation.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

39. **How Obtained, Date and Time — Column (f) .**

- a. The purpose of this column is to show to whom queries should be addressed.
- b. The target record books in the battery will reflect the call sign of the observer for targets adjusted by that battery.
- c. When the record is to be circulated outside the adjusting battery, the RCPO and remaining GPO/CPO's records will reflect the adjusting battery's call sign.
- d. If the target record was received from an outside source, enter the designation of the source, e.g., RCPO, TARGET LIST NUMBER THREE.
- e. When more than one battery has engaged the target and no adjustment was carried out, all batteries engaging the target will enter the call sign of observer. The RCPO will ensure that the engaging batteries receive this information if required.

40. **Remarks — Column (g) .**

- a. Any notes which would assist in the re-engagement should be entered, e.g.:
 - (1) DANGER CLOSE, record the fact that the printout is contained in the target record book, including individual corrections;
 - (2) CHECK CREST AT (range or location) if C of M changes;
 - (3) HIGH ANGLE; and
 - (4) REGISTRATION POINT or LASER POINT.
- b. If neither met nor registration data are available, enter NO MET in coloured pencil. If the target record is to be

circulated without removing the C of M, its use is restricted by registration limits. In such a case, all corrections for non-standard conditions shall be removed except for the C of M. When met or registration data become available, the originating battery shall circulate map data. The NO MET entry shall be drawn through with a line at this time.

TARGETS ON WHICH THE GUNS HAVE FIRED

41. **Responsibilities of the GPO/CPO.** The GPO/CPO is responsible for the:
- a. records of all targets the battery has been ordered to record;
 - b. reduction to map data of all targets the battery has been ordered to record;
 - c. accuracy of target record data emanating from the CP; and
 - d. production of map data for alternate positions in the following order of target priority:
 - (1) FPF tasks,
 - (2) other DF tasks, and
 - (3) other targets as ordered.
42. **Outline Procedure.**
- a. When any of the guns of the battery have engaged a target and if the target has been ordered recorded, the GPO/CPO shall order RECORD AS (target number).
 - b. The detachment commander of any gun that has engaged that target shall send a target record to the CP.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

- c. The GPO/CPO shall inspect each target record from the guns to ensure that the data thereon is identical with the data ordered. Any error shall be reported to the observer who shall decide whether the error is to be accepted or corrected.
- d. The GPO/CPO shall plot the bearing and range and determine the grid reference as a gross error check.
- e. When a computer is used to produce data, the CPO will check if the map bearing and map range that he has deduced from the map is in tolerance with the map bearing and range of the computer. The CPO will adopt the map bearing and range of the computer and produce an eight figure grid. The CPO will compare his grid with the computer's grid; tolerance is 50 m in Eastings and Northings. The grid produced by the computer is entered in the Target Record Book.
- f. When data is produced manually, both technicians will deduce an eight figure grid using the final map bearing and range from the shooting technician. Tolerance between technicians is 50 m in Eastings and Northings. The CPO will also deduce a grid using the final map bearing and range from the shooting technician. In the event that the technicians are out of tolerance, the CPO will decide which grid to adopt (the CPO will use the technician's grid that is in tolerance with his grid).
- g. Once the grid is produced, the CPO will do an altitude check on his check map; tolerance is five metres.
- h. If the altitude changes by more than five metres from the original altitude, the CPO will order the technicians to calculate false angle of sight.
- i. The data produced will be entered in the target record books and the GPO/CPO will ensure that:

TECHNICAL DUTIES

- (1) the data contained in columns (a) to (f) is passed to the RCPO who will pass it to the other batteries, if applicable; and
 - (2) if ordered, the grid reference is sent to the observer.
- j. The GPO/CPO shall then report (target number) recorded to the observer.

RECORDING A TARGET FROM GRID REFERENCE

43. The record of a target originates as a grid reference when:
- a. the grid reference, obtained by map spotting or similar means, and the target number and description, are passed to the CP from the observer, the RCPO, or appear on a target list or fire plan table; or
 - b. the target is fired on by another battery and the grid reference is circulated by the RCPO or GPO/CPO of the battery that engaged it.
44. The GPOT in all cases shall:
- a. enter in columns (a) to (g) the details received and fill in the index;
 - b. plot the target, determine the bearing and elevation; and
 - c. enter the data obtained in subparagraph b above in the target record book.

MISCELLANEOUS

45. **Safety.** A red line shall be drawn through the record of any target rendered unsafe by the movement of our own troops. The data is not cancelled and shall not be erased.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

46. **Cancelled Targets.** The record of a cancelled target shall be drawn through with a pencil. The data shall not be erased. The entry in the index referring to the target shall be erased. Generally, a target can be cancelled only by the originator. BCs and observers should cancel all targets which no longer serve a useful purpose.

47. **Scribing.** All entries must be written neatly and legibly using a sharp HB or similar pencil. Ink of any type, indelible pencils or coloured pencils (except when met or registration data are not available or a target becomes unsafe) shall not be used.

48. **Passing Target Records.** Target records shall be passed between CPs by technicians. The sender reads out the data from his target record book, the recipient enters it directly into his, then reads the complete record back as a check. Columns containing no entry are omitted.

ADJUSTMENT OF RANGE FOR FALSE ANGLE OF SIGHT

49. **The Problem.** If a target is adjusted for future engagement and recorded with an incorrect angle of sight, the recorded range — and consequently the grid reference of the target — will be incorrect. When a target has been engaged or adjusted for future engagement, the QE at which the adjusting gun(s) fired is known to be correct since rounds have been seen to hit or bracket the target. If too large an angle of sight has been used, the recorded range will be too small and vice versa. Therefore, an adjustment is required before the record may be circulated. No adjustment is required if the target was engaged in high angle.

50. **Method of Adjustment.**

- a. The GPO/CPO shall determine a new altitude for the new grid reference. If the new altitude is within five metres of the initial altitude, no adjustment is necessary.
- b. If the new altitude is more than five metres, the GPO/CPO will order the new altitude to the technicians. The technicians will enter the new altitude into the computing device and produce a new grid reference. This new grid reference must be checked as above and

the procedure continued until such time as the altitude is within tolerances.

SECTION 4 CHANGE OF GRID

INTRODUCTION

51. The prime purpose of a change of grid is to place as many guns as possible and any targets engaged on the same grid, e.g., to place the batteries of a regiment on a common grid by changing from separate battery grids to a regimental grid.

52. As soon as regimental survey data becomes available, a change of grid will be effected immediately, unless engaged in a fire mission or fire plan, and without reference to a higher headquarters. Change to a grid higher than regimental grid may not be effected without a specific order. The issuing of provisional survey data above regimental level from a survey pair does not constitute the authority to adopt higher survey data. Only the RSO, his TSM or the RCPO have the authority to implement the adoption of this survey data to a higher grid.

53. A change of grid may involve the deduction of new:

- a. coordinates for all points fixed on the old grid and an alteration to the orientation of the guns;
- b. grid references of all targets whose current grid references are on the old grid; and
- c. centre-to-centre data for all targets whose grid references are already on the new or some higher grid.

54. When the fire of two or more batteries that are on separate grids is required, their fire may have to be adjusted onto the target individually unless their grids are closely related.

55. If orders for a change to a higher grid are received during the establishment of any grid, the higher grid takes precedence.

DUTIES AT REGIMENTAL HEADQUARTERS
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DUTIES AT RHQ

56. The duties of the RSO are outlined in Chapter 2 of this manual and given in detail in B- GL-306-017/FT-001, *Artillery Survey*. If it is decided to change to regimental or higher grid, the RSO shall calculate the required alteration to the battery or regimental orientation and provide coordinates on the new grid of at least one point in each battery area, preferably the battery centre.

57. Subsequent orders by the RCPO to the batteries must be issued sufficiently far in advance of a change of grid to enable the necessary work to be carried out. The orders must include the:

- a. time at which the change is to take place;
- b. alteration to be made to the bearing; and
- c. coordinates on the regimental grid of the point(s) fixed in the battery area.

58. Following is an example order for a change of grid: P BATTERY, CHANGE TO REGIMENTAL (DIVISIONAL OR THEATRE) GRID AT 1400 HOURS. AMEND CENTRE OF ARC RIGHT 10 MILS. AMEND ROs AND OLD GRID TARGET RECORDS LEFT 10 MILS. COORDINATES BATTERY CENTRE 46169 71953, ALTITUDE 350 FEET.

GPO/CPO'S DUTIES

59. **Situations.** The following will render it necessary for the GPO/CPO to effect a change of grid:

- a. the RCPO so orders; or
- b. the GPO/CPO has put his guns onto a battery grid and subsequently by means of a more deliberate procedure, he obtains more accurate data.

60. In all cases, a change is necessary only when the new data differs from the old data by more than one mil for orientation, or 10 m for Eastings or Northings and five metres for altitude.

61. When a change of grid is necessary, the GPO/CPO will:

- a. amend the RO reading as ordered;
- b. order the required change to the guns;
- c. order the change in fixation to his technician; and
- d. amend target records.

62. **Orientation Only.** Compare the old grid bearing to an RO with the new grid bearing to the same RO. The difference in bearing is the amount of the change required to the orientation. It may be convenient to pass new orientation to each gun; if not, corrections must be deduced and ordered as shown below:

- a. the change required for the guns is equal to the old grid bearing minus the new grid bearing;
- b. the change for ROs and target records is the same as that required for the guns, but is in the opposite direction;
- c. the following example shows the computation required:
 - (1) grid bearing of C of A 0800 mils,
 - (2) old grid bearing to RO 3201 mils,
 - (3) new grid bearing to RO3217 mils, and
 - (4) change in orientation required for the guns (2) minus (3) — 16 mils or LEFT 16 mils; and
- d. the GPO/CPO would order BEARING 0784, RECORD AT 0800 to the guns. He would order AMEND ROs

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AND OLD GRID TARGET RECORDS RIGHT 16 to his technicians.

63. **Fixation Only.** If a change in fixation only is required the GPO/CPO will:
- a. deduce a new grid reference for the battery centre and compare it to the old one; and
 - b. prepare orders for the change to include the new grid reference and altitude of the battery centre. Altitude is read directly from the map at the new grid reference.
64. **Orientation and Fixation.** When a change in both orientation and fixation is required, the steps detailed in both paragraphs 62 and 63 of this section are carried out. The GPO shall order to the guns — TAKE POST, BEARING 0784, RECORD AT 0800, and to his technicians — AMEND ROs AND OLD GRID TARGET RECORDS RIGHT 16 MILS, GRID 4621 7183, ALTITUDE 325 FEET.
65. **Miscellaneous.** If the survey officer fixes the battery director or the point of origin of the battery survey plan, the GPO/CPO should have little difficulty in effecting a change of grid. However, if the survey officer provides fixation and orientation at a point other than this, the GPO/CPO will have to calculate his own change in bearing and complete another survey plan incorporating the fixed point.
66. The GPO/CPO is responsible for informing the RCPO and his BC of the state of survey in the battery.

TECHNICIANS' DUTIES

67. The record of the reading from the director is amended as ordered so that the director can be set up at any time on the amended bearing. For example, orders for change include: BEARING 1110, RECORD AT 1100. AMEND ROs LEFT 10 MILS. The original reading to the RO was 2285 mils; therefore, the new reading to the RO would be 2275 mils.

68. The new battery centre grid reference is entered into the computing device and the battery centre survey data page of the target record book is amended (see Figure 6-4).

AMENDMENT OF TARGET RECORDS

69. **Priority.** When a large number of target records has to be amended, the following priority should be used for main gun positions unless otherwise ordered:

- a. FPF and DF tasks covering the main positions of the supported arm of which the guns are in Direct Support (DS);
- b. FPF and DF tasks covering the main positions of adjacent supported arms;
- c. regimental and battery targets; and
- d. hostile guns and mortars (if gun data has been produced).

70. The priority is repeated for alternative positions.

71. **GPO/CPO's Target Records.** A summary of the rules in this paragraph is given in Figure 6-6:

- a. **Targets on the Same Grid as the Guns.** The centre-to-centre data of targets on the same grid as the guns are amended one at a time, the two technicians working together with manual systems or with computing devices and GPO's check map when computing devices are in use. The procedure is as follows:
 - (1) the new grid is entered in column (e);
 - (2) a new grid reference is deduced; and
 - (3) if the altitude of the battery centre is changed by more than five metres, adjustment of range for false angle of sight shall be carried out.

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- b. **Targets on a New Grid.** The centre-to-centre data of targets on the new grid are amended one at a time, as described in subparagraph a. The procedure is:
 - (1) re-compute the target from its grid reference; and
 - (2) read the new bearing, sight and range and enter them in the appropriate column of the target record book.
- c. **Targets Received from Outside Sources.** Targets which were received from outside sources are treated in the same manner as targets on the new grid once grid references from the adjusting units have been received.
- d. **All Cases.** In all cases the GPO/CPO shall pass amended target records, columns (a) to (e) inclusive, to the RCPO and other battery CPs for those regimental or higher targets adjusted in his battery.

72. **RCPO's Target Records.**

- a. **Targets on New or Higher Grid.** The RCPO takes no action on these targets.
- b. **Targets on Any Other Grid.** The RCPO records the amended data (columns (a) to (e)) as soon as they are received from the GPO/CPO of the originating battery. Amended records for divisional and higher targets adjusted within the regiment shall be passed to the higher artillery HQ and to other RCPOs.

TECHNICAL DUTIES

SER	GRID OF TARGET	TYPE OF CHANGE	GUNS	PLOTTING DEVICE	TARGET RECORDS	EFFECT OF CHANGE
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	Target on the same grid as the guns	Fixation only	No change	Replot battery centre	a. No change in bearing, angle of sight and range. b. Record new grid reference. c. Amend column (e).	Target and gun remain in the same relative position.
2		Orientation only	Record fresh bearing	No change	a. Amend bearing. b. Amend grid reference. c. Amend column (e).	Centre of arc moves on the ground.
3		Fixation and Orientation	Record fresh bearing	Replot battery centre	a. Amend bearing. b. Amend grid reference. c. Amend column (e).	Centre of arc moves on the ground.
4	Targets on the new or higher grid	Fixation only	No change	Replot battery centre	a. Produce new bearing, angle of sight and range. b. No change in grid reference.	Target and gun do not remain in the same relative position.
5		Orientation only	Record fresh bearing	No change	Nil	The change directs the guns more accurately to the centre of arc ordered.
6		Fixation and Orientation	Record fresh bearing	Replot battery centre	Produce new bearing, angle of sight and range.	Relative position of gun and target change.

Figure 6 - 6 Summary of Amendments to Target Records Caused by Change of Grid

**SECTION 5
FIRE PLANS**

TERMINOLOGY

73. **Tactical Classification of Fire.**

- a. **Preparatory Fire.** Preparatory fire is undertaken to:
 - (1) weaken the enemy by inflicting casualties to personnel and damage to equipment, destroying his defensive works and disrupting his communications; and
 - (2) demoralize the enemy so that he will offer reduced resistance to our operations.
- b. **Covering Fire.** Covering fire is delivered to protect troops when they are within range of enemy direct fire which could prevent or delay the achievement of their mission.
- c. **Defensive Fire (DF):**
 - (1) DF is delivered to assist and protect a unit engaged in a defensive action. DF targets may be in-depth with the object of disorganizing enemy preparations for attack and the movement of his reserves, or they may be close targets designed to engage and destroy the enemy at relatively close range when his attack is launched. Fire orders for DF targets must be brief and the response must be rapid.
 - (2) DF targets which cover the most likely and dangerous enemy approaches are nominated as Final Protective Fire (FPF). Guns will normally be laid on these targets when not otherwise engaged.

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- d. **Counterbattery Fire.** Counterbattery fire is undertaken to destroy or neutralize the enemy's indirect fire weapon systems and are normally coordinated at Divisional Artillery HQ.
- e. **Depth Fire.** Depth fire is designed to delay, isolate, disrupt, harass and deny the enemy freedom of movement. Its purpose is to maintain favourable force ratios by preventing the enemy from deploying additional forces to reinforce those he has already committed to an operation.

74. **Classification of Targets.** A target consists of personnel, materiel, or an area that warrants engagement by fire and which may be numbered for future reference.

- a. **Planned Targets.** A planned target is one on which fire is pre-arranged. It includes the following:
 - (1) **Scheduled Targets.** Targets on which fire is to be delivered at a specific time.
 - (2) **On-Call Targets.** Targets other than scheduled targets on which fire is delivered when requested.
- b. **Targets of Opportunity.** A target of opportunity is one which previously has not been considered, analyzed or planned.

