National Defence / Défense nationale

B-GL-385-007/PT-001

WEAPONS

GRENADES AND PYROTECHNICS
(ENGLISH)

(This publication is active on receipt)

WARNING

ALTHOUGH NOT CLASSIFIED, THIS PUBLICATION, OR ANY PART OF IT, MAY BE EXEMPT FROM DISCLOSURE TO THE PUBLIC UNDER THE ACCESS TO INFORMATION ACT. ALL ELEMENTS OF INFORMATION CONTAINED HEREIN MUST BE CLOSELY SCRUTINIZED TO ASCERTAIN WHETHER OR NOT THE PUBLICATION OR ANY PART OF IT MAY BE RELEASED.

Issued on the Authority of the Chief of the Land Staff

Canada

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Issued on the Authority of the Chief of the Land Staff

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Canada

FOREWORD

1. B-GL-385-007/PT-001, *Weapons, Volume 7, Grenades and Pyrotechnics*, is issued on authority of the Chief of the Land Staff (CLS).

2. This publication is effective on receipt.

3. Unless otherwise indicated, the masculine pronouns used in this publication designate both genders.

4. Suggestions for changes to this publication shall be forwarded through normal channels to the Infantry School, Attention Chief, Standards.

5. This publication is available electronically on both the Defence Information Network (DIN) and the World Wide Web in the Army Electronic Library. Keyword—Army Electronic Library.

SAFETY AND WEAPONS

Safety involving small arms and ammunition is your responsibility. Make sure that they are in a safe place and protected in accordance with existing orders and instructions.

WARNING
MISUSE OF WEAPONS, AMMUNITION AND EXPLOSIVES

PURPOSE

1. This order outlines Canadian Forces (CF) Policy governing the use or misuse of weapons, ammunition and explosives.

WEAPONS

2. Firing or attempting to fire locally manufactured weapons, obsolete service or foreign weapons, or weapons used for display, ceremonial or trophy purposes in museums, messes, parade grounds, armouries or suchlike areas is prohibited except when specifically authorized by National Defence Headquarters (NDHQ).

3. Attention is also drawn to the following references which concern offences connected with the use or misuse of weapons:

a. *National Defence Act*, Section 117;

b. *Criminal Code of Canada*, Sections 82 to 106; and

c. *QR&O* 103.59.

AMMUNITION AND EXPLOSIVES

4. Tampering with or use of service and commercial operation explosives for other than their designated purpose is prohibited.

5. Except as prescribed in para 6, the modification, breakdown or sectioning of live ammunition for experimental, instructional or any other purchase, or manufacture of explosives is forbidden. This prohibition includes:

a. Unauthorized interchange of fuzes or primers or both.

b. Experiments with blank ammunition to alter the powder charge or to introduce any other substance into the cartridge case or into the weapon with the approved cartridge.

c. Experiments involving the use of altered propelling charges or bursting charges with ammunition of any type.

d. The use of any non-service or obsolete ammunition.

e. The use of foreign ammunition other than that received through normal supply channels or supplied in accordance with NATO Standardization Agreements.

f. The manufacture and use of locally fabricated explosive training devices, battle simulators, saluting charges, etc.

g. Any alteration to the design of ammunition or explosive devices.

h. Rendering live ammunition inert for use as museum or instructional items.

i. Any departure from authorized drills in the use of ammunition or explosive devices.

6. The prohibition in para 5 does not apply to:

a. Authorized experiments, modifications, etc., carried out by experimental, research, proof or inspection establishments.

b. Authorized breakdown, modification, repairs, proof, testing, etc., carried out as normal functions of a Canadian Forces ammunition depot or base ammunition facility.

c. Personnel employed at Canadian Forces School of Aerospace and Ordnance Engineering (CFSAOE) as instructors or trainees under supervision, when breaking down is carried out as part of a course training standard and in accordance with an approved course training plan.

d. The use for its designed role of commercial pattern ammunition, which is obtained for local purchase as specified in CFP 137 or as authorized by NDHQ in accordance with *DAOD* 3004-0.

e. The use for its designed role of commercial pattern ammunition which is taken into service and catalogued.

f. Hand-loading small arms ammunition in accordance with *CFAO* 50-18.

g. Other cases, when specifically authorized by NDHQ.

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CHAPTER 1
INTRODUCTION

GENERAL

1. This publication is a reference manual covering instruction in the handling of grenades and pyrotechnics, and is intended for both classroom and field use. This publication does not deal with advanced techniques for the use of this equipment. The information contained in this publication is taken largely from Canadian Forces technical publications.

FORMAT

2. The information contained in Chapters 2 to 6 is presented in the form of lesson plans. You will find handling tests for the items of equipment taught in the chapter in the annex at the end of each. The publication is sub-divided as follows:

a. Chapter 1 contains general information on the use of this publication.

b. Chapter 2 contains lessons on the use and operation of hand-grenades.

c. Chapter 3 contains lessons on the use and operation of pyrotechnics.

d. Chapter 4 contains lessons on the use and operation of the trip flare.

e. Chapter 5 contains lessons on the use and operation of smoke pots.

f. Chapter 6 contains lessons on the use and operation of 38 mm smoke grenade launchers and the 38 mm emission type CS tear gas grenades.

g. Chapter 7 contains information on the conduct of grenade training on the range.

EXERCISE PERIODS

3. **General**. Training must be progressive, but it is important to avoid useless repetition. A soldier will acquire the skills and knowledge required in the course of basic lessons which are given

only once. He must then exercise properly in order to be able to carry out the necessary actions more quickly and instinctively.

4. Each exercise period consists of the following steps:

   a. **Review**. With explanations.

   b. **Evaluation of weak points**. Exercises or tests.

   c. **Improvement of weak points**. With exercises.

   d. **Progressive exercises**. Competitions.

5. The exercise periods are guides to help the soldiers in their training. The instructor must bear in mind that these periods are used to evaluate the soldiers' weak points.