75. **Combination of Targets.**

- a. **Group of Targets.** A group of targets is two or more targets on which fire is desired simultaneously. A group of targets may be designated by a letter and number combination (CA/US) or by a nickname (UK/AS). In a group of targets, each fire unit can engage only one target, and the targets must be allocated in advance so that time is not wasted when the group is ordered to be fired. A group of targets would appear on a map or overlay as shown in Figure 6-7.

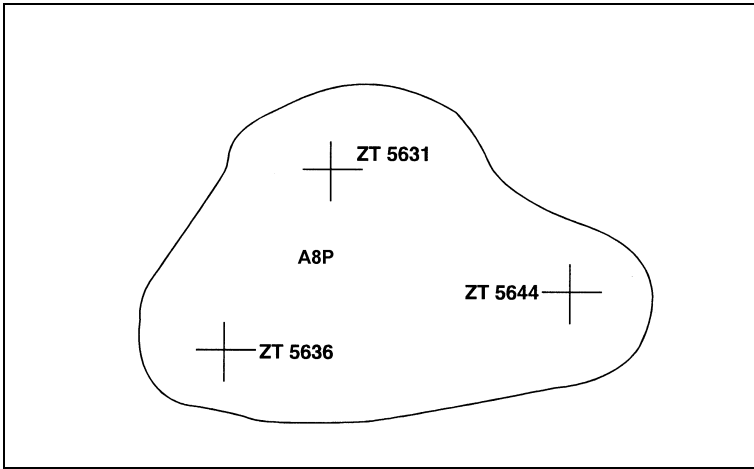


Figure 6 - 7 A Group of Targets

- b. **Series of Targets.** A series of targets is a number of targets, groups of targets, or both, not required to be fired simultaneously but planned to support a manoeuvre phase. A series of targets may be indicated by a nickname. It is not normal to engage a complete series of targets simultaneously. A series of targets is illustrated in Figure 6-8.

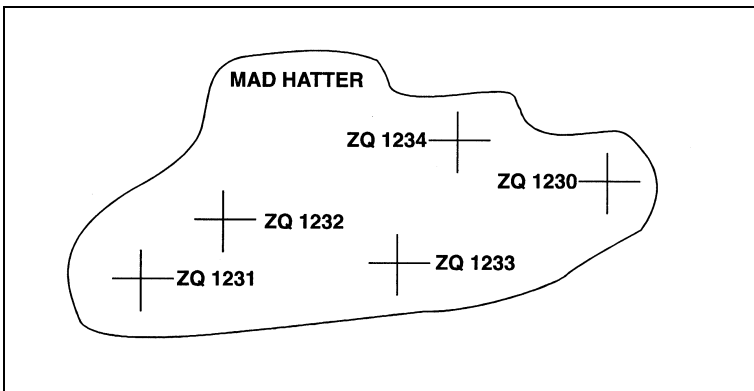


Figure 6 - 8 A Series of Targets

76. **Superimposed Artillery.** A term used in fire planning to indicate that an artillery unit is supplementing the fire of other units on a

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target, and that its fire may be lifted from that target by the appropriate authority.

77. **Time on Target (TOT).** A term used in fire planning to indicate the method of firing on a target in which various units time their fire so that all projectiles reach the target simultaneously. It also indicates the time at which aircraft are scheduled to attack or photograph a target. By convention, all scheduled targets on a fire plan table are TOT.

78. **Fire Plan.** A fire plan is a tactical plan for using the weapons of a unit or formation so that their fire will be coordinated. It is the means by which the artillery commander defines all targets assigned or able to be assigned to units whose fire is placed at his disposal, and allocates these targets to specific units as required. Fire plans may be designed to support either offensive or defensive operations. A completed fire plan consists of the following documents:

a. **Target List.**

- (1) This is a list containing the locations of targets and a brief description of each. It may also indicate special types of engagement, ammunition to be used and target combinations, see Figure 6-9.
- (2) If all the targets on the list are of one type, e.g., DF, HB, etc., the list's title may be so annotated.
- (3) Altitudes given are in metres unless otherwise specified.
- (4) The target list will often be circulated in advance of other fire planning documents and in some cases, e.g., simple low-level DF plans, constitute the only document for the fire plan.



SECRET

TARGET LIST NO
N° DE LISTE DE CIBLE

16

SECURITY CLASSIFICATION
CLASSIFICATION DE SÉCURITÉ

REFERENCES - RÉFÉRENCES

COPY NO.-COPIE N°	SHEET OF FEUILLE DE
8	1 DE 1

MAPS - CARTES A. FANTASIA, 21D/2 (KARKA), ED 1, 1:50 000	*	PLACE OF ISSUE (MAY BE IN CODE) - LIEU D'ORIGINE (PEUT ÊTRE CODÉ) BRANSTEAD EW 2832
B. FANTASIA, 21D/3 (TORBIK), ED 2, 1:50 000	*	ISSUING HEADQUARTERS - QG D'ORIGINE 1 DIV ARTY HQ
CO-ORDINATE SYSTEM - SYSTÈME DE COORDONNÉES UTM	*	DATES/TIME OF SIGNATURE - DATE/HEURE DE LA SIGNATURE 311730Z MAY
ATTITUDE (IF NOT GRID NORTH) - ORIENTATION - (S'IL NE S'AGIT PAS DU NORD DU QUADRILLAGE)	*	MESSAGE REFERENCE NO. - N° DE RÉFÉRENCE DU MESSAGE ARTY 201

LINE NO Ligne n°	(A) TARGET NO Cible n°	(B) DESCRIPTION	(C) LOCATION Emplacement	(D) ALTITUDE	(E) SIZE Dimensions		(F) ATTITUDE Orientation	(G) SOURCE/ ACCURACY Source/ précision	(H) REMARKS Remarques
					Lg	Wd			
					Longueur	Largeur			
1	ZU1201	Coy Area	25483638	110	400	300	1400		Predict unless otherwise stated.
2	ZU1203	Diggings	24683637	105	300	200	3200		Adj for coords.
3	ZU1204	OP	24783677	140					12 Med Regt Adj
4	ZU1205	A Tk Gun	25213682	110	20				
5	ZU1206	Coy Area	25643676	110	300	300	1800		12 Med Regt Adj
6	ZU1207	Pl Loc	25903676	110	100				NEW GIRL, Adj
7	ZU2300	WD	24583728	100	250	50	2200		DF 155mm only
8	ZU2301	X Rds	25683729	110	200				DF 155mm only
9	ZU2302	Track	25003750	100	300				DF
10	ZU4531	120mm Mors	24053571	110	50				11 Med Regt Adj
11	ZU4532	WDS	24763580	105	300	200	1400		11 Med Regt Adj
12	ZU4533	Coy Area	23763578	100	400	400	4800		Recorded
13	ZU4534	Coy Area	22843504	110	400	300	1600		Recorded
14	ZU4535	APC Hide	22443664	110	500	200	1200		Recorded
15	ZU4536	MGs	23663608	105	200	100	0800		11 Med Regt Adj
16	ZU4537	HQ	23993620	90	150				11 Med Regt Adj
17	ZU4538	Hide	22693590	110	200				DF
18	ZU4539	SP Gun	23133606	105	50				
19	ZU6200	WD	23523664	110	300	200	1600		DF
20	ZU6201	Houses	23353641	105	400	300	1200		DF 155mm only
21	ZU6202	Road	24003651	110	600	50	1400		OF 155mm only

(*WHEN REQUIRED - AU BESOIN)

* DISTRIBUTION - DIFFUSION LISTE A

* AUTHENTICATION - AUTHENTIFICATION

G.T. Lyon, Capt, SO3, Arty Ops

CF 643 (10-80) 7530-21-883-4186

*SIGNATURE OF COMMANDER
SIGNATURE DU COMMANDANT

Briggs, BGen, CDA

SECURITY CLASSIFICATION
CLASSIFICATION DE SÉCURITÉ

SECRET

Figure 6 - 9 A Target List

b. Target Overlay.

- (1) A target overlay is a transparent sheet which, when superimposed on a particular chart, map,

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drawing, trace or other representation, depicts target locations and designators. It thus supplements and confirms the target list. The target overlay may also show boundaries between manoeuvre elements, objectives, friendly forward dispositions, safety lines and other graphical information (see Figure 6-10).

- (2) A target overlay will only be produced if time permits.
 - (3) Targets are identified on the overlay by their symbol and target number. Since reproduction of the overlay may cause inaccuracies, the target locations given in the target list are authoritative and the overlay is annotated, "Not to be used for predicted fire."
 - (4) Groups and series of targets are represented by solid lines encircling the targets concerned and are indicated by their nickname or reference number.
- c. **Fire Plan Table.** A fire plan table is a presentation of planned targets giving data for engagement. Scheduled targets are fired in a definite time sequence. The starting time may be on call, at a pre-arranged time, or at the occurrence of a specific event (see Figure 6-11).
- d. **Written Portion.** A written portion may be included if the originator so desires. Alternatively, any additional instructions may be given in an operation order or annotated on the target list, overlay or fire plan table.

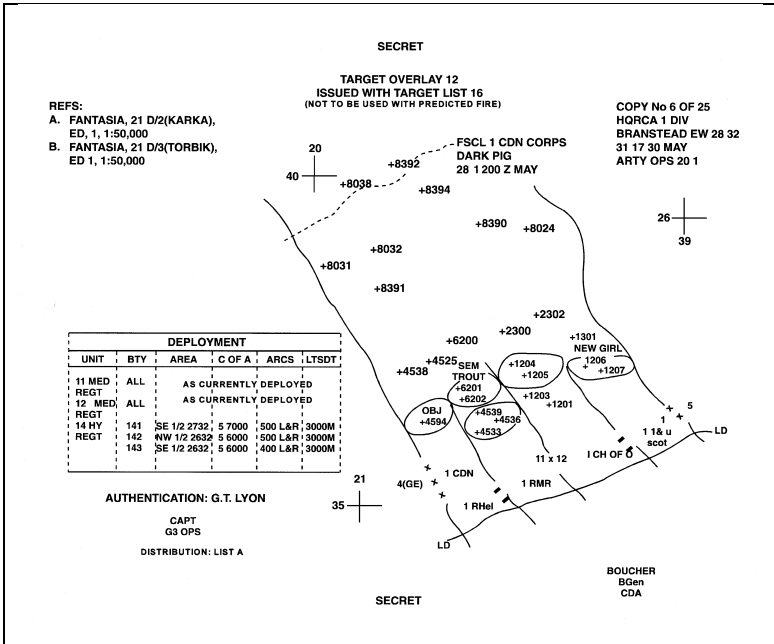


Figure 6 - 10 A Target Overlay

FIRE PLAN TABLES

79. The Artillery Fire Plan Table.

a. **General.** The Artillery Fire Plan Table (see Figure 6-11) gives the target engagement orders for a timed programme of fire. It specifies:

- (1) timings for all scheduled targets;
- (2) total ammunition expenditure by each fire unit on each target, or rates of fire for each target in rounds per gun per minute;
- (3) the type of ammunition to be fired for each target;
- (4) on-call targets; and

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- (5) any special instructions.

- b. **Target Locations and Descriptions.** This data is listed separately on a target list or in target records, with a reference to the appropriate target list on this table.

- c. **Schedule.** The information is entered on the schedule as follows:
 - (1) **Line Number.** The line numbers on the left edge of the table are for ease of reference to the information contained in the schedule. One line number is used for each fire unit. The size of the fire unit is a battery.

 - (2) **Organization or Formation — Column (a).** This column is used to identify the parent unit or formation to which the fire unit in column (b) belongs. Identification can be by name or by address group, e.g., 2 RCHA.

 - (3) **Fire Units — Column (b).** The fire unit is identified in this column, e.g., 13 FD BTY. In some cases only the size or number of the fire units may be indicated, e.g., BTY, or TWO BTYS, in which case the RCPO will nominate the particular battery prior to circulating the table.

ARTILLERY FIRE PLAN TABLE TABLEAU DE PLAN DE TIR D'ARTILLERIE										SECURITY CLASSIFICATION CLASSIFICATION DE SÉCURITÉ			SHEET OF FEUILLE DE						
TABLE NO TABLEAU N°	TGT LIST NO LISTE DE CIBLE N°	TGT OVERLAY NO CALQUE DE CIBLE N°	H-HOUR HEURE H	ISSUING HQ QG D'ORIGINE	PLACE OF ISSUE LIEU D'ORIGINE	DATE/TIME DATE/HEURE	MESSAGE REF NO N° DE RÉF DU MESSAGE	ANNEXES	COPY NO COPIE N°										
LINE NO LIGNE N°	(A) ORGANIZATION OR FORMATION ORGANISATION OU FORMATION	(B) FIRING UNITS UNITÉS DE TIR	(C) SCHEDULE TARGETS - CIBLES DÉSIGNÉS										(D) ON-CALL TARGETS CIBLES À LA DEMANDE	(E) REMARKS REMARQUES					
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
*DISTRIBUTION DIFFUSION *AUTHENTICATION AUTHENTIFICATION										(* WHEN REQUIRED) (* AU BESOIN)					SECURITY CLASSIFICATION CLASSIFICATION DE SÉCURITÉ			SIGNATURE OF COMMANDER SIGNATURE DU COMMANDANT	

Figure 6 - 11 An Artillery Fire Plan Table

- (4) **Scheduled Targets — Column (c).** This column is used to specify the target number, timings and quantity of ammunition for each scheduled target.
- (a) **The Time Scale.** This scale, covering 55 minutes, is graduated every minute and accented every five minutes. The top of the time scale is marked every five minutes. If the timed programme is longer than 55 minutes, a second sheet is used.
- (b) **Target Data.** The target data is marked on the schedule in column (c) as follows: Opposite the appropriate fire unit shown in column (b), each target is indicated by a horizontal line extending from the starting time to the finishing time. The target number is entered above the horizontal line and the total quantity of ammunition to be fired by the fire unit or the rate is entered below the line. If the type of ammunition is other than HE quick, or if any special instructions pertain to the target, an annotation, e.g., (a), (b), etc., is entered below the horizontal line and reference made to it in column (e). The schedule indicates the time the first and last rounds are to impact on the target. If a rate is ordered, the GPO/CPO calculates the number of rounds to be fired by multiplying the number of minutes by the rate ordered and adding one round, e.g., rate 3 x 5 minutes = 15 rounds plus 1 round = 16 rounds FFE 20 seconds. If a number of rounds is ordered, the GPO/CPO calculates his interval by dividing the number of minutes (expressed in seconds), by the

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number of rounds to be fired, minus one, e.g., 16 rounds FFE in 5 minutes (300 seconds), $300/15 = 20$ seconds; therefore, 16 rounds FFE 20 seconds. When FFE is to be applied at a specific time, the target number and number of rounds are displayed, but no horizontal line is shown. The time is specified in column (e) by reference to a note, e.g., (a) AT H +14 or (a) TOT 1230 HOURS.

- (5) **On-Call Targets — Column (d).** On-call targets are listed in column (d).
- (6) **Remarks — Column (e).** The remarks in column (e) give special instructions concerning timings, method of engagement and ammunition, e.g., SMOKE, ONE BATTERY ONLY, TWO GUNS WP FROM H-8, TWO GUNS ONLY, CONVERGE, SUPERIMPOSED.

80. **The Quick Artillery Fire Plan Table .** This table combines the information from the artillery fire plan table and a target list in one form. It is used for quickly arranged fire plans at lower levels using fewer batteries and guns. Greater use is made of verbal rather than written orders. These tables are often sent by radio and the following remarks deal primarily with that mode of transmission for the form shown at Figure 6-12.

- a. The originator of the fire plan sends a warning order in advance. The use of the term TIME SCALE indicates that the subsequent fire plan data is to be written on this form, e.g., WARNING ORDER, FIRE PLAN BIG APPLE, TIME SCALE MINUS 10. PREPARE 10 ROUNDS PER GUN. CALL SIGN 2, PREPARE 10 ROUNDS SMOKE PER GUN, H-HOUR NOT BEFORE 0800, K-HOUR LATER.

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- b. On receipt of this warning order all CPs on the net will prepare a quick artillery fire plan table by marking the time scale starting with the time ordered (in the above example minus 10 minutes). Subsequent orders will be transmitted on an officer-to-officer basis. All CPs on the net will record the data for all call signs, not just their own.

- c. Notes on the completion of the quick artillery fire plan table are as follows:
 - (1) **Heading.** The heading includes the following details:
 - (a) **Fire Plan.** The nickname of the fire plan as assigned by the artillery commander.
 - (b) **Supporting.** The address group of the formation or unit supported by the fire plan. This is not transmitted unless necessary.
 - (c) **Originator.** The originator of the fire plan. It is not required if the originator is the sending station.
 - (d) **Modification By.** The call sign of the artillery officer authorized to implement modification to the fire plan.

DUTIES AT REGIMENTAL HEADQUARTERS
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National Défense

QUICK ARTILLERY FIRE PLAN TABLE
TABLEAU DE PLAN DE TIR D'ARTILLERIE RAPIDE

SHEET	OF
FEUILLE	DE

FIRE PLAN - PLAN DE TIR	SUPPORTING - TIR D'APPUI	ORIGINATOR - AUTEUR	MODIFIED BY - MODIFICATIONS PAR
SUPERIMPOSED - SUPERPOSÉ	H-HOUR - HEURE H	DATE/TIME GROUP - GROUPE DATE/HEURE	

TARGET INFORMATION – RENSEIGNEMENT SUR LA CIBLE

LINE LIGNE	(A) TARGET NO - CIBLE N°	(B) DESCRIPTION	(C) LOCATION – EMPLACEMENT	(D) ALTITUDE	(E) REMARKS - REMARQUES
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

SCHEDULE TIMINGS - (H) - TABLEAU FRÉQUENCE

LINE LIGNE	(F) REGIMENT/ FORMATION RÉGIMENT/ FORMATION	(G) FIRING UNITS UNITÉS DE TIR	
			4 4 4 4 4 4 4 4 4
1		 4 4 4 4 4 4 4 4
2		 4 4 4 4 4 4 4 4
3		 4 4 4 4 4 4 4 4
4		 4 4 4 4 4 4 4 4
5		 4 4 4 4 4 4 4 4
6		 4 4 4 4 4 4 4 4
7		 4 4 4 4 4 4 4 4
8		 4 4 4 4 4 4 4 4
REMARKS – REMARQUES			

CF 644 (4-84) 7530-21-896-0895

Figure 6 - 12 Quick Artillery Fire Plan Table

(e) **Superimposed.** If a fire unit is superimposed throughout or from a

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specific time period, its call sign is entered followed by the words THROUGHOUT or the time period.

- (f) **H-Hour/K-Hour.** Self-explanatory. (K-Hour is the equivalent of H-Hour for the second phase of an operation.)
 - (g) **Sheet of Sheets.** This is self-explanatory and is not transmitted.
 - (h) **Date/Time Group.** The date and time of the transmission.
- (2) **Target Information.** The target information portion is a form of target list and includes the following information on every target in the fire plan:
- (a) **Line Number.** The line number columns on the left edge of the table are for ease of reference to the target information. One line number is used for each target.
 - (b) **Target Number — Column (a).** The target number of each target in the fire plan is entered in column (a), normally in the following sequence: scheduled targets, on-call targets, and DF targets.
 - (c) **Description — Column (b).** A brief target description will be entered in this column, e.g., MACHINE GUN.
 - (d) **Location — Column (c).** An eight-figure grid reference is included in this column unless the target is a recorded target or will be adjusted.

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- (e) **Altitude — Column (d).** When a location has been included, the altitude will be in metres, unless otherwise stated.
 - (f) **Remarks — Column (e).** Special instructions for the adjustment or engagement of the target are entered in column (e), e.g., ON CALL, LINEAR 300, ATTITUDE 1200, REGISTRATION POINT 1, ALTERNATIVE TO ZP 1283, 22 WITH 3, etc. If a target is not to be adjusted, PREDICT is entered in this column.
- (3) **Schedule.** The schedule block is completed in the same manner as the schedule on an artillery fire plan table.
- d. When a quick artillery fire plan is transmitted, the heading is sent first, followed by the target information and the schedule.
- (1) **Target Information.** This is transmitted by line number and by column, e.g.: TARGET INFORMATION, LINE 1. (ALPHA) ZT 1783. (BRAVO) MGs. (CHARLIE) GRID 6172 3482. (DELTA) 125. (ECHO) PREDICT. LINE 2 (ALPHA) ZT 1843, etc.
 - (2) **Schedule.** The schedule is transmitted by line number and column. The time scale is normally sent at the beginning of the schedule, e.g.: SCHEDULE. TIME SCALE MINUS 15 TO PLUS 10. LINE 1. (FOXTROT) ADDRESS GROUP ACK. (GOLF) CALL SIGN 1. (HOTEL) -10 TO -3. ZT 4526. RATE 2. NOTE (a). H TO +4. ZP 4528. RATE 1. NOTE (b). ONE GUN WP. LINE 2. (GOLF) CALL SIGN 2. (HOTEL). etc.

NOTES

1. When only the subunits of one regiment are engaged in a regimental or battery fire plan, column (f) may not be used.
2. If column (f) is included, it will be sent only once with instructions from the first battery, providing the instructions for other batteries within the regiment or battery follow directly one after the other. Column designators need not be used.
- e. The fire plan shall be read back by the senior station addressed, and acknowledged by the other stations addressed. All OPs and CPs on the net shall copy the fire plan orders.

81. Simple Fire Plan Orders.

- a. Fire plans which involve no more than five to eight and as few as two targets and only the batteries of one regiment, may be arranged simply by an officer-to-officer conversation without using the quick artillery fire plan table normally used in FOO fire planning. When using this method, the following essential information must be sent and acknowledged by officers:
 - (1) target numbers and locations;
 - (2) allotment of fire units and ammunition;
 - (3) H-hour;
 - (4) all timings and instructions on the firing of planned targets;
 - (5) method of engagement and distribution of fire, if necessary; and
 - (6) any other information essential to the guns.
- b. For a simple fire plan of this kind, the orders may be given concurrently with the adjustment of the targets. A

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standard sequence of orders for each target is normally followed, both to ensure that data is not forgotten and for convenience in the CP. When possible, targets are sent in the order in which they will be engaged during the fire plan. An example of simple fire plan orders is shown in Figure 6-13.

SER	OBSERVER	NOTES
(a)	(b)	(c)
1	WARNING ORDER. FIRE PLAN PREPARE FIVE ROUNDS HE, FOUR ROUNDS VT PER GUN. H-HOUR 0615 HOURS.	Warning Order sent whenever possible. Regardless of the time of H-Hour the RCPO or GPO/CPO will report when all fire units are ready to fire or that the fire units will be unable to make the H-Hour ordered.
2	FIRE MISSION BATTERY. GRID 1268 5649. DIRECTION 3010 ADJUSTING ZP 2140. ADJUST FIRE. FIRE PLAN FETCH OFFICER.	
3	FIRE PLAN. H TO +3. ZP 2141 ATGM. C/S 1. RATE 1 THROUGHOUT. +4 TO +7. ZP 2140. PLATOON POSITION. DPICM RATE 1. ON CALL FROM +8. ZP 2142. GRID 1345 7961. DIR 3940. PREDICT.	The fire plan orders can be sent in packets between adjusting rounds. The DF task could be sent later while adjustment is in progress.
4	TIME CHECK ... ANY QUESTIONS?	A time check need not be sent if one has recently been completed.
5	(Adjustment continues.)	
6	RECORD AS TARGET ZP 2140.	The observer need not wait for the report that ZP 2140 has been recorded before continuing with his orders.
7	DIRECTION. LEFT 200 DROP 800. ADJUSTING ZP 2141. ADJUST FIRE.	In order to save time the observer has ordered a target grid correction from the last fired data.
8	(Adjustment continues.)	

Figure 6 - 13 Example of Simple Fire Plan Orders

82. **Amendments.** The orders which can be used to amend fire plan tables are given in Chapter 4, Section 4 of this manual.

CP DUTIES**83. Fire Plan Tables.****a. Regimental CP.**

- (1) Written orders for a fire plan are usually received from higher artillery HQ in sufficient numbers for two copies to be distributed to each battery (BC and CP).
- (2) On receiving orders for a fire plan, the RCPO should send a warning order to the batteries involved, so that preparation of ammunition can commence.
- (3) The RCPO shall indicate the battery tasks on the fire plan table(s) and on the target overlay (if issued) and send them complete with the target list to the batteries.
- (4) The RCPO shall control the batteries engaged in the fire plan, ensuring that:
 - (a) modification orders are implemented promptly; and
 - (b) fire commences and ends at the correct time.
- (5) The RCPO shall synchronize time with the originator of the fire plan and the batteries engaged prior to the commencement of the fire plan. In addition, he may control all or some of the times of firing by use of the regimental fire orders line or radio. When the RCPO does not control the timings, the GPO/CPOs shall do the synchronized time.
- (6) The RCPO shall report to higher artillery HQ or to the originator of the fire plan when the last rounds of the fire plan, or any phase of it,

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have been fired, e.g., ROUNDS COMPLETE;
3, ROUNDS COMPLETE.

b. **Battery CPs.**

- (1) The GPO/CPO is responsible for the following duties:
 - (a) copying the fire plan when sent by radio; and
 - (b) on receiving orders for a fire plan, the GPO/CPO should send a warning order to the guns so that preparation of ammunition can commence;
 - (c) controlling the fire plan ensuring that modification orders are implemented properly and that fire commences and ends at the correct time.
 - (d) reporting to the RCPO when the first and last rounds of the fire plan or any phase of it, have been fired.
- (2) **Gun Programmes.** The GPO/CPO will produce gun programmes if required. If gun programmes are used, they should be issued in sufficient time for the detachment commanders to brief their detachments. Figure 6-14 shows an example of a GPO's gun programme. Figure 6-15 shows an example of a detachment commander's gun programme.
- (3) **Ammunition.** All ammunition to be used during the fire plan should be prepared before the fire plan starts. The ammunition should be placed in readily accessible stacks by serial and type.

- (4) **Sight Testing and Check Bearing.** Tests shall be carried out as follows:
- (a) prior to the fire plan;
 - (b) during lulls in the fire plan; and
 - (c) during long fire plans, the sights of each gun must be checked periodically to ensure that the guns are laid on the correct serial at the correct data.

PROGRAMME - PROGRAMME DE PIÈCE

GUN NO/PIÈCE			ORIGINATOR/DEMANDE PAR					NAME OF FIRE PLAN/ NOM DE CODE DU PLAN DE FEU					H-HOUR/ HEURE H	PAGES OF 1 DE 1
			1 CDN DIV ARTY HQ QG ARTIL 1 DIV CA					MAD BORE					0600	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)	(m)	(n)	(p)	(q)	(r)
SER/ N°	TIME/ DURÉE		TYPE OF ENGAGEMENT/ GENRE D'ENGAGEMENT	AMMO/ TYPE DE MUNITIONS	CHARGE	CONVERGE/ CONVERGENCE	BEARING/ AZIMUT	GUN CORRECTION/ CORRECTION DE LA PIÈCE	FUSE CORRECTION/ CORRECTION DE FUSÉE	FUZE/ FUSÉE	AMC	ELEVATION/ HAUSSE	METHOD OF FIRE/ MÉTHODE ET INTERVALLES	REMARKS/ REMARQUES
	FROM DE	TO À												
1	H	+8	LINEAR	HE VT	5	1 2 3 4 5	- 2675 - 2673 - 2671 - 2669 - 2667			22.0	1 2 3 4 5	- 378 - 376 - 374 - 372 - 370	8 Rds FFE 60"	20/R Included TOF 22
2	+10	+14		HE QUICK	5	1 2 3 4 5	- 2511 - 2512 - 2513 - 2514 - 2515				1 2 3 4 5	- 398 - 396 - 394 - 392 - 390	4 Rds FFE 60"	TOF 24
3	+15	+18		HE QUICK	5	1 2 3 4 5	- 2531 - 2533 - 2535 - 2537 - 2539				1 2 3 4 5	- 413 - 411 - 409 - 407 - 405	3 Rds FFE 60"	TOF 26
4	+21	+24		HE QUICK	7	1 2 3 4 5	- 2615 - 2613 - 2611 - 2609 - 2607				1 2 3 4 5	- 313 - 315 - 317 - 319 - 321	4 Rds FFE	TOF 25
5	+38	+45		HE QUICK	7	1 2 3 4 5	- 2723 - 2722 - 2721 - 2720 - 2719				1 2 3 4 5	- 358 - 359 - 360 - 361 - 362	14 Rds FFE 30"	TOF 28

Figure 6 - 14 An Example of a GPO's Gun Programme

GUN PROGRAMME - PROGRAMME DE PIÈCE

GUN NO/PIÈCE			ORIGINATOR/DEMANDÉ PAR					NAME OF FIRE PLAN/ NOM DE CODE DU PLAN DE FEU					H-HOUR/ HEURE H	PAGES
			1 CDN DIV ARTY HQ QG ARTIL 1 DIV CA					MAD BORE					0600	OF 1 DE 1
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)	(m)	(n)	(p)	(q)	(r)
SER/ N°	TIME/ DURÉE		TYPE OF ENGAGEMENT/ GENRE D'ENGAGEMENT	AMMO/ TYPE DE MUNITIONS	CHARGE	CONVERGE/ CONVERGENCE	BEARING/ AZIMUT	GUN CORRECTION/ CORRECTION DE LA PIÈCE	FUSE CORRECTION/ CORRECTION DE FUSÉE	FUZE/ FUSÉE	AMC	ELEVATION/ HAUSSE	METHOD OF FIRE/ MÉTHODE ET INTERVALLES	REMARKS/ REMARQUES
	FROM DE	TO À												
1	H	+8	LINEAR	HE VT	5		- 2671			22.0		- 374	8 Rds FFE 60"	TOF 22
2	+10	+14		HE QUICK	5		- 2513					- 394	4 Rds FFE 60"	TOF 24
3	+15	+18		HE QUICK	5		- 2535					- 409	3 Rds FFE 60"	TOF 26
4	+21	+24		HE QUICK	7		- 2611					- 317	4 Rds FFE	TOF 25
5	+38	+45		HE QUICK	7		- 2721					- 360	14 Rds FFE 30"	TOF 28

Figure 6 - 15 An Example of a Detachment Commander's Gun Programme

84. **Control of Firing.** The initial timings in a fire plan table are the times at which the first rounds must arrive on the target. No rounds must arrive on the target after the second time specified. When issuing gun programmes the GPO/CPO shall show all timings as listed on the Fire Plan Table; in the remarks column he will insert the TOF. The most satisfactory way for the GPO/CPO to control the times of guns firing is by voice, using the GPO's gun programme as a reference, e.g., CEASE LOADING ON SERIAL TWO, LAY ON SERIAL THREE (at the appropriate time) SERIAL THREE, FIRE. An alternative system, such as the use of a vehicle horn or whistle to indicate the end of a serial should be arranged in case the loud speaker system fails.

85. **Resting Guns During Prolonged Firing.**

- a. During a fire plan which lasts for more than one hour, it may be necessary for each gun to be rested periodically to avoid overheating and to allow maintenance to be carried out. The frequency and duration of the periods of rest shall be governed by:
 - (1) the length of the programme,
 - (2) the rate of fire,
 - (3) the climate, and
 - (4) the frequency and duration of important serials on which it is essential that all guns fire.
- b. No more than one gun in each battery should normally be rested at any one time. A suggested rest period is ten minutes.
- c. The originating HQ may indicate the targets on which no guns may rest.
- d. The GPO/CPO is responsible for:
 - (1) entering the periods of rest in the remarks column of the gun programme;

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- (2) ensuring that the guns rest and resume the programme at the times ordered; and
- (3) ordering the resting gun to resume firing if another gun goes out of action.

86. **DF Target Lists.** DF target lists will be prepared by BCs and observers as soon as a supported unit prepares to occupy or occupies a position. The lists are sent to the next higher artillery commander for coordination and the addition of more targets, and he in turn sends his list to his commander. At each stage in this process, the lists are also sent to the battery and regimental CPs to provide target information. Thus the GPO/CPO can expect to receive a battery DF target list which may be superseded or incorporated on a regimental, divisional and/or corps list unless the formation moves and the process is interrupted.

87. If the number of targets adopted exceeds the 60 to 100 that a CP can efficiently handle, direction must be given on priorities for the production of gun data. One of the means for an artillery commander to establish such priorities is the combination of targets into series and groups; see Section 3 of this chapter.

- a. **Series.** The following examples illustrate the orders used with series:
 - (1) ADOPT _____, e.g., ADOPT IRON HEEL. On receipt of this order, the CPs involved shall prepare GPOT proforma/printout for all targets within the series designated.
 - (2) CANCEL ADOPT _____, e.g., STAND DOWN ON IRON HEEL. This order shall frequently be coupled with an order to adopt another series, e.g., STAND DOWN ON IRON HEEL, ADOPT MEAT BALL. On this order the CP staffs need no longer be prepared for immediate response to tasks in the IRON HEEL series but shall prepare GPOT proforma/printout for all targets in the MEAT BALL series. This order does not cancel any targets.