6. Errors must immediately be pointed out to the soldiers and corrected, otherwise they will be repeated every time.

7. In the course of an exercise period, if it becomes apparent that the soldiers have not thoroughly assimilated a practical or theoretical point, the instructor must review this portion of the lesson.

8. The exercise periods can be repeated depending on the students' progress. Instructors must remember that theoretical training and dry run exercises generate boredom; everything must be done so that the students can move on to live firing as soon as possible.

9. **Competition**. Competition always makes the exercises more interesting. If the instructor wishes, an entire exercise period can be devoted to competitions. Here are a few suggestions and clarifications:

   a. Competitions can be either individual or on a team basis.

   b. If competitions are between teams, the instructor must ensure that the teams are of relatively equal strength; the more advanced members of each team should help those who are having greater difficulty.

   c. The winners can be those who score the highest number of points, or those who lose the fewest points.

   d. A blackboard or a piece of paper must always be available to write down the results.

e. The interest value can be increased by having one trainee observe another or the members of one team observe the members of another team to assign or dock points.

f. The most important thing is that the instructor ensure that the competitions involve simple, realistic activities, ie., that they give the soldiers an opportunity to acquire knowledge and skills related to their training.

10. **Master and student**. The simplest exercise method involves two people: the student and the master. The master supervises the students' work, while the instructor supervises them both.

11. Interest, enthusiasm and concern for detail must be stimulated at all stages of training. This is very useful in the presence of large groups or during competitions. If used regularly, the “master-student” provides an opportunity for developing initiative and leadership, and it is possible to identify potential leaders by watching the “masters” at work.

CLASSROOM FORMALITIES

12. Prior to each lesson, a number must be assigned to each student or, where applicable, to each team of two students. Ideally, there should be no more than ten students per instructor. All the students, as well as the instructor, should have a weapon or the item being taught.

SAFETY MEASURES

13. Before and after each lesson, the weapons, bandoliers, ammunition, boxes, dummy cartridges and bags must be checked to ensure that they contain no live ammunition.

HANDLING TEST

14. **Introduction**:

a. The list of items covered by the handling test for the use of grenades and pyrotechnics will be found in the annexes to the chapters.

b. The handling test for a grenade or a pyrotechnic can be omitted if it is temporarily not available. However, the test will be resumed when it becomes available.

15. **Handling test**:

a. The handling tests measure the soldier's essential ability to handle grenades and pyrotechnics safely and efficiently.

b. Students must pass the relevant handling test to demonstrate that they are ready and able to progress to handling live grenades and pyrotechnics.

c. The purpose of the handling test is to ensure that the soldier can use grenades and pyrotechnics effectively in combat.

d. When a trainee fails any part of a handling test or is not sure of himself, he must receive additional instruction and pass the test before using grenades or pyrotechnics.

e. The handling test will be conducted without ammunition until the students have reached the desired level of skill and self-confidence.

f. The annual qualification consists of retaking the handling test by throwing at least two fragmentation grenades and one live smoke grenade in accordance with the appendices to the annexes. The other grenade handling tests can be conducted using the M69 dummy grenade if required.

g. All combat arms classification soldiers must pass the annual battle task standards qualification.

h. If necessary, the materials in hand will be used to construct appropriate targets.

16. **Standards**. Students will:

a. carry out all the exercises as they have been taught;

b. comply with the time limits for tests, if applicable;

c. pass all the tests marked with an asterisk (*).

17. **Special instructions**:

a. If a student hesitates too much during a handling test where there is no time limit, this indicates that he requires additional training before moving on to other tests or exercises.

b. Students who make a mistake must be told about it immediately.

c. Students who exceed the time limit because of another student's mistake must begin the test again.

d. For handling tests, the sequence of chapter appendices must be maintained. This sequence is intended to provide continuity and save time in the test process.

18. **Handling tests**:

HANDLING TESTS	
Grenade-hand, fragmentation, delay, C13	Chapter 2, Annex A
Grenade, hand, practice, delay M69	Chapter 2, Annex A
Grenade, hand, coloured smoke, C8 and No 4	Chapter 2, Annex A
Grenade, hand, smoke HC C1	Chapter 2, Annex A
Throwing the grenade	Chapter 2, Annex A
Throwing from a concealed position	Chapter 2, Annex A
Light signals, hand held, Comet 1260	Chapter 3, Annex A
Flare C1A1	Chapter 3, Annex A
Simulator, projectile, ground burst, C1A1	Chapter 3, Annex A
Signal illumination (firing device M207)	Chapter 3, Annex A
Flare, surface, trip M49A1 or C6	Chapter 4, Annex A
Smoke pots, ground type	Chapter 5, Annex A
Grenade launcher, smoke 38mm and grenade, CS tear gas, emission, 38 mm	Chapter 6, Annex A

CHAPTER 2
GRENADES

GENERAL

1. Grenades are items of explosive or chemical ammunition used for attacking enemy troops, vehicles or fortified positions at close range. They are usually hand thrown (hand-grenades) but sometimes may also be launched from rifles (rifle-grenades). Most varieties of hand-grenades are cheap and easy to manufacture and can be used effectively by troops with little training. Despite the trend of modern technology to develop ever more complicated weapons, the simple hand-grenade remains a valuable infantry weapon.

DESCRIPTION

2. Grenades are designed primarily to be thrown and therefore are small in size. The shape of the grenade varies with the type and purpose. For example, a fragmentation grenade is usually oval in shape in order that the shrapnel will cover a given area with equal density when the grenade explodes. Smoke and chemical grenades, however, are usually larger than fragmentation grenades, and cylindrical in shape. They can therefore contain a relatively large volume of smoke-producing chemical filler.

OPERATION

3. Most grenades are fitted with a safety lever and a safety pin. The pin holds the lever in the “safe” position. When the pin is pulled and the lever is released, the grenade becomes “armed”. Fragmentation grenades have a “delay” fuze which burns for a specific period of normally a few seconds before exploding a detonator. The explosion of the detonator sets off the main explosive charge, scattering shrapnel in the immediate area.