- (3) CANCEL _____, e.g., CANCEL IRON HEEL. On this order all targets in the IRON HEEL series lapse and the appropriate target records are struck out.

b. **Groups.**

- (1) Targets which are located close to one another and are tactically related may be grouped for simultaneous engagement. Each group of targets will be assigned a letter and number combination (CA/US) A8P and a nickname will be assigned by UK/AS.
- (2) As each task within the group will require at least one fire unit, the number of targets within each nicknamed group will be limited by the number of fire units available. Unless the artillery commander orders otherwise, the RCPO will designate which batteries will engage which targets.
- (3) All the targets within a group can be fired by ordering the combination, e.g., A8P, FIVE ROUNDS FIRE FOR EFFECT. Irrespective of this, individual targets within the group may be engaged separately as required.

c. **FPF.**

- (1) Of the close DF targets chosen by a battle group commander, one or more, depending on the amount of artillery in DS of the battle group, may be designated as FPF targets. A FPF target shall be placed to cover the most dangerous enemy approach into our positions, and may be changed periodically because of a change in the threat. SOPs should include rate, volume of fire and who has authority to call for the FPF.

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- (2) When not otherwise engaged, guns allotted to a FPF task shall be laid on that target in accordance with SOPs. If it is anticipated that a very quick response will be required, guns may also be ordered loaded.

d. **Implementation of the DF Plan at the Guns.**

- (1) **RCPO.** On receipt of a DF target list, the RCPO shall:
 - (a) acknowledge receipt;
 - (b) distribute copies to the battery CPs; and
 - (c) maintain an up-to-date list of all DF targets, including alterations to grid reference resulting from adjustment and which batteries can engage which targets.
- (2) **GPO/CPO.** On receipt of a DF target list, the GPO/CPO shall:
 - (a) acknowledge receipt;
 - (b) determine GPOT proforma/printout for all DF targets that he has been ordered to adopt; FPF tasks shall be kept up-to-date and may be issued to each detachment commander on a gun programme;
 - (c) determine whether his battery can engage each target;
 - (d) maintain an up-to-date list of all DF targets, including alterations to grid reference resulting from adjustment; and

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- (e) report to the RCPO those targets which are out of range.

CHAPTER 7
REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

SECTION 1
RESOURCES

GENERAL

1. The communications resources within a regiment are:
 - a. radio;
 - b. line;
 - c. Signals Dispatch Service (SDS); and
 - d. Liaison Officers (LOs).
2. As the effectiveness of artillery depends on good communications, the establishment and maintenance of communications is a matter of the utmost importance at all levels.
3. This section is concerned with the communications resources within the regiment. In addition, artillery officers and communicators should familiarize themselves with the communication facilities of supported arms and formations.

RADIO

4. The primary means of communication within the regiment is radio. The allocation shall generally follow the framework illustrated in Figure 7-1.
5. The most important nets established in a regiment are the regimental and battery nets. They are used primarily for the passage of fire orders and tactical information, in that order. The principle is that the regimental net shall be used for fire orders affecting two or more batteries

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and for tactical information of immediate importance; otherwise battery nets shall be used.

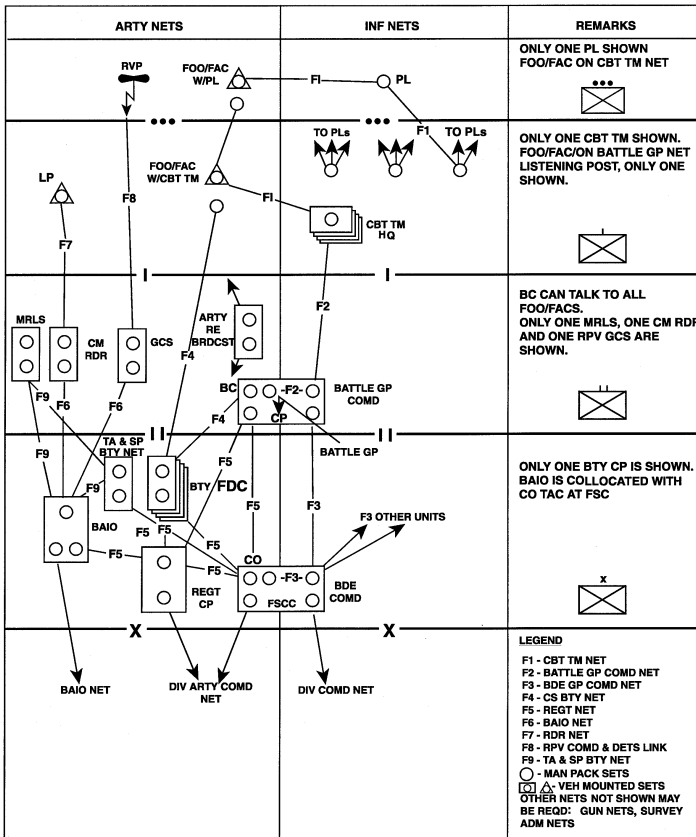


Figure 7 - 1 Skeleton Regimental Radio Diagram

6. The regimental FSCC and the regimental CP are provided with radios to allow them to be substations on the divisional artillery command net and the CDA's HF Guard net. In addition, the regimental FSCC, BC's party and observation parties all have radios to allow them to join the supported formation or unit command nets.

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7. The major advantage of radio is its flexibility. The ease with which frequencies can be changed and nets joined must be fully exploited, particularly for regimental or higher missions and for fire planning. The methods explained in this paragraph are meant to demonstrate how this flexibility can be used in given situations.

- a. **Artillery in Support of a Covering Force.** Artillery deployed under command of a brigade group covering force may be allotted additional frequencies. This has the effect of speeding up response, as it eliminates the need for simultaneous missions. It also allows the passage of information without awaiting the completion of fire orders.
- b. **Adjusting a Fire Plan.** In adjusting a regimental fire plan, the BC may direct his observers to join the battery net of the unit whose fire they are adjusting. This leaves the regimental net free for fire plan orders and regimental adjustment when necessary.
- c. **Adjusting More than One Fire Unit.** An observer requiring to fire a regimental fire mission, rather than initiate it through the battery net, may change to the regimental frequency for the period of the engagement. This avoids the unnecessary use of the battery net and yields a quicker response.
- d. **Passage of Fire Orders within the Regimental Area .** Fire orders and target data between the RCPO and GPO/CPOs may be passed on a separate regimental fire orders net or line.

LINE

8. Line is used to augment radio. It is far less flexible and takes considerable time and effort to lay and maintain. It is usually profitable to lay line if the expected time of usefulness is equal to or in excess of the time required to lay it. In some operations line may supplant radio for a

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time as the primary means of communications, particularly when security is vital.

9. The most important line is the regimental fire orders line. It is used for the passage of fire orders and target data between two or more CPs. It is laid as a circuit connecting the battery and regimental CPs and shall be laid whenever feasible.

10. Other lines which may be laid are:

- a. regimental and battery exchange lines, which are used mainly for administrative traffic (at the battery level the exchange line is often used to coordinate local defence by connecting outposts, etc.);
- b. a line from the battery CP to the BC; and
- c. a line connecting the BC to his observers.

11. As the line resources within a regiment are limited, it may be necessary for RHQ to control these holdings to ensure that the more important lines are laid and maintained.

SDS

12. The proper use of the SDS can eliminate much of the bulky and routine traffic from radio and line facilities and provide security in the passage of fire plans, target lists, etc.

13. The SDS facilities of the regiment are coordinated by the regimental signals officer who will establish the schedule as required. A schedule of SDS runs is arranged between the regimental FSCC, the regimental CP and battery CPs.

LO

14. A LO, in addition to his normal duties, may be used to deliver a message which requires explanation.

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15. LO's duties are specified in B-GL-303-002/FP-001, *Operational Staff Procedures* and are amplified in Divisional Artillery SOPs.

RESPONSIBILITIES

16. **General.** All officers are responsible for the communications equipment and personnel under their command.

17. **Regiment.** The signals officer is responsible for advising the CO on communication matters. In addition, with the signals troop, the following facilities are provided:

- a. **Radio.** Radio communication to higher and flanking formations, the control station on the regimental net and communication facilities at the CO's tactical HQ.
- b. **Line.** Line communication between regimental and battery CPs and, if time permits, a regimental exchange line.
- c. **Miscellaneous:**
 - (1) SDS,
 - (2) a message centre at RHQ, and
 - (3) battery charging and communications equipment repair facilities.

16. **Battery.** All communications are manned by artillery communicators. The GPO normally coordinates battery communications assisted by the battery signals sergeant. The following are the primary duties of the battery signals sergeant:

- a. communications training;

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- b. supervision of maintenance as follows:
- (1) coordinating the activities of the personnel attached to the battery from the signal troop;
 - (2) ensuring that regular and frequent checks of radio and line equipment are carried out using a check list for each radio and line vehicle including:
 - (a) a list of all communications equipment carried;
 - (b) the date of the last check on serviceability made by the communicator or the RAD TECH or both; and
 - (c) the disposition of non-serviceable equipment and the actions being taken to repair or replace it; and
 - (3) ensuring that repairs to communications equipment are carried out as quickly as possible; and
- c. ensuring that CEOIs are distributed.

17. **Battery Communications.** The communication links are laid out in Figure 7-2.

DUTIES AT REGIMENTAL HEADQUARTERS
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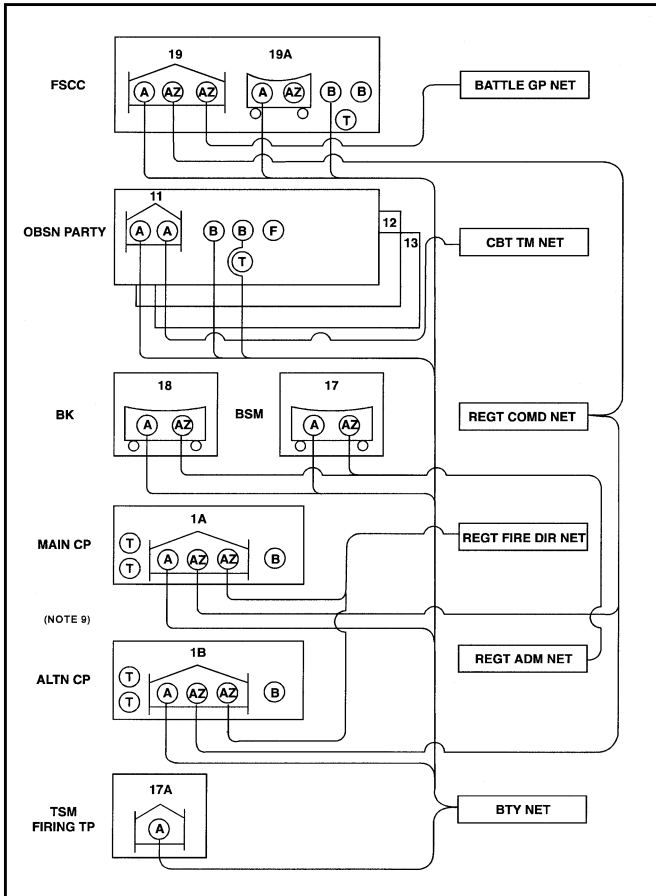


Figure 7 - 2 Direct Support Battery Communications (Sheet 1 of 3)

Figure 7 - 2 Direct Support Battery Communications (Sheet 2 of 3)

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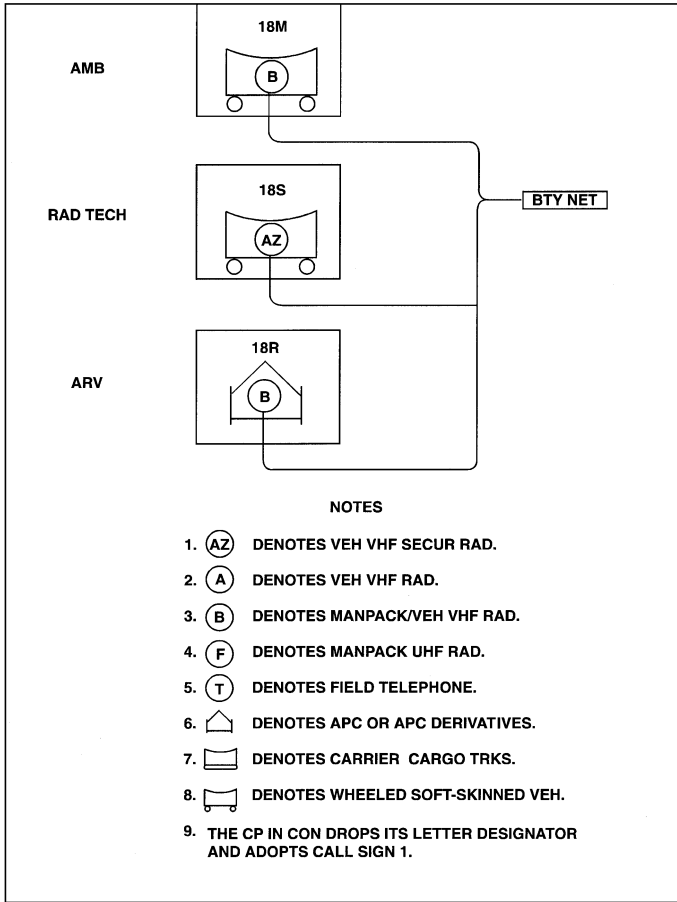


Figure 7 - 2 Direct Support Battery Communications (Sheet 3 of 3)

DUTIES AT REGIMENTAL HEADQUARTERS
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SECTION 2

BASIC PROCEDURE FOR TRANSMISSION OF FIRE ORDERS

GENERAL

18. Artillery fire orders procedure applies to the transmission of all fire orders whether by radio or line. Officers and communicators must be completely proficient in fire orders procedure.

19. For the purpose of this chapter, anyone who transmits or receives artillery fire orders is considered to be a communicator.

RULES

20. **General.**

- a. Artillery fire orders procedure deviates slightly from normal voice procedure described in ACP 125 CANSUPP-1 in that an abbreviated style is used in those instances where no confusion will arise. These deviations are shown in the remaining paragraphs of this article.
- b. All transmissions including fire orders are not offered. The only exceptions are those transmissions where preparation is required prior to the receipt of the data, e.g., met messages, tgt lists, tgt records, etc.
- c. After identities have been established and no confusion can arise, it is not necessary to continue with the use of call signs.

21. **Precedence.** Fire orders take precedence over all other traffic on artillery nets. They are interrupted only in cases of urgency. If interruptions are necessary they should be made during the natural pauses during the mission, i.e., after SHOT has been sent to the observer.

22. **Read Back.** To ensure accuracy, all fire orders shall be read back by the receiver exactly as sent. When the orders are addressed to

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more than one call sign, the first call sign to reply shall read back in full, all others shall acknowledge, in order, the transmission with their identity followed by ROGER, OUT.

23. Packets.

- a. Orders are sent in packets, each of which is answered back in full before the next is sent. A packet should be a transmission no more than 20 sec, e.g., GRID TWO THREE ONE SIX TWO FIVE, DIRECTION ZERO ZERO FOUR ZERO, and its length may vary with the experience of the communicators.
- b. A communicator shall normally send the orders in the same packets in which they are given to him; if he considers a packet too long or cumbersome to transmit under prevailing conditions, he may subdivide it for transmission. Every transmission which will leave the air, or line, clear for the sending of a fresh packet is ended by OUT. All other transmissions are ended by OVER, see Figure 7-3.

OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(1) RIGHT FOUR HUNDRED, OVER	
	(2) RIGHT FOUR HUNDRED, OUT
	(3) SHOT, OVER
(4) SHOT, OUT	

Figure 7 - 3 The Use of OVER and OUT

WRITING DOWN

24. All fire orders must be written down by the communicator whether he is sending or receiving. When an order has been read back by the receiver, the sending communicator shall tick (T) the order on his pad and, if appropriate, say THROUGH SIR to his officer. This will indicate to the officer that the orders which he has given the communicator have been sent and received.

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25. Officers must take full advantage of the fact that fire orders are written down and shall, whenever possible, site their communicators so that the pad can readily be seen. Neatness must be emphasized to minimize errors.

26. In addition to the list of abbreviations contained in this manual and in A-AD-121-F01/JX-000, *Manual of Abbreviations*, unofficial abbreviations such as those shown in Figure 7-4 shall be used within the RCA.