4. Smoke and chemical grenades are also equipped with “delay” fuzes which burn for a few seconds before exploding a detonator and starting the production of the smoke or chemical agent.

5. Most grenades are issued with the fuze and primer already in place; other grenades must be primed by the user.

TYPES OF GRENADES

6. The following grenades are currently in use in the Canadian Forces:

a. Grenade, Hand, Fragmentation, Delay, **C13**;

b. Grenade, Hand, Practice, Delay, **M69**;

c. Grenade, Hand, Coloured Smoke, **C8**;

d. Grenade, Hand, Coloured Smoke **N^{o} 4**;

e. Grenade, Hand, HC **HCC1A2**;

f. Grenade, Hand, Riot, CS **M518**;

g. Flare, **M49A1 or C6**; and

h. Cartridge CTG 38 mm spedhete CS or I.S.M.C.E. C8 (CS)

SAFE HANDLING OF GRENADES

7. **Instructors must be qualified and experienced in the type of grenade being taught. The instructor will personally verify all grenades (including live, inert, dummy and practice) before beginning the lesson or exercise**.

8. Grenades whose body or safety pin show signs of structural defects or damage, whose identification cannot be clearly established, or which are not appropriate to the lesson to be conducted, will be set aside and returned to the issuing authority unless destruction is warranted as prescribed in the detailed safety precautions contained in this publication.

9. All defects will be reported on form CF 410 in accordance with A-GG-040-006/AG-002, NATO stock number 7530-21-902-0842 (6180).

10. Grenades will **NEVER** be left unattended. All grenades (including dummy, inert and practice grenades) will be handled in the same manner as live grenades.

11. No modifications will be made by instructors, or anyone under their supervision, to live, dummy, inert or practice grenades.

12. The instructor/class ratio should **NEVER** be less than one instructor per platoon or equivalent sized sub-unit (approximately

30 personnel). Ideally, when live or practice grenades are in use, the ratio should be one instructor per section (10 personnel).

13. Inert, dummy and practice ammunition shall **NOT** be mixed with live ammunition in the same container or vehicles; nor will live ammunition be present during an instructional period where dummy, inert or practice ammunition is being used.

14. The list of all types of ammunition will be kept and checked before and after use. Every item will be accounted for by the person in charge before the class leaves.

15. All exhibits will be proved deliberately with an explanation at the outset of the period. Subsequently, the proving action shall be taken by each individual receiving the exhibit.

16. During instruction, all stores and exhibits will be treated as live, even when they are marked “dummy”, “inert”, or “practice”.

17. This publication covers the safety precautions specific to each type of grenade. Instructors and other users of this publication will also consult B-GL-381-001/TS-000 before conducting grenade training.

IDENTIFICATION OF HAND-GRENADES

18. To assist users in the identification of commonly used fragmentation and smoke hand-grenades, the colour coding table at Annex A gives details of markings in a convenient condensed form. The technical publication C-74-300-A01/NJ-000 is the reference for the identification of ammunition.

MODEL	TYPE OF GRENADE	COLOUR OF BODY	MARKINGS	BAND	REMARKS
C13	Fragmentation	Olive Green	Yellow	Nil	
M69	Practice	Blue	White	Brown	Similar to the C13 and is provided with a safety clip and pin.
C8	Smoke, coloured	Light Green	Black and the same colour as the smoke	None	The cap on the top is the same colour as the smoke.
HCC1A2	Smoke, high capacity	Light Green	Black	None	

MODEL	TYPE OF GRENADE	COLOUR OF BODY	MARKINGS	BAND	REMARKS
COLOURED No 4	Smoke, coloured	Light Green	Black	None	The cap on the top is the same colour as the smoke.
DUMMY	Dummy	Bronze	Black	None	There is a hole in the grenade and DUMMY is marked on the body.
CS M518 / M7A3	Riot CS	Grey	Red	Red	

Table 2-1: Identification of common used hand-grenades

LESSON 1
GRENADE, HAND, FRAGMENTATION, DELAY C13

NOTES FOR THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the C13 fragmentation grenade and to use it safely.

2. **Main teaching points**:
   a. description of the C13 grenade;
   b. characteristics of the C13 grenade;
   c. safety precautions;
   d. functioning;
   e. malfunctions; and
   f. packaging.

3. **Duration**. One x 40 minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:
   a. diagrams; and
   b. one dummy grenade per student.

6. **Preparation**:
   a. prepare the classroom;
   b. place one dummy grenade on the floor in front of each student; and
   c. check each dummy grenade.

WARNING

Do not introduce in class practice or demonstration items without having previously checked that they are safe. Teach the students how to recognize practice items.

7. **Miscellaneous**:

a. Explain the control system that will be used during the lesson.

b. When dealing with the items, the instructor will name each one and describe how it operates. At this stage, do not expect the students to have memorized all the names of the parts.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. inspect all dummy grenades; and

b. ensure that the students do not touch any of the dummy grenades before they have been given permission to do so.

9. **Review**. N/A

10. **Introduction**. *Explanation.* Explain that the C13 grenade is the regulation antipersonnel grenade. It is light in weight, but has lethality and dependability. It is used in close quarter fighting to clear enemy from slit trenches, dugouts, buildings and any position that cannot be neutralized by direct fire. The risk of casualties to one's own troops when the grenade is used, particularly in the open, must be taken into consideration.

DESCRIPTION OF THE C13 GRENADE (*Explanation*)

11. **General**:

a. the C13 grenade has a spherical shape (figure 2-1); and

b. the grenade consists of the following main components:

(1) body assembly;

(2) bursting charge;

(3) fuze M213;

(4) safety clip.