IN FULL	ABBREVIATION
Add	A
Adjust, Adjustment, etc.	ADJ
Adjust Fire	A/F
Altitude	ALT
At My Command	AMC
Attitude	ATT
Cancel, Cancelled, etc.	CANC
Charlie, Charlie	CC
Converge, Convergence, etc.	CONV
Coordinated, etc.	COORD
Direction	DIR
Drop	D
Effect	EFF
End of Mission	EM
Fire for Effect	FFE
Fire Mission (One Gun, Battery, etc.)	FM (1G, BTY, etc.)
Followed By	FB
Grid Reference	GR
Illuminating, etc.	ILL
Left	L
Record, etc.	REC
Registration	REG
Report	REP
Right	R
Rounds	RDS
Rounds Complete	RC
Shot	S
Splash	SPL
Upgrade	UG

Figure 7 - 4 Abbreviations Used by Artillery Communicators

PRONUNCIATION OF FIGURES

27. Each digit is pronounced separately except for exact multiples of 100 or 1 000, as shown in the examples in Figure 7-5.

SER	ORDER	ORDER AS SPOKEN
(a)	(b)	(c)
1	Right 80	RIGHT EIGHT ZERO
2	Left 400	LEFT FOUR HUNDRED
3	Drop 50	DROP FIVE ZERO
4	1200	ONE TWO HUNDRED
5	6050	SIX ZERO FIVE ZERO
6	10000	ONE ZERO THOUSAND
7	3000	THREE THOUSAND
8	50 tanks	FIVE ZERO TANKS
9	Altitude 350	ALTITUDE THREE FIVE ZERO
10	Down 50	DOWN FIVE ZERO
11	Bearing 0650	BEARING ZERO SIX FIVE ZERO
12	Elevation 1147	ELEVATION ONE ONE FOUR SEVEN

Figure 7 - 5 Pronunciation of Figures

CALLS

28. **By Radio.** The normal voice procedure rules apply to the first order sent and read back. After the first order, call signs are dropped by the observer and by the station reading back. If, owing to poor working conditions, doubt or confusion is likely to arise concerning the identity of the station transmitting, call signs should be used for each transmission. The same rule applies when operating on other than a Canadian numerical, fixed call sign system, except that the full call sign, e.g., ALPHA DELTA is used only to establish communications; if identification is required during the transmission, only the sender's abbreviated call sign is used, e.g., 6.

29. **By Line.** Once communications are established, the procedure by radio and line is identical.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

30. **Field Call Signs and Appointment Titles.** These are shown in Figures 7-6 and 7-7 respectively.

REGIMENTAL COMMUNICATIONS RESOURCES AND FIRE ORDERS PROCEDURES

OPS		GUN BATTERY CALL SIGNS/TAC SIGNS					
APPOINTMENT/ FUNCTION	C/S	SERIAL	APPT/VEH	C/S 1	C/S 2	C/S 3	C/S 4
		(a)	(b)	(c)	(d)	(e)	(f)
Regt CP	OA	1	BTY CP (a)	1A	2A	3A	4A
Regt CP (STEP UP)	OB	2	BTY ALTN CP (a)	1B	2B	3B	4B
Regt CP (DR)	OD	3	BTY RECCE	10	20	30	40
Regt CP (stores)	OG	4	RECCE TSM	17B	27B	37B	47B
CO	9	5	SIG SGT	10A	20A	30A	40A
		6	DR	10D	20D	30D	40D
		7	OP	11,12,13,14	21,22,23,24	31,32,33,34	41,42,43,44
CO's Tac HQ	9A	8	OP ROVERS (b)	11A,12A,13A,14A	21A,22A,23A,24A	31A,32A,33A,34A	41A,42A,43A,44A
Sigs Offr	91	9	GUNS	14A,14B	24A,24B	34A,34B	44A,44B
RRB	91A	10	AMMO LIMBERS	16A TO 16F	26A TO 26F	36A TO 36F	46A TO 46F
CRTTZ FSCC Higher	91C1	11	BSM	17	27	37	47
CRTTZ ADMIN Rear Link	91C2	12	GUN LINE TSM	17A	27A	37A	47A
Sig Line Det	91L	13	BQMS	17C	27C	37C	47C
Msg Cen	91M	14	AMMO VEHS	17F TO 17K	27F TO 27K	37F TO 37K	47F TO 47K
Sig Repair	91R	15	BK	18	28	38	48
		16	AMB	18A	28A	38A	48A
		17	RECOVERY	18C	28C	38C	48C
Sig Stores	91S	17	RECOVERY	18C	28C	38C	48C
Adjt	92	18	RAD TECH	91R1	91R2	91R3	91R4
LO	94	19	KITCHEN	18K	28K	38K	48K
FSCC (Ops O) (a)	95A	20	MAINT	18M	28M	38M	48M
		21	POL	18P	28P	38P	48P
		22	MRT	18R	28R	38R	48R
FSCC (STEP UP)	95B	22	MRT	18R	28R	38R	48R
FSCC (DR)	95D	23	STORES	18S	28S	38S	48S
		24	BC	19	29	39	49
		25	BC'S ROVER	19A	29A	39A	49A
RSM	97	25	BC'S ROVER	19A	29A	39A	49A
2IC	98	26	FS CC (BC)	19B	29B	39B	49B
NOTES							
(a) The CP and FSCC in con drops its letter designator (e.g., 1A become1).							
(b) Where available.							

Figure 7 - 6 Fixed Regimental Call Signs/Tactical Signs

REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

SER	TITLE	GENERAL APPLICATION	REGIMENT	
			RHQ	BATTERY
(a)	(b)	(c)	(d)	(e)
1	SUNRAY	Commander	CO	BC
2	SUNRAY MINOR	Deputy Commander	2IC	BK
3	ACORN	Intelligence Staff Officer (not Artillery Intelligence)	Ops O	
4	ACORN MINOR	Assistant Intelligence Staff Officer	AOps O	
5	SEAGULL	Operations Staff Officer	RCPO	GPO
6	SEAGULL MINOR	Assistant Operations Staff Officer	ARCPO	AGPO
7	CONROD	Air Defence Representative	Comd, AD Elm	
8	MANHOLE	Personnel or Administrative Staff/Adjutant	Adjt	BSM
9	MANHOLE MINOR	Assistant Personnel Staff Officer	RSM	
10	MOLAR	Logistics Staff Officer	Sup Offr (QM)	BQMS
11	PRONTO	Signals Representative	Sigs Offr	Sigs Sgt
12	FORTUNE	FAC	Att FAC	Att FAC
13	STARLIGHT	Medical Representative	MO	Any CFMS Elm with the Bty
14	BLUEBELL	EME Representative	Tech Adjt	Any EME Elm with the Bty
15	METEOR	Meteorological Representative	Met Sect	
16	WATCHDOG	Military Police	MP Sgt	

Figure 7 - 7 Appointment Titles Within the Regiment

31. Additional radios within either sub-unit establishments or functional groupings will be allocated non-used letter suffixes rather than spare call signs, e.g., a second observation party vehicle is 11A (the primary vehicle, when the FOO is dismantled, becomes Z11).

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

32. **Fixed collective call signs:**
- a. all battery CPs — CHARLIE CHARLIE 1;
 - b. all FOOs — CHARLIE CHARLIE 11;
 - c. all BCs — CHARLIE CHARLIE 19; and
 - d. all BKs — CHARLIE CHARLIE 18.
33. Call signs 60 to 79 inclusive are spares for use by all batteries.

CORRECTION PROCEDURES

34. There are four situations which necessitate using correction procedures. They are as follows:
- a. a sender realizes, during the course of a transmission, that he has made a mistake;
 - b. a sender completes an incorrect transmission without realizing that he has made a mistake;
 - c. a receiving operator reads back an order or report incorrectly; or
 - d. a receiving operator asks for verification.
35. If a sender realizes, during the course of a transmission, that he has made a mistake, he shall correct himself by sending CORRECTION followed by the complete packet again (see Figure 7-8).

REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

OBSERVER	OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(a)	(b)	(c)
(1) DROP 50, ONE ROUND FIRE FOR EFFECT	(2) DROP 50, TWO ROUNDS FIRE FOR EFFECT. CORRECTION, DROP 50, ONE ROUND FIRE FOR EFFECT	(3) DROP 50, ONE ROUND FIRE FOR EFFECT, OUT

Figure 7 - 8 An Example of Correction Procedure During a Transmission

36. If a sender completes an incorrect transmission without realizing that he has made a mistake, it is the responsibility of the originator to determine a course of action. An example is shown in Figure 7-9.

OBSERVER	OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(a)	(b)	(c)
(1) GRID 123 456, DIRECTION 0130	(2) GRID 123 456, DIRECTION 0130, OVER	(3) GRID 123 456, DIRECTION 0130, OUT
(4) ADD 200	(5) ADD 200, OVER	(6) ADD 200, OUT
(7) CORRECTION, CANCEL ADD 200, ADD 400	(8) CANCEL ADD 200, ADD 400, OVER	(9) CANCEL ADD 200, ADD 400, OUT

Figure 7 - 9 An Example of Correction Procedure After the Completion of Transmission

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

37. If a receiver makes a mistake in reading back an order or report, the sender shall transmit the order or report again, prefixed by the word **WRONG** (see Figure 7-10).

OBSERVER	OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(a)	(b)	(c)
(1) DROP 50, ONE ROUND FIRE FOR EFFECT	(2) DROP 50, ONE ROUND FIRE FOR EFFECT, OVER (4) WRONG, DROP 50, ONE ROUND FIRE FOR EFFECT, OVER	(3) RIGHT 50, ONE ROUND FIRE FOR EFFECT, OUT (5) WRONG, DROP 50, ONE ROUND FIRE FOR EFFECT, OUT

Figure 7 - 10 An Example of Correction Procedure When a Receiving Operator has Read Back Incorrectly

38. When a receiving operator asks for verification, the sender shall answer in full and shall immediately check with the originator. If the order or report is correct the originator shall again order it transmitted, prefixed by **I VERIFY** (see Figure 7-11).

OBSERVER	OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(a)	(b)	(c)
(1) GRID 123 456, DIRECTION 0130 (6) (After verifying direction and finding it correct) DIRECTION 0130	(2) GRID 123 456, DIRECTION 0130, OVER (5) VERIFY DIRECTION, WAIT OUT (7) I VERIFY, DIRECTION 0130, OVER	(3) GRID 123 456, DIRECTION 0130, OUT (4) VERIFY, DIRECTION 0130, OUT (8) I VERIFY, DIRECTION 0130, OUT

Figure 7 - 11 An Example of a Verification Where No Error has Taken Place

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

REPETITIONS

41. When a transmission is not read back at all, the communicator shall send it again, preceded by I SAY AGAIN (see Figure 7-13).

OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(a)	(b)
(1) LEFT 100, OVER	(No Reply)
(2) I SAY AGAIN, LEFT 100, OVER	
	(3) LEFT 100, OUT

Figure 7 - 13 An Example of a Repetition When a Transmission is Not Read Back

42. When a receiving communicator is not certain of the reception of all or any part of a transmission, a repetition shall be asked for as follows:

- a. **A Complete Repetition.** This shall be asked for by sending SAY AGAIN. It is used when no part of a transmission has been understood or when any part which has been missed cannot be conveniently asked for as a separate item. See the first example in Figure 7-14.
- b. **A Part Repetition.** When a part of a transmission has been missed which can be conveniently asked for as a separate item, the receiving communicator shall answer back the transmission as received, less the part missed, and shall conclude the transmission by sending SAY AGAIN (missing part), see example two of Figure 7-14.

43. REPEAT and VERIFY shall not be used to obtain a repetition. REPEAT is a fire order. VERIFY is used to draw attention to a possible mistake or omission.

REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

EXAMPLE	OBSERVER'S COMMUNICATOR	CP COMMUNICATOR
(a)	(b)	(c)
1	(The communicator misses the whole transmission.) (2) SAY AGAIN, OVER (4) SHOT 3, OUT	(1) SHOT 3, OVER (3) I SAY AGAIN, SHOT 3, OVER
2	(1) GRID 176 391, DIRECTION 0400, OVER (3) I SAY AGAIN, DIRECTION 0400, OVER	(2) GRID 176 391, SAY AGAIN DIRECTION, OVER (4) DIRECTION 0400, OUT

Figure 7 - 14 Examples Showing Action When Receiving Communicator is Not Certain of All or Part of a Transmission

SUMMARY OF PROCEDURES FOR CORRECTIONS AND REPETITIONS

44. The originator issues the order or report; the communicator writes it down and at the same time, sends it over the line or radio, speaking loudly enough for the originator to hear it. If sent incorrectly, the originator calls out CORRECTION followed by the correct version or, if the immediate firing of guns is entailed, orders CHECK FIRING.

45. The receiving communicator writes down the order or report and reads it back to the sender. If read back correctly, the observer's communicator reports THROUGH SIR and ticks the order on the Log.

SECTION 3
SIMULTANEOUS MISSIONS PROCEDURE

GENERAL

46. It is sometimes necessary to fire two missions simultaneously on the same net. When this situation arises, stations must use their call signs and prefix all fire orders to avoid confusion.

47. Interruptions should only be made during a natural pause, e.g., after the call for fire and before the first round is fired, or after a report of SHOT, i.e., during the TOF.

48. Each communicator involved must keep a record of the orders of both missions so they will know when it is their turn to transmit. When commencing a turn, a communicator must leave a short pause before transmitting to allow the other communicator time to correct any mistakes.

49. Call signs may be dropped as soon as one mission has ended.

50. It is recommended that this procedure not be used when:

- a. an air OP mission is in progress;
- b. rebroadcast procedure is in use, particularly manual rebroadcast; or
- c. when relay procedure is in use.

51. Figure 7-15 illustrates two missions, complete with abbreviations, being conducted simultaneously on the battery net. This procedure shall be used whether the missions are being conducted by the same observer or two observers.

**REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES**

FIRST OBSERVER'S COMMUNICATOR	SECOND OBSERVER'S COMMUNICATOR	BATTERY COMMUNICATOR
(a)	(b)	(c)
(1) 1, THIS IS 11, FM 3 GUNS, OVER		(2) 1, FM 3 GUNS, OUT
(3) GR 216 821, ALT 800, DIR 2100, OVER		(4) GR 216 821, ALT 800, DIR 2100, OUT
(5) WIRING PARTY, 100X50, 5 RDS, A/F, OVER		(6) WIRING PARTY, 100X50, 5 RDS, A/F, OUT
	(7) 1, THIS IS 12, FM 3 GUNS, OVER	
(10) 11, LEFT SECTION, 12, RIGHT SECTION, OUT		(8) 1, FM 3 GUNS, OUT (9) 11, LEFT SECTION, 12, RIGHT SECTION, OVER
	(11) 12, OUT	
	(12) R/S, GR 256 835, R/S, ALT 740, R/S DIR 0200, OVER	(13) R/S, GR 256 835, R/S, ALT 740, R/S DIR 0200, OUT
	(14) R/S, WORKING PARTY, 40 PERSONNEL, 100X100, R/S, VT ONE ZERO RDS, R/S, A/F, OVER	(15) R/S, WORKING PARTY, 40 PERSONNEL, 100X100, R/S, VT ONE ZERO RDS, R/S, A/F, OUT
(17) L/S, S5, 28, OUT		(16) L/S, SHOT 5, 28 OVER
(18) L/S, L200, OVER		(19) L/S, L200, OUT (20) R/S, S2,24, OVER
	(21) R/S, S2, 24 OUT R/S, R100, R/S, D400,OVER	

**Figure 7 - 15 An Example of the Simultaneous Mission
Procedure on the Battery Net (1 of 2)**

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

FIRST OBSERVER'S COMMUNICATOR	SECOND OBSERVER'S COMMUNICATOR	BATTERY COMMUNICATOR
(a)	(b)	(c)
<p>(25) L/S, S, OUT</p> <p>(28) L/S, D50, L/S FFE, OVER</p> <p>(31) L/S, S, L/S RS, OUT</p> <p>(32) L/S, EM, L/S, WIRING PARTY DISPERSING, OVER</p>	<p>(27) R/S, S, OUT (Adjustment Continues)</p> <p>(34) R50, FFE, OVER</p> <p>(37) S, RC, OUT</p> <p>(38) EM, SOME CAS, REMAINDER WITHDRAWING SE INTO WOODLINE, OVER</p>	<p>(23) R/S, R100, R/S, D400, OUT</p> <p>(24) L/S, S, OVER</p> <p>(26) R/S, S, OVER</p> <p>(29) L/S, D50, L/S FFE, OUT</p> <p>(30) L/S, S, L/S, RC, OVER</p> <p>(33) L/S, EM, L/S, WIRING PARTY DISPERSING, OUT</p> <p>(35) R50, FFE, OUT</p> <p>(36) S, RC, OVER</p> <p>(39) EM, SOME CAS, REMAINDER WITHDRAWING SE INTO WOODLINE, OUT</p>

Figure 7 - 15 An Example of the Simultaneous Mission Procedure on the Battery Net (2 of 2)

SECTION 4
RELAY PROCEDURE

GENERAL

52. Relay procedure is used when the distance between the observer and the guns is so great, or interference so strong, that orders cannot be passed directly. Under these conditions, a station in good communication with the two substations concerned is used to relay orders. It is the duty of all artillery communicators to assist a station which is unable to communicate in the passage of fire orders.

PROCEDURE

53. The relay is established by a warning call combined with the first order, e.g., 39 THIS IS 31, RELAY TO 3, FIRE MISSION BATTERY, OVER. The relay station reads back to the sender and relays to the receiver in one combined transmission, e.g., 3 THIS IS 39, FROM 31, FIRE MISSION BATTERY, OVER. Once the link has been established the relay station prefixes every transmission with his own call sign.

54. To enable the originating station to indicate, if necessary, that a mistake has been made, the receiving station waits for five seconds before reading back. This pause is not made when the receiving station has made a mistake and has been corrected by the relay station, or is reading back a repetition.

55. If the relay station reads back incorrectly, the originator immediately sends WRONG, OVER, which is read back WRONG, OVER. The correct order is then sent; again preceded by WRONG and, thereafter, the normal rules for corrections apply.

56. When an order has been read back correctly by the receiving station, the relay station sends OUT. This informs both originator and receiver that the order is through and the next order may be sent. An example of the relay procedure with abbreviations is shown in Figure 7-16.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

OBSERVER'S COMMUNICATOR	RELAY BC R BATTERY COMMUNICATOR	BATTERY CP COMMUNICATOR
(a)	(b)	(c)
(1) 39, THIS IS 31, RELAY TO 3, FM BTY, OVER	(2) 3 THIS IS 39, FROM 31, FM BTY, OVER	(3) (PAUSE) 3, FM, BTY, OUT
(5) ZR 3579, DIR 1670, OVER	(4) 39, OUT	
(9) SIX RDS, A/F, OVER	(6) 39, ZR 3579, DIR 1670, OVER	(7) (PAUSE) ZR 3579, DIR 1670, OUT
(11) WRONG, OVER	(8) 39, OUT	
(13) WRONG, SIX RDS, A/F, OVER	(10) 39, A/F, OVER	
(19) (Pause) S3, 27, OUT	(12) 39, WRONG, OVER	(Pause) (when the receiving station hears 39, WRONG, OVER, he does not answer)
(21) R100, D400, OVER	(14) 39, WRONG, SIX RDS A/F, OVER	(15) (Pause) WRONG, SIX RDS, A/F, OUT
	(16) 39, OUT	
	(18) 39, S3 27, OVER	(17) S3, 27 OVER
	(20) 39, OUT	
	(22) 39, R100, D400, OVER	(23) (Pause) SAY AGAIN, OVER
	(24) 39, I SAY AGAIN, R100, D400, OVER	(25) R200, D400, OUT
	(26) 39, WRONG, R100, D400, OVER	(27) WRONG, R100, D400, OUT
	(28) 39, OUT (The mission continues)	

Figure 7 - 16 An Example of Relay Procedure

REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

SECTION 5
BATTERY FIRE MISSIONS

GENERAL

57. An observer is authorized to conduct battery fire missions with his own battery. An example of a battery fire mission with abbreviations, utilizing all nets, is shown in Figure 7-17.

BATTERY NET	
OBSERVER'S COMMUNICATOR	CP'S COMMUNICATOR
(a)	(b)
(1) 1 THIS IS 11, FM BTY, OVER	(2) 1, FM BTY, OUT
(3) GR 259 621, ALT 100, DIR 3280, OVER	(4) GR 259 621, ALT 100, DIR 3280, OUT
(5) TRUCKS IN OPEN, RADIUS 80, A/F, OVER	(6) TRUCKS IN OPEN, RADIUS 80, A/F, OUT
(8) S, 5, 24, OUT	(7) S, 5, 24, OVER
(THE MISSION CONTINUES)	

Figure 7 - 17 Example of a Battery Fire Mission

58. In certain circumstances, e.g., during a fire plan, it may be necessary for an observer to conduct a mission using a battery from his or another regiment. The possibility is usually foreseen and the procedure must be included in the orders for the operation. The observer flicks to the frequency of the battery he is going to use, identifies himself using his NIS, and proceeds as in a normal battery mission.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SECTION 6
FIRE MISSIONS ADDRESSED TO MORE THAN
ONE CALL SIGN

PROCEDURE

59. The observer addresses his orders to the fire units concerned; the senior call sign reading them back in full and, after a short pause, the other call signs acknowledging them with the order ROGER.

60. A difference in procedure for the call for fire exists when the observer is authorized to order the fire of specific call signs, and when he is an ordinary observer; he must first obtain such authorization before the fire unit will respond. This difference is made clear in subsequent articles.

MORE THAN ONE BATTERY FIRE MISSIONS

61. The regimental net is used for regimental, higher formation or more than one battery fire missions. If the observer is not already on the regimental net he shall change frequency. If this is not possible, he shall relay his orders through his own battery CP. As there is an appreciable increase in the number of transmissions and time required, the latter method should be considered only as a last resort.

62. A regimental fire mission may be engaged by either an authorized observer or an ordinary observer.

AUTHORIZATION

63. All calls for fire will be directed to the regimental CP. The regimental CP will coordinate all calls for fire on regimental command net. Batteries will acknowledge these orders and conduct any coordination of these orders on regimental ring. If an observer has been authorized to fire the regiment, he will receive the required support as ordered unless it is not available. If this is the case the regimental CP shall send a message to observer. An ordinary observer is unauthorized; therefore, he must receive a message to observer prior to receiving fire support.

REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

64. When all addresses have acknowledged, any battery not allotted takes no further part in the mission on regimental ring.

MIXED ORDERS, CORRECTIONS, REPETITIONS, ETC

65. When a packet of orders applies to all call signs, the orders shall not be prefixed. Any order that applies to an individual battery shall be prefixed by the call sign of that battery.

66. When a station other than the senior station addressed asks for a repetition, the sender shall prefix the order with I SAY AGAIN followed by the last packet sent; the station asking for the repetition shall then read back the packet in full.

67. A complete transmission prefixed by a particular station's call sign shall be read back in full by that station only, and not acknowledged by the others. Unprefixed orders or orders applying to more than one sub-unit, however, are read back in full by the senior station addressed and acknowledged by the others.

68. Example fire missions with abbreviations to illustrate these principles are given in Figures 7-18 and 7-19. When studying these example the following points should be noted:

- a. the difference between the initial calls of the authorized and ordinary observers on the regimental net;
- b. the procedure when orders are addressed to a particular call sign;
- c. the procedure when orders are addressed partly to a specific call sign and partly to all call signs;
- d. that the RCPO is the senior station and shall read back all orders; and
- e. that repetitions demanded by a particular station are addressed to, and read back in full, by that station only.

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

FIRE MISSIONS CONDUCTED BY AIR OBSERVERS

69. When airborne observers are conducting fire missions they shall use standard fire discipline, and shall read back all orders and reports. There may be occasions when this is not practicable and reports may not be read back immediately. The CP communicator shall pause before repeating the report.

UPGRADED MISSIONS

70. An example of an upgraded mission is given in Figure 7-19.

**REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES**

SER	REGIMENTAL COMMAND		REGIMENTAL RING		
	AUTHORIZED OBSERVERS COMMUNICATOR	REGIMENTAL CPO	A BATTERY COMMUNICATOR	B BATTERY COMMUNICATOR	C BATTERY COMMUNICATOR
(a)	(b)	(c)	(d)	(e)	(f)
1	0, CC1 THIS IS 31 FM REGIMENT, OVER				
2		0, FM REGIMENT, OUT			
3			(Pause) 1 ,ROGER OUT (Note 1)	2, ROGER OUT	3, ROGER OUT
4	GR 502 321, ALT 100, OVER (Note 2)				
5		GR 502 321, ALT 100, OUT			
6			(Pause) 1, ROGER OUT		
7				2, ROGER OUT	3. ROGER OUT
8	DIR 3500, COY POSN RADIUS RADIUS 150, FOUR RDS, AMC, A/F, OVER				
9		DIR 3500, COY POSN RADIUS RADIUS 150, FOUR RDS, AMC, A/F, OUT			
(A message to obverver will be sent at this time if required).					
10			(Pause) 1, ROGER OUT		
11				2, ROGER OUT	3, ROGER OUT
12				2, READY 30, OVER	
13		2, READY 30, OVER			
14	2, READY 30, 2 A/F, 2 FIRE, OVER				
15		2, READY 30, 2 A/F, 2 FIRE, OUT			
16			(Pause) 1, ROGER OUT		
17				2, ROGER OUT	3, ROGER OUT
18				2, S3, OVER	
19		2, S3, OVER			
20	2, S3, OUT				
21	L200, CANCEL AMC, OVER				
22		L200, CANCEL AMC, OUT			
23			(Pause) 1, ROGER OUT	2, ROGER OUT	3, ROGER OUT
(The Adjustment continues)					
24	A100, AMC, ONE 1 RD FFE, OVER				
25		A100, AMC, ONE 1 RD FFE, OVER			
26			(Pause) 1, ROGER OUT		
27				2, ROGER OUT	3, ROGER OUT

Figure 7 - 18 An Example of a Regimental Fire Mission (Sheet 1 of 2)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

SER	REGIMENTAL COMMAND		REGIMENTAL RING		
	AUTHORIZED OBSERVERS COMMUNICATOR	REGIMENTAL CPO	A BATTERY COMMUNICATOR	B BATTERY COMMUNICATOR	C BATTERY COMMUNICATOR
(a)	(b)	(c)	(d)	(e)	(f)
28					3, READY, OVER
29		3, READY OVER			
30	3, READY OUT				
31			1, READY OVER		
32		1, READY OVER			
33	1, READY OUT				
34				2, READY OVER	
35		2, READY OVER			
36	2, READY OUT				
37	FIRE OVER				
38		FIRE OUT			
39			(Pause) 1, ROGER OUT		
40				2, ROGER OUT	3, ROGER OUT
41					3, S OVER
42				2, S OVER	
43		2,3, S OVER			
44			1, S OVER		
45		1, S OVER			
46	CC1, S OUT		1, RC OVER	2, RC OVER	
47		1,2 RC OVER			
48	1,2, RC OUT				
49					3, RC OVER
50		3, RC OVER			
51	3, RC OUT				
52	REC AS TGT ZT 2964, OVER				
53		REC AS TGT ZT 2964, OUT			
54			(Pause) 1, ROGER OUT		
55				2, ROGER OUT	3, ROGER OUT
56			CC1, ZT2964 REC, OVER		
57		ZT 2964 REC, OVER			
58	ZT 2964 REC OUT				
59	EM OVER				
60		EM OUT			
61			CC1, ROGER OUT		
NOTES					
1. The communicator of the senior battery must allow a short pause before acknowledging so that the observer's communicator may correct any mistake that is made.					
2. The observer and the regimental CP drop their call signs.					
3. The communicator for the regimental CP reads back in full. The batteries acknowledge on regimental ring.					

Figure 7 - 18 An Example of a Regimental Fire Mission (Sheet 2 of 2)

**REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES**

SER	BATTERY		REGIMENTAL	
	OBSERVER	BTY CP	COMMAND	RING
01	1 THIS IS 11 . FIRE MISSION BTY OVER			
02		1 , FIRE MISSION BTY OUT		
03	GRID 100100 ALT 50 DIR 1600, OVER			
04		GRID 100100 ALT 50 DIR 1600, OUT		
05	CRP ADVANCING RAD 30 THREE 3 RDS, ADJ FIRE, OVER			
06		CRP ADVANCING RAD 30 THREE 3 RDS .ADJ FIRE, OUT		
07			0 THIS IS 1 ENGAGED BTY GRID 100100 CRP ADVANCING RAD 30 (0 Reads Back)	
08		S,1,23, OVER		
09	S 1,23, OUT			
10	A400, OVER			
11		ADD 400, OUT		
12		S, OVER		
13	S, OUT			
14	D200, OVER			
15		D 200, OUT		
16		S, OVER		
17	S, OUT			
18	(At this point in the adjustment the actual target size becomes more evident as more vehicles appear; what was initially thought to be a cbt recee patrol is actually a coy minus.)			
19	SITREP TGT NOW COY MINUS WITH BMPS AND 6 X T72 ADVANCING RAD 100 REFERENCE FIRE MISSION BTY UPGRADE REGIMENT, OVER			
20		SITREP TGT NOW COY MINUS WITH BMPS AND 6 X T72 ADVANCING RAD 100 REFERENCE FIRE MISSION BTY UPGRADE REGIMENT		
21	(The GPO/CPO will record this TGT immediately and include the deduced grid in the initial sequence of orders sent to 0).			
22			0 THIS IS 1 FROM 11, FIRE MISSION REGT GRID 102100 ALT 150 DIR 1600	
23			(0 Reads Back)	(Btys Ack)
24	A100, OVER			
25		A100, OUT		
26			COY MINUS WITH BMPS AND 6 X T72 ADVANCING RAD 100 3 RDS 1 ADJ FIRE	

Figure 7 - 19 An Example of a Regimental Mission with the Misc Order UPGRADE (1 of 2)

**DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION**

SER	BATTERY		REGIMENT	
	OBSERVER	BTY CP	COMMAND	RING
27			(0 Reads Back)	(Btys Ack)
28			(A100, Over)	
29			(0 Reads Back)	(Btys Ack)
30	(Once the initial sequence of orders has been sent to 0 the bty CP will order the observer to join regimental command. Message to observer sent at this time if required.)			
31		JOIN HIGHER ,OVER		
32	JOIN HIGHER, OUT			
33			0 THIS IS 11 JOINING NET RADIO CHECK, OVER	
34			(0 Responds)	
35			CC1,11 THIS IS 0 REGIMENT 5 RDS ZT 4150, OVER	
36			(Observer Ack)	(Btys Ack)
37	(The remainder of the mission is conducted as a normal regimental mission)			
38				

Figure 7 - 19 An Example of a Regimental Mission with the Misc Order UPGRADE (2 of 2)

**SECTION 7
FIRE PLAN ORDERS**

PROCEDURE FOR TRANSMISSION OF AN ARTILLERY FIRE PLAN

71. The procedure described in Chapter 6 of this manual is used for passing fire plan orders by radio or line. Fire plan orders shall normally be passed from officer to officer, but all communicators must be trained in the procedure (see Figure 7-20).

72. The rules for fire orders shall be adhered to with the following exceptions:

- a. each packet shall comprise one or two complete lines; it shall not exceed 30 seconds in transmission;
- b. the sender of the fire plan shall allow a pause of five seconds after each packet has been read back before sending another; and

REGIMENTAL COMMUNICATIONS RESOURCES AND
FIRE ORDERS PROCEDURES

- c. in requesting repetitions and making corrections, only the actual part of the line requiring repetition or correction needs to be transmitted.
73. The number of lines should be stated in the first transmission relating to the fire plan.
74. H-hour shall be encoded unless the notice is sufficiently short to justify the security risk.
75. All CPs and observers on the net shall copy the fire plan orders.
76. Column indicators need not be sent.