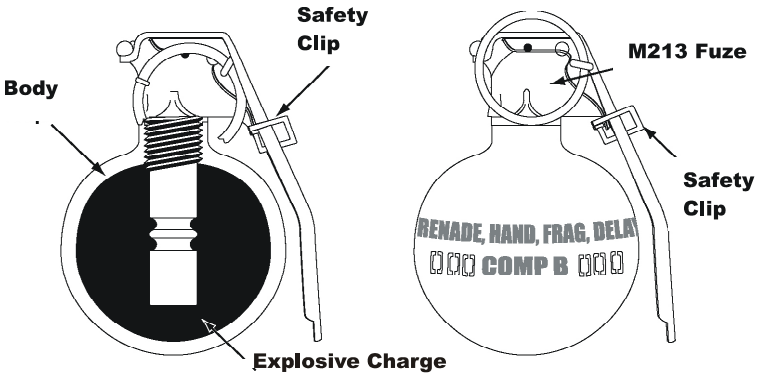

Figure 2-1: C13 Grenade

NOTE

The C13 grenade is equipped with a safety clip. The safety clip is a one-piece steel wire which is wrapped around the extension of the fuze body assembly, the lip of which fits on top of the fly-off lever. It holds the fly-off lever even when the safety pin has been removed. The safety clip prevents the grenade from firing accidentally if its ring is banged or accidentally pulled by branches.

12. **Markings on the grenade**. The C13 grenade is painted olive drab and has the following information stencilled in yellow on the exterior:

a. designation of the grenade;

b. filled lot number;

c. month and year of filling; and

d. type of filling.

13. **Markings on the M213 fuze**. The following information is stamped or stencilled on the top of the fuze:

a. designation of the fuze;

b. filled lot number; and

c. month and year of filling.

14. *Knowledge check using questions*.

CHARACTERISTICS OF THE C13 GRENADE (*Explanation*)

a. Weight: 395 grams (14 ounces).

b. Length: 8.96 cm (3.53 inches).

c. Diameter: 6.35 cm (2.50 inches).

d. Fuze: M213 (the grenade is issued primed from the manufacturer. No preparation is required).

e. Delay time: The C13 grenade has a 4 to 5 second fuze.

f. Method of delivery: the C13 grenade is hand thrown only.

g. Lethality: The C13 grenade has a lethal radius of up to 18 m (20 yards) from the point of burst.

h. Danger radius: up to 275 m from point of impact.

15. *Knowledge check using questions*.

WARNING

Never hang the grenades from equipment, straps or pockets by the safety pin pull ring, the fly-off lever or the safety pin. Use approved bandoliers or transport the grenades in the combat jacket pocket.

Throwing fragmentation grenades at night or in conditions of reduced visibility is prohibited.

SAFETY PRECAUTIONS

16. *Explanation, demonstration, imitation.* Every C13 grenade that is issued to a candidate will be stored in its own container, primed and ready for delivery (figure 2-2). The following safety precautions will be taken:

a. Remove the cover from the container. **Do not take the grenade out of its container**.

b. Examine the top of the grenade to ensure that the safety pin and the cartridge safety clip are in place.

c. If the safety pin or the cartridge safety clip are loose or missing, or if the grenade is reversed in the container, **do not** remove the grenade from the container.

d. Remove the safety pin and cartridge safety clip only if the grenade is to be thrown.

e. If the safety pin and the safety clip are properly in place, the grenade can be removed from the container.

f. Check whether the body of the grenade is cracked.

g. Check whether the fly-off lever is broken or if the safety pin, the cartridge safety clip or the ring are damaged.

h. Damaged grenades will be treated as misfires. They must be placed in the area designated for destruction.

17. *Knowledge check using questions and practice drills*.

OPERATION

18. **Explanation**. When the safety clip and the safety pin are removed, and the fly-off lever is released, the striker spring causes the striker to put on its axis and strike the fuze. The spark produced by the fuze lights the delay element, which burns for 4 to 5 seconds before firing the detonator. The detonator instantly activates the grenade's bursting charge. The explosion shatters the steel body of the grenade into multiple fragments of uniform size and weight, and propels them up to a distance of 200 m.

MISFIRE PROCEDURES

19. **Explanation**. All misfires will be treated in accordance with Canadian Forces Technical Order (CFTO) C-09-008-002/FP-000, *Disposal of Misfires and Unexploded Ordnance*.

20. *Knowledge check using questions*.

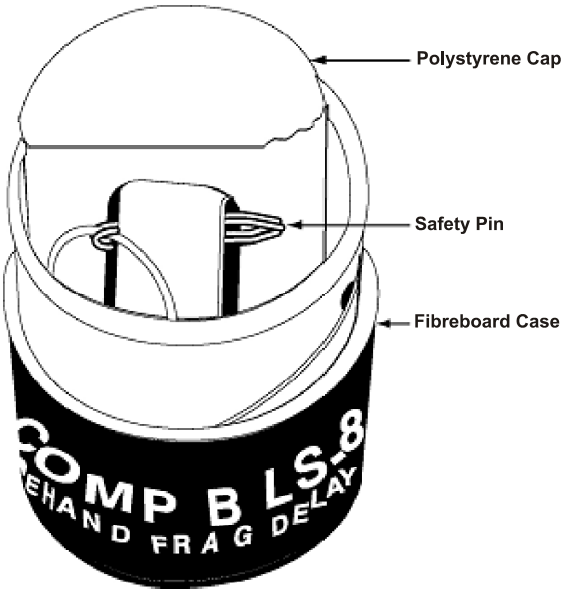

Figure 2-2: Fibreboard case of the C13 grenade

PACKAGING

21. **Explanation**. The C13 grenade is issued in a box containing 30 grenades. Each grenade is stored in a fibreboard case (figure 2-2).

22. *Knowledge check using questions*.

23. **Conclusion**:

    a. question period;

    b. knowledge check using questions and practice drills;

    c. carry out safety precautions;

    d. pack the equipment; and

    e. **review**:

        (1) it is essential to recognize the fragmentation grenade with certainty; and

        (2) the safety precautions must always be carried out as taught.

LESSON 2
GRENADE, HAND, PRACTICE, DELAY M69

NOTES FOR THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the M69 practice grenade and to use it safely.