REGIMENTAL COMMUNICATIONS RESOURCES AND FIRE ORDERS PROCEDURES

FIRE PLANNER BC R BATTERY	REGIMENTAL CP	P BATTERY CP	Q BATTERY CP	R BATTERY CP
(a)	(b)	(c)	(d)	(e)
<p>(1) 0, CHARLIE CHARLIE 1, THIS IS 39, FIRE PLAN IRON HEEL, FOUR LINES, FETCH OFFICER, OVER (Note 1)</p> <p>(10) IRON HEEL, H-HOUR LATER, TARGET INFORMATION, LINE 1, A ZT 6160, B PLATOON AREA, LINE 2 A ZT 6161, B SECTION POSITION, E 31 WITH 2, OVER</p>	<p>(2) 0, FIRE PLAN IRON HEEL, FOUR LINES, WAIT, OUT</p> <p>(6) 0, SEND, OVER</p> <p>(11) IRON HEEL, H-HOUR LATER, TARGET INFORMATION, LINE 1, A ZT 6160, B PLATOON AREA, LINE 2 A ZT 6161, B SECTION POSITION, E 31 WITH 2, OUT</p>	<p>(3) 1, ROGER, WAIT, OUT</p> <p>(7) 1, SEND, OVER</p> <p>(12) 1, ROGER, OUT</p>	<p>(4) 2, ROGER, WAIT, OUT</p> <p>(8) 2, SEND, OVER</p> <p>(13) 2, ROGER, OUT</p>	<p>(5) 3, ROGER, WAIT, OUT</p> <p>(9) 3, SEND, OVER</p> <p>(14) 3, ROGER, OUT</p>
<p>(This continues until all lines in the TARGET INFORMATION portion of the fire plan have been transmitted. The SCHEDULE is then sent; it may be transmitted immediately after the TARGET INFORMATION, or later.)</p>				
<p>(15) SCHEDULE, TIME SCALE MINUS 15 TO PLUS 20. LINE 1, F XAN, G 1, MINUS FOUR TO H, ZT 6165. RATE 2, PLUS FOUR TO PLUS 10, ZT 6162 RATE 1, NOTE (a) ONE GUN WP, (Note 2) OVER</p>	<p>(16) SCHEDULE, TIME SCALE MINUS 15 TO PLUS 20. LINE 1 F XAN, G 1, MINUS FOUR TO H, ZT 6165, RATE 2, PLUS FOUR TO PLUS 10, ZT 6162, RATE 1, NOTE(a) ONE GROUP WP, (Note 2) OUT</p>	<p>(17) 1, ROGER, OUT</p>	<p>(18) 2, ROGER, OUT</p>	<p>(19) 3, ROGER, OUT</p>
<p>(This continues until all lines in the SCHEDULE portion of the fire plan have been transmitted)</p>				
<p>NOTES</p> <p>1. The number of lines is stated in the first transmission relating to the fire plan.</p> <p>2. TIME SCALE MINUS 15 to 20 was sent in warning order. In this example ADDRESS GROUP XAN, would normally not be sent in a regimental fire plan. It is included only to show how it is transmitted</p>				

Figure 7 - 20 Example of the Transmission of a Quick Artillery Fire Plan (Three-Batteries Regiment)

SECTION 8
THE METEOROLOGICAL MESSAGE

PROCEDURE

77. If possible, met messages should be sent on other than the regimental fire orders net. The procedure is the same whether radio or line is used.

78. The following rules apply:

- a. a met message shall be offered, together with the number of lines;
- b. the message shall be subdivided into packets, each taking less than 30 seconds to transmit; and
- c. when requesting repetitions or making corrections, only the actual line requiring repetition or corrections shall be transmitted.

79. An example of an artillery met message on a standard form is shown in Figure 7-21. Figure 7-22 shows the voice procedure for its transmission from the RCPO to the battery CPs.

**ARTILLERY METEOROLOGICAL MESSAGE
MESSAGE MÉTÉOROLOGIQUE D'ARTILLERIE**

TYPE OF/DE MESSAGE		OCTANT	CENTRE OF APPLICABILITY CENTRE DE LA ZONE DE VALIDITE		DATE	VALID PERIOD PERIODE DE VALIDITE		MDP - PRMS		
Anti-aircraft Anti-avion		METB2	L ₀ L ₁ L ₂ L ₀ L ₁ L ₂			Begins Début	Duration Durée	In - En déca-mètres	PRESSURE - PRESSION	
Surface-to-Surface Sol-Sol		METB3	OR		YY	G ₀ G ₁ G ₂	G	hhh	PPP (METB2)	
Computer Calculateur		METCM	Q XXXXXX						PPP (METB2)	
		MET							P _d P ₃ P _d (METCM)	
ZONE HEIGHTS (METRES)		LINE	WIND - VENT		TEMPERATUR E	DENSITY OR		WIND		REMARKS - OBSERVATIONS
HAUTEUR DES ZONES (METRES)		LIGNE	DIRECTION SPEED DIRECTION VITESSE		TEMPÉRATUR E	PRESSURE - MASSE SPEC. OU PRESSION		DIRECTION DU VENT		
BALLISTIC MESSAGE MESSAGE BALISTIQUE		Line No Ligne N°	100's mils en 100m	Knots En noeuds	Percentage of Standard Pourcentage du standard	TTT		? ? ?		
COMPUTER MESSAGE MESSAGE DESTINÉ AU CALCULATEUR		Zone No N° de Zone	10's mils En 10m	Knots En noeuds	1/10° K	In - En millibars		degrees degrés		
Surface En Surface		Z _n Z _n	ddd	FFF	TTTT	PPPP		Do not transmit Ne pas transmettre		
200	200	01								
500	500	02								
1000	1000	03								
1500	1500	04								
2000	2000	05								
3000	2500	06								
4000	3000	07								
5000	3500	08								
6000	4000	09								
8000	4500	10								
10000	5000	11								
12000	6000	12								
14000	7000	13								
16000	8000	14								
18000	9000	15								
Serial: N° :	10000	16								
	11000	17								
	12000	18								
	13000	19								
	14000	20								
Date :	15000	21								
	16000	22								
	17000	23								
Time: Heure :	18000	24								
	19000	25								
	20000	26								
Sent by: Transmis par :		99999 or 9 METCM only/seulement								
Recv by: Reçu par :		CHECKWORD CODE DE VERIFICATION								
TO: A:		99999								For abbreviations/codes See REVERSE side Pour abréviations et codes voir endos

Figure 7 - 21 Artillery Meteorological Message (Front)

	<u>Octant</u>	
	Latitude	Longitude
	0 - North	0° - 90° W
	1 - North	90° - 180° W
	2 - North	180° - 90° E
	3 - North	90° - 0° E
	4 -	
	5 - South	0° - 90° W
	6 - South	90° - 180° W
	7 - South	180° - 90° E
	8 - South	90° - 0° E
	9 - Use with XXXXXX	
L _a L _a L _a	<u>Latitude</u> , to 0.1°	
L _o L _o L _o	<u>Longitude</u> , to 0.1°	
XXXXXX	<u>Location</u> , clear or code	
YY	<u>Date of Month</u> (GMT), referred to by G _o G _o G _o	
G _o G _o G _o	<u>Time Valid Period Begins</u> to 0.1 hours (GMT)	
G	<u>Valid Period Duration</u>	
	0 - duration unspecified	
	1 - 1 hour	
	2 - hours etc.	
	8 - 8 hours	
	9 - 12 hours	
MDP	Mean Datum Plain	
hhh	<u>MDP Height</u> , decametres	
PPP	<u>MDP Pressure</u> , to 0.1% of standard	
P _d P _d P _d	<u>MDP Pressure</u> , millibars	
ZZ	<u>Ballistic Line Number</u>	
Z _n Z _n	<u>Zone Number</u>	
dd	<u>Ballistic Wind Direction</u> , to nearest 100 mils	
ddd	<u>Zone Mean Wind Direction</u> , to nearest 10 mils	
FF	<u>Ballistic Wind Speed</u> , knots	
FFF	<u>Zone Mean Wind Speed</u> , knots	
TTT	<u>Ballistic Temperature</u> , to 0.1% of standard	
TTTT	<u>Zone Mean Virtual Temperature</u> , to 0.1° K	
? ? ?	<u>Ballistic Density</u> , to 0.1% of standard	
PPPP	<u>Zone Mid-Height Pressure</u> , in millibars	

Figure 7 - 22 Artillery Meteorological Message (Back)

**REGIMENTAL COMMUNICATIONS RESOURCES
AND FIRE ORDERS PROCEDURES**

REGIMENTAL CP COMMUNICATOR	P BATTERY COMMUNICATOR	Q BATTERY COMMUNICATOR	R BATTERY COMMUNICATOR
(a)	(b)	(c)	(d)
(1) CHARLIE CHARLIE 1, THIS IS 0, MET MESSAGE NINE LINES, OVER	(2) 1. MET MESSAGE NINE LINES, SEND, OVER	(3) 2. SEND, OVER	(4) 3, SEND OVER
(5) MET, BRAVO 3, 1, 495 994, 30, 175, 4, 038, 012, LINE 00, 32, 08, 946, 021, OVER	(6) MET, BRAVO 3, 1, 495 994, 30, 175, 4, 038, 012, LINE 00, 32, 08, 946, 021, OUT	(7) (Pause) 2, ROGER, OUT	(8) 3, ROGER, OUT
(9) LINE 01, 32, 09, 946, 018, LINE 02, 33, 11, 952, 013, OVER	(10) LINE 01, 32, 09, 946, 018, LINE 02, 33, 11, 952, 013, OUT	(11) (Pause) 2, SAY AGAIN, LINE 01, OVER (See Note)	
(12) I SAY AGAIN, LINE 01, 32, 09, 946, 018, OVER		(13) 2, I SAY AGAIN LINE 01, 32, 09, 946, 018, OUT	(14) 3, ROGER, OUT
(The message continues)			
NOTE			
Note the drill when a repetition is requested.			

Figure 7 - 23 A Meteorological Message Being Transmitted (Three-Batteries Regiment)

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

CHAPTER 8
ADMINISTRATION

INTRODUCTION

1. The principles of administration and the normal administrative procedures for the efficient conduct of unit administration, as part of a formation, are fully discussed in B-GL-311-001/FP-001, *Administration in Battle*. This chapter will, therefore, consider only those aspects of administration which are of particular interest to a field artillery unit.
2. Units will develop and publish an administrative portion to unit SOPs based upon B-GL-311-001/FP-001, *Administration in Battle* and formation SOPs.

GENERAL

3. The service support system is designed to leave the regiment free to carry out its role. Formation transport delivers supplies and replacements as far forward as possible for transfer to the unit at Delivery Points (DPs) or if required, direct to the batteries themselves. Similarly, formation transport moves forward to pick up personnel and equipment casualties and to take them back, thus keeping movement by unit transport to a minimum.
4. Regimental control over service support is exercised from the HQ and Services Battery CP established in the regimental A echelon area. Duty officers may be drawn from:
 - a. BC HQ and Services Battery;
 - b. the adjutant;
 - c. the supply officer (RQM);
 - d. the maintenance officer (Tech Adjt);
 - e. the RQMS; and

- f. BSM HQ and Services Battery.
5. The HQ and Services Battery CP is responsible for:
- a. consolidation and dispatch of all administration and logistical reports, returns and demands to second line;
 - b. control of unit DP operations; and
 - c. receipt and dissemination of logistics information and directives.

AMMUNITION

6. Small arms ammunition, grenades, etc., will be obtained through DPs like other combat supplies. Artillery ammunition, however, because of its bulk, receives separate treatment. The remainder of this article is concerned with artillery ammunition.

7. The regiment holds a basic load of ammunition, divided between SPs/gun tractors and ammunition vehicles, which represents a set amount of consumption (normally three days) but this may vary with theatre policy. The formation holds additional ammunition called a maintenance load. The maintenance load is normally equal to one day's average consumption. Maintenance loads are used to replenish the regiment as required.

8. Ammunition expenditure is partly regulated by higher HQ through an allotment expressed in rounds per gun per day or in rounds per gun for a particular phase of an operation, see B-GL-306-002/FP-001, *Artillery Staff Duties*. Based on this allotment, the CO may allot ammunition to subordinate commanders, CPs and a reserve. Units must endeavour to conduct their operations within these constraints. Resupply may not be possible to meet expenditure above the allocated rate with a resulting shortage in the basic or maintenance loads. Requests to exceed the ammunition allotment should be made to higher headquarters.

9. Efficient ammunition control requires a knowledge of ammunition holdings in the regiment at all times. This information is based on ammunition returns submitted routinely as required by formation and unit SOPs and on known or expected expenditure. Over and above

DUTIES AT REGIMENTAL HEADQUARTERS AND THE GUN POSITION

the routine returns, which must be exact, artillery commanders may require approximate expenditures or holdings at certain periods during a battle. GPO's are responsible for maintaining a running total of battery ammunition holdings based on actual expenditures and receipts. A similar running total may be maintained by the RCPO.

10. The RCPO informs the HQ and Services Battery CP daily of the regiment's ammunition expenditure, or forecast expenditure and the latter in turn forwards this information to the supporting service battalion logistics operation centre. Modification to these forecasts, or emergency demands can be made if required. Depending on the quantity, the ammunition will be resupplied either through a DP or by direct delivery to the batteries. Direct delivery by trucks or helicopters will be the normal method used when ammunition must be delivered on a priority basis, or if the quantity is large. In these cases, the supply trucks will be met by unit guides at a RV and led onto the battery position. For routine deliveries, the RV may conveniently be the DP location, with the BSM leading the ammunition supply trucks back on his return.

11. **Dumping.** Dumping of ammunition involves the putting on the ground, usually at the gun position, of stocks over and above the amounts normally carried on wheels. If dumping has to be carried out before the guns deploy, the regiment will often be ordered to supply personnel for unloading, concealment and protection. Orders given to the regiment for a dumping programme will normally include:

- a. the quantity of ammunition by types to be dumped;
- b. the size and composition of guide parties;
- c. where and when the guides are to report;
- d. the requirement to nominate personnel to assist supply and transportation officers at Forward Regulating Centres and Return Control Posts (the RSM will normally carry out this role if it is required);
- e. the provision of work parties and guards where necessary;
- f. camouflage and storage instructions; and

DUTIES AT REGIMENTAL HEADQUARTERS
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ANNEX A
DESTRUCTION OF MATERIEL

1. Great effort must be made to prevent materiel from falling into enemy hands. This will normally be accomplished by the careful evacuation of all equipment and supplies when necessary, but if the tactical situation is serious enough, destruction may have to be carried out. Materiel will only be destroyed:

- a. on orders from a formation commander, who may delegate this authority if a specific situation requires it; or
- b. when capture by the enemy is imminent and unavoidable.

2. Destruction will be carried out simultaneously on all equipment in the order of priority listed below. Destruction must achieve such damage that it will be impossible to restore the equipment to a usable condition in the combat zone by either repair or cannibalization (including parts from another battery). Priorities for destruction of parts, including spare parts, are as follows:

- a. **Guns:**
 - (1) breech, breech mechanism and spares,
 - (2) recoil mechanism,
 - (3) barrel,
 - (4) sighting and fire control equipment, and
 - (5) carriage and tires.
- b. **Small Arms:**
 - (1) breech mechanism,
 - (2) barrel,

- (3) sighting equipment (including infra-red), and
 - (4) mounts.
- c. **Rockets:**
- (1) launcher,
 - (2) rocket, and
 - (3) sights.
- d. **Vehicles:**
- (1) carburetor/fuel pump/injector distributor,
 - (2) engine block and cooling system,
 - (3) tires/tracks and suspension,
 - (4) mechanical or hydraulic systems,
 - (5) differentials, and
 - (6) frame.
- e. **Optical Equipment:**
- (1) laser range-finders,
 - (2) GACS,
 - (3) optical parts, and
 - (4) mechanical parts.
- f. **Radios:**
- (1) secure communications equipment,
 - (2) transmitter (oscillators and frequency generators),

DUTIES AT REGIMENTAL HEADQUARTERS
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- (3) receiver,
- (4) remote control units or switchboards (exchanges) and operating terminals,
- (5) power supply and/or generator set,
- (6) antennae, and
- (7) tuning heads.

g. **Radars:**

- (1) frequency determining components,
- (2) antennae, reflectors and optics,
- (3) transmission lines and waveguides,
- (4) transmitter high voltage components,
- (5) control consoles, displays, plotting boards,
- (6) cable systems,
- (7) automatic devices,
- (8) other control panels and generators, and
- (9) carriage, tires.

3. In addition to the priorities listed above, all further stores, ammunition and equipment will be destroyed or removed. Nothing of value to the enemy should be left behind.