2. **Main teaching points**:

   a. description of the M69 grenade;

   b. characteristics of the M69 grenade;

   c. safety precautions;

   d. assembly;

   e. operation;

   f. reloading; and

   a. malfunctions.

3. **Duration**. One x 40 minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. diagrams;

   b. one M69 practice grenade per student; and

   c. two M228 fuzes per student.

6. **Preparation**:

   a. prepare an area outside suitable for throwing practice grenades (must have a safety radius of 20 m);

   b. place one M69 practice grenade on the ground in front of each student; and

   c. check each M69 grenade and M228 fuze.

WARNING

Do not introduce in class practice or demonstration items without having previously checked that they are safe. Teach the students how to recognize practice items.

7. **Miscellaneous**:

   a. Explain the control system that will be used during the lesson.

   b. When dealing with the items, the instructor will name each one and describe how it operates. At this stage, do not expect the students to have memorized all the names of the parts.

CONDUCT OF THE LESSON

8. **Preliminaries**:

   a. inspect all the M69 practice grenades;

   b. ensure that the students do not touch any of the practice grenades before they have been given permission to do so; and

   c. number off the student and explain that they will be working on their own during the practice drills.

9. **Review**. Characteristics of the grenade, hand, fragmentation, delay, C13.

10. **Introduction**. *Explanation.* The M69 delay practice hand grenade (figure 2-3) is a practice version of the C13 delay fragmentation hand grenade. It comprises a safe, economical mechanism which increases the realism of field training. Its purpose is to give students practice in delivering a grenade accurately and safely.

DESCRIPTION

11. **Explanation**. The M69 delay practice hand grenade is issued in its component parts (figure 2-3). It consists of the following two parts:

   a. **Body practice, hand grenade M69**. The body is spherical in shape and is made of steel. The body of

the grenade is empty. A hole in the base of the body evacuates the gases produced by the fuze detonator, and allows for the removal of any metal residue from the fuze assembly that remains in the body. The upper part is threaded to receive the M228 fuze.

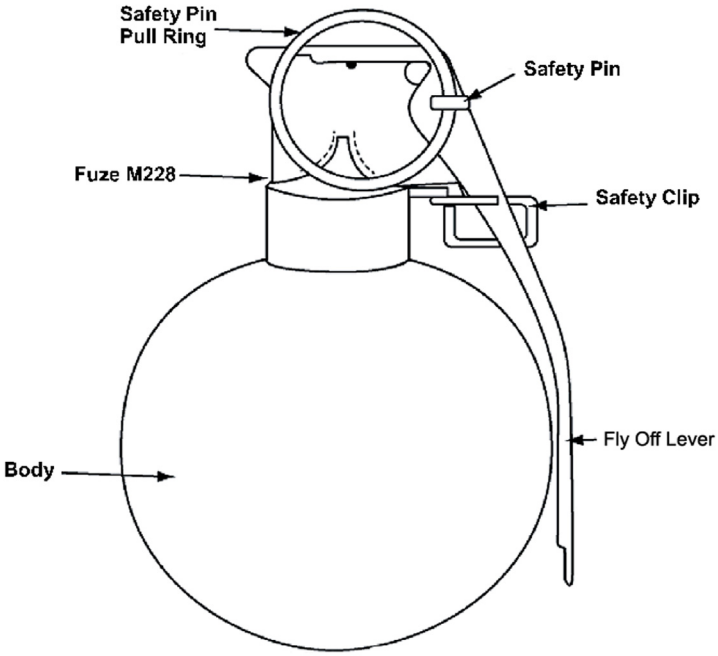

Figure 2-3: Delay practice hand grenade M69

b. **Fuze, hand grenade, practice, M228**. The main component parts of the fuze are as follows (figure 2-4) :

(1) body and striker assembly;

(2) fuze;

(3) delay element;

(4) detonator; and

(5) safety clip.

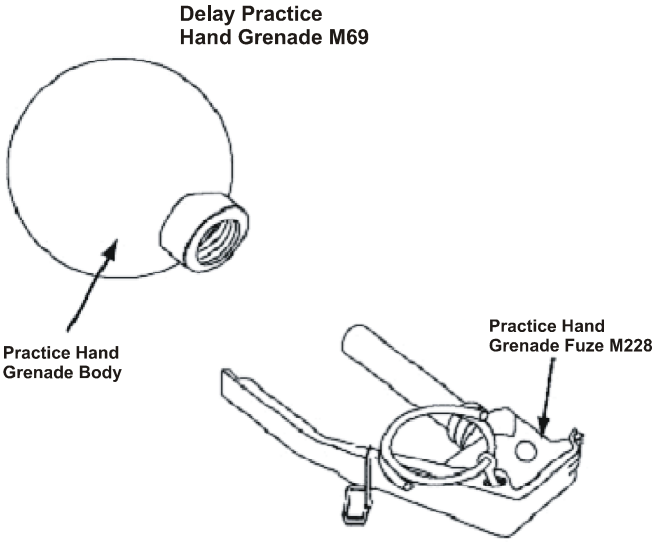

Figure 2-4: Component parts of grenade, hand, practice, delay M69.

12. **Markings**:

a. **Body**. The body of the grenade is painted blue, with a brown band around the body with the designation and NATO stock number stencilled in white.

b. **Fuze M228**. The top of the fuze is stamped with the following information:

(1) designation of the fuze;

(2) filled lot number; and

(3) month and year of filling.

NOTE

The safety lever of the M228 fuze is painted blue with the end painted red.

13. *Knowledge check using questions.*

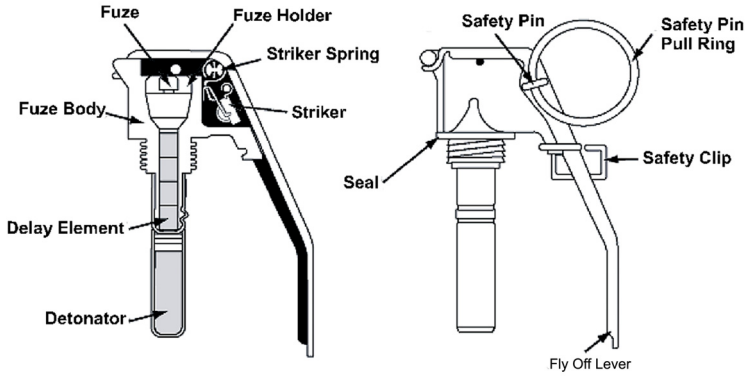

Figure 2-5: Fuze M228 for the M69 delay practice hand grenade

CHARACTERISTICS

14. **Explanation**. The M69 practice hand grenade with delay has the following characteristics:

a. Weight (fuzed): 397 grams (14 ounces).

b. Length: 9.14 cm (3.60 inches).

c. Diameter: 6.65 cm (2.62 inches).

d. Delay: 4 to 5 seconds.

e. Method of delivery: The M69 grenade may be thrown by hand only.

f. Lethality: the M69 grenade is used for instruction and training and has no lethal radius. It can, however, cause injury if not handled properly.

g. Safety radius: the safety radius is 20 m, in accordance with publication B-GL-381-001/TS 000.

15. *Knowledge check using questions.*

WARNING

Never hang the grenades from equipment, straps or pockets by the safety pin pull ring, the fly-off lever or the safety pin. Use approved bandoliers or transport the grenades in the combat jacket pocket.

SAFETY PRECAUTIONS *(Explanation, demonstration, imitation)*

16. Ensure that only M228 fuzes are used.

17. When assembling the M228 fuze on the body of the M69 practice grenade, never point the hole at the base of the body towards personnel.

18. When assembling the M228 fuze on the body of the M69 practice grenade, never cover the hole at the base of the body with the hand.

19. The following situations must be corrected prior to using the M69 practice grenade, failing which the defective practice grenade must be disposed of:

a. the surface of the grenade must not be cracked;

b. there must be no foreign material in the practice grenade;

c. there must be no foreign material in the threads at the opening of the M228 fuze; and

d. there must be no obstruction of the ventilation hole at the base of the practice grenade.

20. *Knowledge check using questions and practice drills*.

ASSEMBLY *(Explanation, demonstration, imitation)*

a. carry out the safety precautions; and

b. screw the M228 fuze onto the upper portion of the body of the practice grenade until it sits firmly on the neck of the grenade.

21. *Knowledge check using questions and practice drills*.

OPERATION. *Explanation.*

22. When the safety clip and the safety pin are removed and the fly-off lever is released, the striker spring causes the striker to pivot on its axis and strike the percussion primer.

23. The flash from the primer ignites the delay element. The delay element burns for 4 to 5 seconds and ignites the black powder in the igniter assembly which burns emitting a puff of smoke, and making a sharp report.

24. *Knowledge check using questions.*

RELOADING THE M69 PRACTICE GRENADE

25. *Explanation, demonstration, imitation.* The following procedure shall be followed for reloading an expended grenade:

a. Recover the expended grenade and allow five minutes for grenade to cool.

b. Unscrew the fired fuze M228.

c. Remove all foreign material from the inside and outside of the grenade body.

d. Inspect the grenade body for damage. Discard damaged bodies and dispose of in accordance with the disposal instructions set out at Chap 15-1, Annex A of Canadian Forces Publication (CFP) 181.

e. Reassemble the practice grenade using the method already taught.

MISFIRE PROCEDURES

26. **Explanation**. All misfires will be treated in accordance with Canadian Forces Technical Order (CFTO) C-09-008-002/FP-000, *Disposal of Misfires and Unexploded Ordnance*.

27. *Knowledge check using questions and practice drills*.

28. **Conclusion**:

a. question period;

b. knowledge check using questions and practice drills;

c. carry out the safety precautions;

d. pack the equipment; and

e. **review**:

(1) always obey the safety rules you have been taught; and

(2) always use the reload method you have been taught.

LESSON 3
GRENADE, HAND, COLOURED SMOKE, C8 AND SERIES 4

NOTES FOR THE INSTRUCTOR

1. **Purpose**. The purpose of this lesson is to teach students how to recognize and safely use C8 and No 4 series coloured smoke hand grenades.

2. **Main teaching points**:

   a. description and identification of the C8 and No 4 series coloured smoke hand grenade;

   b. characteristics of the C8 and No 4 series coloured smoke hand grenade;

   c. safety precautions;

   d. operation;

   e. firing instructions;

   f. malfunctions; and

   g. packaging.

3. **Duration**. One x 40 minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. diagrams;

   b. one C8 or No 4 series coloured smoke hand grenade per student.

6. **Preparation**:

   a. conduct a thorough reconnaissance of the area to be used outside;

   b. place one C8 or No 4 series coloured smoke hand grenade on the ground in front of each student; and

   c. check each C8 and No 4 series coloured smoke hand grenade.

7. **Miscellaneous**:

a. during the lesson, make the necessary corrections on the way to hold and handle the C8 and No 4 series coloured smoke hand grenade; and

b. emphasize the safety precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. inspect all C8 or No 4 series coloured smoke hand grenades;

b. ensure that the students do not touch any C8 or No 4 series coloured smoke hand grenades before they have been given permission to do so; and

c. number off the students and explain that they will be working on their own during the practice drills.

9. **Review**. N/A.

10. **Introduction**. *Explanation*. C8 and No 4 series coloured smoke hand grenades are delivered by hand and are used to indicate the direction of the wind or the position of a target. They are also used for signalling purposes by troops in the field.

DESCRIPTION

11. **Explanation**. C8 and No 4 series coloured smoke hand grenades are an aluminium tube filled with a chemical smoke compound. They are equipped with a cloth impregnated with chemical lighting compound. A firing mechanism is mounted in the open end. The chemical smoke composition varies depending on the colour of the smoke to be produced (figures 2-6 and 2-7).