DUTIES AT REGIMENTAL HEADQUARTERS
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ANNEX B
INTERNATIONAL AGREEMENTS

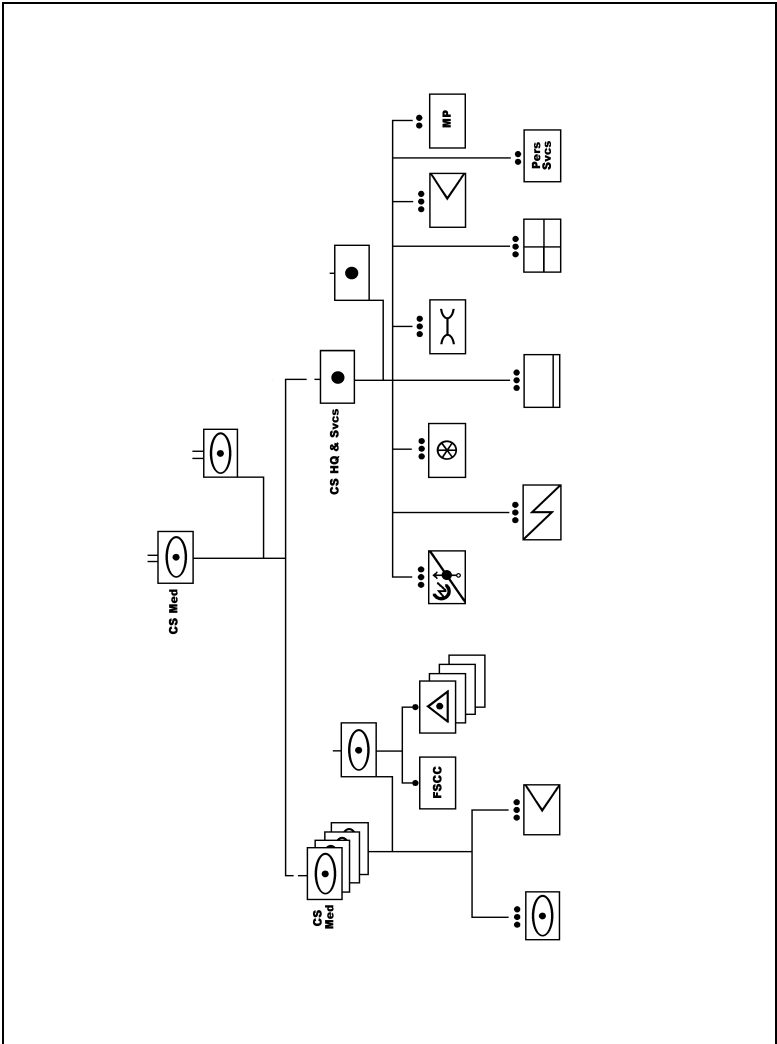
1. The following international standardization agreements have been wholly or partially incorporated into this publication:

NO.	STANAG	QSTAG	TITLE
(a)	(b)	(c)	(d)
1	2008 Ed 4, Amdt 4	503 Ed 1	BOMREP/SHELREP/MORTREP/Location Report
2	2011 Ed 3, Amdt 3	505 Ed 1	Target Grid Procedures
3	2031 Ed 4, Amdt 4	515	Proforma for Artillery Fire Plan
4	2088 Ed 5	182 Ed 2	Battlefield Illumination
5	2099 Ed 3, Amdt 4	531	Fire Coordination in Support of Land Force
6	2144 Ed 2, Amdt 1	225 Ed 2, Amdt 1	Call for Fire Procedures
7	2147 Ed 3		Target Numbering
8		221 Ed 1	Target Numbering for Post 1970
9	2865 Ed 1, Amdt 3		Recording of Data for Artillery Service Control Points
10	2867 Ed 1, Amdt 6	246 Ed 2, Amdt 1	Radio Telephone Procedures for the Conduct of Artillery Fire
11		269 Ed 1	Standard Survey Accuracy Requirements
12	2875 Ed 2, Amdt 2		Calls for Destruction, Smoke, Illumination and Danger Close
13	2887 Ed 2, Amdt 2	217 Ed 2, Amdt 1	Tactical Tasks and Responsibilities for Control of Artillery
14	4044 Ed 2	186 Ed 1	Adoption of Standard Atmosphere
15	4061 Ed 3, Amdt 1	332 Ed 1	Standard Ballistic Met Message
16	4103 Ed 2, Amdt 1		Requests for Met Messages
17		224 Ed 2	Manual Fire Direction Equipment, Target Classification and Methods of Engagement

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ANNEX C
BRIGADE GROUP CLOSE SUPPORT ARTILLERY

REGIMENT AND HQ & SVC BTY



DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

LIST OF TERMS AND ABBREVIATIONS

ENGLISH		FRENCH	
2IC	Second in Command	cmdtA	Commandant adjoint
A Ops O	Assistant Operations Officer	O Ops A	Officier des opérations adjoint
A/S	Angle of Sight	A/S	Angle de site
ABCA	America, Britain, Canada, Australia	ABCA	États-Unis (Amérique), Grande-Bretagne, Canada, Australie
AD	Air Defence	DAA	Défense antiaérienne
ADAM	Area Denial Artillery Munitions	MAIZ	Munitions d'artillerie d'interdiction de zone
AGPO	Assistant Gun Position Officer	O Tir A	Officier de tir adjoint
AN	Area Neutralization	NZ	Neutralisation de zone
AP	Ammunition Point	P mun	Point de munitions
APC	Armoured Personnel Carrier	TTB	Transport de troupes blindé
APICM	Anti-Personnel Improved Conventional Munitions	MCAAP	Munitions classiques améliorées antipersonnel
ARCPO	Assistant Regimental Command Post Officer	AOPCR	Adjoint à l'officier du poste de commandement régimentaire
ARV	Armoured Recovery Vehicle	VBD	Véhicule blindé de dépannage
AT	Anti-Tank	AC	Antichar
BAIO	Brigade Artillery Intelligence Officer	ORAB	Officier du renseignement artillerie de la brigade
BC	Battery Commander	CB	Commandant de batterie
BE	Base Ejection	EC	Éjection par le culot
BG	Battle Group	GT	Groupement tactique
BK	Battery Captain	BK	Capitaine de batterie
BOMREP	Bombing Report	BOMREP	Compte rendu de bombardement
BP	Bearing Picket		Piquet d'azimut

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

	ENGLISH		FRENCH
BQMS	Battery Quartermaster Sergeant	SQMB	Sergent quartier-maître de batterie
BSM	Battery Sergeant- Major	SMB	Sergent-major de batterie
Bty	Battery	bie	Batterie
C of A	Centre of Arc	C de l'A	Centre de l'arc
C of M	Correction of the Moment	C du M	Correction du moment
CB	Counterbattery	CB	Contre-batterie
Cbt Tm	Combat Team	éqpt cbt	Équipe de combat
CCP	Casualty Collecting Post	PRB	Poste de rassemblement des blessés
CDA	Commander Division Artillery	CAD	Commandant de l'artillerie divisionnaire
CELE	Communications Electronics Engineering (Branch)	GE Comm	Génie électronique et des communications (Branche)
CEOI	Communications- Electronics Operating Instructions	IET	Instructions d'exploitation des transmissions
CFMS	Canadian Forces Medical Service	SSFC	Service de santé des Forces canadiennes
CM	Counter Mortar	CM	Contre-mortier
CO	Commanding Officer	cmdt	Commandant
CP	Command Post	PC	Poste de commandement
CPA	Concrete Piercing Ammunition	MPB	Munition perce-béton
CPFC	Convergence, Position and Fuze Correction	CCPF	Correction de convergence, de position et de fusée
CPO	Command Post Officer	OPC	Officier du poste de commandement
C/S	Call Sign	I/A	Indicatif d'appel
CVT (fuze)	Controlled Variable Time Fuze	fusée MVC	Fusée à minuterie variable contrôlée

LIST OF TERMS AND ABBREVIATIONS

	ENGLISH		FRENCH
DAIO	Division Artillery Intelligence Officer	ORAD	Officier du renseignement artillerie de la division
DF	Defensive Fire	TD	Tir défensif
Div Arty HQ	Divisional Artillery Headquarters	QG artil div	Quartier général de l'artillerie divisionnaire
DP	Delivery Point		Point de livraison
DPICM	Dual Purpose Improved Conventional Munitions	MCADE	Munitions classiques améliorées à double effet
DS	Direct Support	AD	Appui direct
EME	Electrical and Mechanical Engineering (Branch)	GEM	Génie électrique et mécanique (Branche)
ETQMS	Electrical and Technical Quartermaster Sergeant	SQMTG	Sergent quartier-maître technicien du génie
FAC	Forward Air Controller	CAA	Contrôleur aérien avancé
FCA	Fire Coordination Area	ZCF	Zone de coordination des feux
FCL	Fire Coordination Line	LCF	Ligne de coordination des feux
FEBA	Forward Edge of the Battle Area	LAZB	Ligne avant de la zone de bataille
FFE	Fire for Effect	TE	Tir d'efficacité
FLOT	Forward Line of Own Troops	Lafa	Ligne avant des forces amies
FOO	Forward Observation Officer	OOA	Officier d'observation avancée
FPF	Final Protective Fire	TA	Tir d'arrêt
FSCC	Fire Support Coordination Centre	CCFA	Centre de coordination des feux d'appui
FSCL	Fire Support Coordination Line	LCFA	Ligne de coordination des feux d'appui
GACS	Gun Alignment and Control System	SACPA	Système d'alignement et de commande des pièces d'artillerie

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

	ENGLISH		FRENCH
GAFDU	Gun Alignment and Firing Data Display Unit	UVDAP	Unité de visualisation des données de tir et d'alignement des pièces
GAP	Gun Aiming Point	PPP	Point de pointage de pièce
GCS	Ground Control Station	PCS	Poste de contrôle au sol
GFT	Graphical Firing Table		Table de tir graphique
GPO	Gun Position Officer	O Tir	Officier de tir
GPOT	Gun Position Officer's Technician	tech O Tir	Technicien de l'officier de tir
GS	General Support	AG	Appui général
HB	Hostile Battery	BH	Batterie hostile
HE	High Explosive	EB	Explosif brisant
HEPD	High Explosive Point Detonating	obus EB	Obus explosif brisant à fusée d'ogive
HESH	High Explosive Squash Head	OEBOP	Obus explosif brisant à ogive plastique
HF	Harassing Fire	FH	Feux de harcèlement
HOB	Height of Burst	HEX	Hauteur d'explosion
HQ	Headquarters	PC	Poste de commandement
HQ	Headquarters	QG	Quartier général
HQ & Svcs Bty	Headquarters and Services Battery	bie C et S	Batterie de commandement et des services
ICM	Improved Conventional Ammunition	MCA	Munitions classiques améliorées
ILBS	Infra-Red Laser Beacon Set	EBLI	Ensemble de la balise laser infrarouge
LD	Line of Departure	LD	Ligne de départ
LO	Liaison Officer	OL	Officier de liaison
LOG	Logistics (Branch)	log	Logistique (Branche)
LP	Laser Point	PL	Point laser
LP	Listening Post	PE	Poste d'écoute
LRF	Laser Range-Finder		Télémetre à laser

LIST OF TERMS AND ABBREVIATIONS

	ENGLISH		FRENCH
LTSDT	Line to Shoot Down To	LPM	Ligne de portée minimale
LZ	Landing Zone	Z atter	Zone d'atterrissage
m	Metre(s)	m	Mètre
m	Mil(s)	m	Millième(s)
Met Data	Meteorological Data	donnée météo	Donnée météorologique
MG	Machine Gun	mit	Mitrailleuse
MLRS	Multiple Launch Rocket System	LRM	Lance-roquettes multiples
mm	millimetre(s)	mm	Millimètres
MO	Medical Officer	OM	Officier médecin
MORTREP	Mortar Bombing Report	MORTREP	Compte rendu de bombardement de mortiers
MPB	Mean Point of Burst	PEM	Point d'éclatement moyen
MPI	Mean Point of Impact	PMI	Point moyen des impacts
MRT	Mobile Repair Team	EMR	Équipe mobile de réparation
MSR	Main Supply Route	IPR	Itinéraire principal de ravitaillement
MT (fuze)	Mechanical Time Fuze	fusée MT	Fusée mécanique à temps
MV	Muzzle Velocity	V_o	Vitesse initiale
NATO	North Atlantic Treaty Organization	OTAN	Organisation du traité de l'Atlantique Nord
NCM	Non-Commissioned Member	MR	Militaire du rang
NCO	Non-Commissioned Officer	s/off	Sous-officier
NFL	No-Fire Line	L de S	Ligne de sécurité
NIS	Net Identification Sign	IIR	Indicatif d'identification de réseau
NUCREP	Nuclear Detonation Report	NUCREP	Compte rendu d'explosion nucléaire
O Gp	Orders Group	Gp O	Groupe des ordres
OIC	Officer in Charge	O Resp	Officier responsable

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

	ENGLISH		FRENCH
OP	Observation Post	PO	Poste d'observation
Ops O	Operations Officer	O Ops	Officier des opérations
OT	Observer -Target	OB	Observateur-but
PADS	Position and Azimuth Determining System	SPO	Système de positionnement et d'orientation
PBL	Provisional Bearing Label	EAP	Étiquette d'azimut provisoire
PE	Probable Error	EP	Écart probable
PE_r	Probable Error in Range	EP_p	Écart probable en portée
PI	Platoon	pon	Peloton
POL	Petroleum, Oils and Lubricants	PP	Produits pétroliers
PW	Prisoner of War	PG	Prisonnier de guerre
PZ	Pick-up Zone	ZE	Zone d'embarquement
QE	Quadrant Elevation	AN	Angle au niveau
QSTAG	Quadripartite Standardization Agreement	QSTAG	Accord quadripartite de normalisation
RAAMS	Remote Anti-Armour Mine System	SMABPD	Système de mines antiblindés posées à distance
Rad	Radio	rad	Radio
RCP	Regimental Command Post	PCR	Poste de commandement régimentaire
RCPO	Regimental Command Post Officer	OPCR	Officier du poste de commandement régimentaire
Rdr	Radar	rdr	Radar
Regt	Regiment	régnt	Régiment
RHQ	Regimental Headquarters	PCR	Poste de commandement régimentaire
RL	Rocket Launcher	LR	Lance-roquettes
RO	Reference Object	OR	Objet repère
rpq (pm)	Rounds per Gun (per minute)	CPP (p min)	Coups par pièce (p min)

LIST OF TERMS AND ABBREVIATIONS

	ENGLISH		FRENCH
RPV	Remotely Piloted Vehicle	VTG	Véhicule téléguidé
RQMS	Regimental Quartermaster Sergeant	SQMR	Sergent quartier-maître régimentaire
RRB	Radio Rebroadcast	PRA	Poste de retransmission automatique
RSCP	Regimental Survey Control Point	PCTR	Point de contrôle d'arpentage régimentaire
RSM	Regimental Sergeant-Major	SMR	Sergent-major régimentaire
RSO	Regimental Survey Officer	OAR	Officier arpenteur régimentaire
RV	Rendezvous	RV	Rendez-vous
SCLDU	Status and Control Link Display Unit	UVELC	Unité de visualisation - état et liaison de contrôle
SCP	Survey Control Point	PCT	Point de contrôle d'arpentage
SDR	Special Dispatch Rider	estaf S	Estafette spéciale
SDS	Signals Dispatch Service	SDE	Service des estafettes
Sect	Section	son	Section
SHELREP	Shelling Report	SHELREP	Compte rendu de bombardement
Sig O	Signals Officer	O Trans	Officier des transmissions
SO	Staff Officer	OEM	Officier d'état-major
SO Arty	Staff Officer Artillery	OEM artil	Officier d'état-major artillerie
SOP	Standing Operating Procedure	IPO	Instructions permanentes d'opération
SP	Self-Propelled	AM	Automoteur, autopropulsé
STANAG	NATO Standardization Agreement	STANAG	Accords de standardisation OTAN
TA&Sp	Target Acquisition and Support	AO & Appui	Acquisition d'objectif et appui
TOF	Time of Flight	DDT	Durée de trajet
TOT	Time on Target	HSO	Heure d'arrivée sur l'objectif

DUTIES AT REGIMENTAL HEADQUARTERS
AND THE GUN POSITION

ENGLISH		FRENCH	
TOXREP	Toxic Incident Report	TOXREP	Compte-rendu d'attaque chimique
Tp	Troop	tp	Troupe
TSM	Troop Sergeant-Major	SMT	Sergent-major de troupe
TTBR	Time to be Ready	HLMB	Heure limite de mise en batterie
UEO	Unit Emplaning Officer	OEU	Officier d'embarquement de l'unité
UG	Upgrade		Passez à
UMS	Unit Medical Station	PSU	Poste sanitaire de l'unité
VT (fuze)	Variable Time Fuze	fusée MV	Fusée à minuterie variable
WORM	Subtension Rule, i.e., Width (metres) Over Range (metres) equals Mils	WORM	Équation, c.-à-d. largeur (mètres) divisée par la portée (mètres) égale mils
WP	White Phosphorus	PB	Phosphore blanc