12. **Identification**. C8 and No 4 series coloured smoke hand grenades are identified as follows:

a. the body is pale green;

b. the colour of the cover corresponds to that of the smoke (yellow, red, green or violet for the C8 and No 4/051 red, No 4/052 yellow, No 4/053 green, or No 4/054 blue for the No 4 series);

c. the adhesive tape is the same colour as the smoke for the C8; and

d. the following information is stamped in black on the container:

(1) Department of National Defence (DND) ammunition identification code;

(2) designation of the grenade;

(3) colour of the smoke;

(4) lot no; and

(5) for the No 4 series, the burning time, the NATO stock number, date of manufacture and the manufacturer.

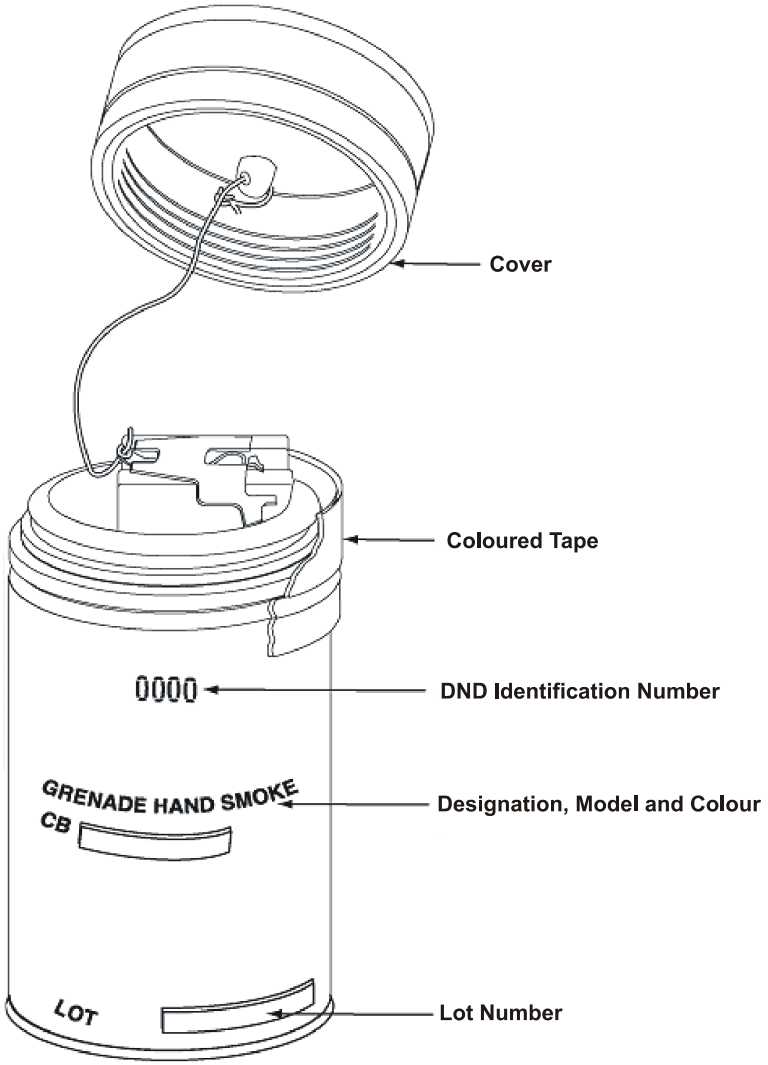

Figure 2-6: C8 coloured smoke hand grenade

Figure 2-7: Series No 4 coloured smoke hand grenade

13. *Knowledge check using questions*.

CHARACTERISTICS

14. **Explanation**. The C8 and No 4 series coloured smoke hand grenades have the following characteristics:

	Grenade, Hand, Smoke, Coloured, C8	**Grenade, Hand, Smoke, Coloured, No 4 series**
Weight	300 g	234 g
Delay	2 to 6 seconds	3 seconds
Duration of emission	40 seconds	45 seconds
Delivery	Hand	Hand

NOTE

In clear weather, in daytime, the smoke can be seen from a helicopter flying at a height of 3,000 m (provided the colour of the smoke contrasts with the surroundings)

15. *Knowledge check using questions*.

WARNING

Do not use smoke grenades in confined spaces, in depressions, trenches or in thick fog. Use a gas mask when smoke clouds are present or approaching.

Do not use smoke grenades or smoke pots near electronic circuit boards or delicate parts, as the residue produced could have a detrimental impact on their operation.

SAFETY PRECAUTIONS *(Explanation, demonstration, imitation)*

a. The C8 and No 4 series coloured smoke hand grenades are issued primed. Ensure that the cap remains screwed in place.

b. They constitute a health hazard if used in an enclosed space, as the smoke they produce makes breathing difficult.

c. Avoid prolonged inhalation of the smoke, as it is slightly toxic.

d. When lit, C8 and No 4 series coloured smoke hand grenades become very hot and can cause serious burns.

16. *Knowledge check using questions and practice drills*.

OPERATION

17. **Explanation**. When the cap is unscrewed and the cord is pulled firmly, it activates the trigger and the striker strikes the primer cap. The primer ignites and after 2 to 6 seconds, the primer charge ignites the cloth impregnated with a chemical compound, which in turn ignites the smoke compound. Smoke is emitted from the opening in the firing mechanism for approximately 40 seconds (figures 2-8 and 2-9).

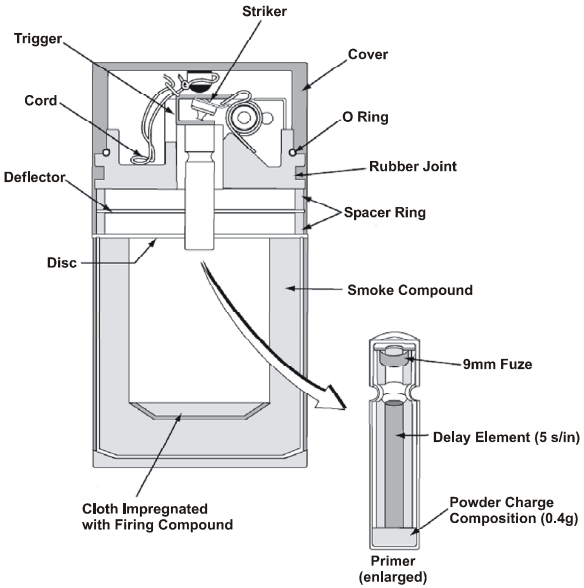

Figure 2-8: Cross section of Coloured Smoke Hand Grenade C8

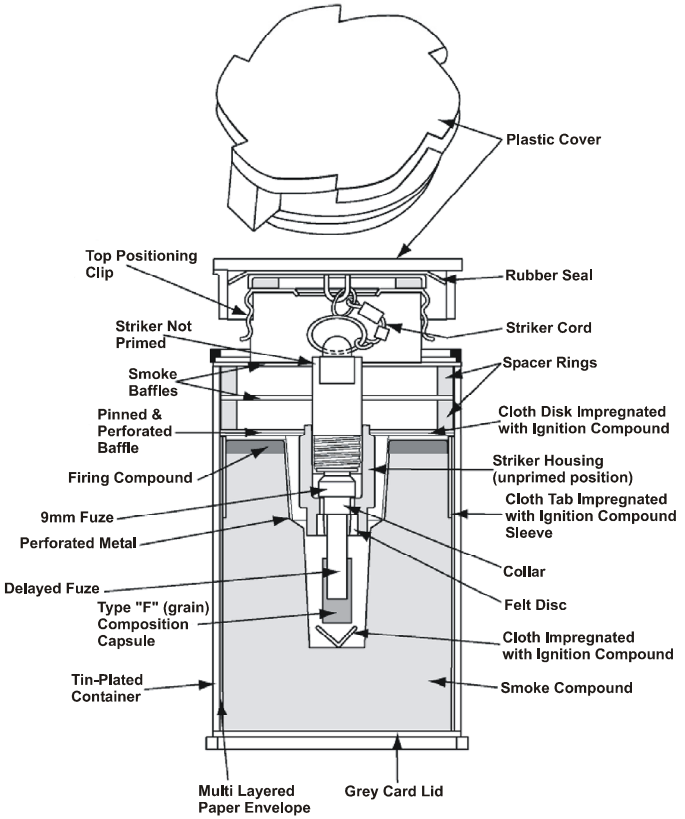

Figure 2-9: Cross Section of Series No 4 Coloured Smoke Hand Grenade

FIRING INSTRUCTIONS

18. *Explanation, demonstration, imitation*. Proceed as follows to hand deliver the C8 and No 4 series coloured smoke hand grenades:

a. check the colour of the grenade;

b. hold the grenade firmly in the hand;

c. unscrew the cover and pull out the chord;

d. pull firmly on the cover to extract the striker; and

e. throw the grenade immediately.

19. *Knowledge check using questions and practice drills*.

MISFIRE PROCEDURES

20. **Explanation**. C8 and No 4 series coloured smoke hand grenades which do not work will be destroyed in accordance with publication C-009-008-002/FP-000.

PACKAGING. ***EXPLANATION.***

21. **Packaging of the C8 series coloured smoke hand grenades**:

a. Each C8 coloured smoke hand grenade is packed in its own container. Ten grenades in bags are packed to a cardboard box with a cotton handle.

b. The DND ammunition identification code is stamped on each box, together with the number of grenades, the designation, the colour of the smoke and the lot number.

c. A strip of adhesive tape the same colour as the smoke is stuck onto the top of the box.

d. Four cardboard boxes are packed in a wire bound wooden box.

22. **Packaging of the No 4 series coloured smoke hand grenade**:

a. Each No 4 series coloured smoke hand grenade is packed individually in a plastic bag. Ten grenades in bags are packed to a cardboard box. Two cardboard boxes are packed in a larger waterproof cardboard box.

b. Two of these larger boxes are packed in a wire bound box.

23. *Knowledge check using questions*.

24. **Conclusion**:

a. question period;

b. knowledge check using questions and practice drills;

c. carry out safety precautions;

d. pack the equipment;

e. **review**:

(1) never use C8 and No 4 series coloured smoke hand grenades in an enclosed space; and

(2) grenades when ignited become very hot.

LESSON 4
GRENADE, HAND, SMOKE, HC C1 SERIES

NOTES FOR THE INSTRUCTOR

1. **Purpose**. The purpose of this lesson is to teach the students how to recognize HC C1 series smoke grenades and use them safely.

2. **Main teaching points**:

   a. description and identification of the HC C1 series smoke grenade;

   b. characteristics of the HC C1 series smoke grenade;

   c. safety precautions;

   d. functioning;

   e. firing instructions;

   f. malfunctions; and

   g. packaging.

3. **Duration**. One x 40 minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. diagrams; and

   b. one HC C1 series smoke grenade per student.

6. **Preparation**:

   a. conduct a thorough reconnaissance of the area to be used outside;

   b. place one HC C1 series smoke grenade on the ground in front of each student;

   c. check each HC C1 series smoke grenade; and

   d. ensure that all students have a functioning gas mask in their possession.

7. **Miscellaneous**:

a. during the lesson, make the necessary corrections on the way to hold and handle the HC C1 series smoke grenade; and

b. stress the importance of carrying out the security precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. inspect all HC C1 series smok grenades;

b. ensure that the students do not touch any HC C1 series smoke grenades before they have been given permission to do so; and

c. number off the students and explain that they will be working on their own during the practice drills.

9. **Review**. N/A.

10. **Introduction**. The grenade is used in combat to produce a smoke screen. It is delivered by hand and emits smoke for 60 seconds.

DESCRIPTION (*Explanation)*

11. The HC C1 series smoke grenade has a tin-plated body with a slightly tapered base (figure 2-10).

12. Screwed into the top of the body is a No. C19 Fuze Assembly with a black tab, consisting of the following parts (figure 2-11):

a. A delay element.

b. A striker and spring.

c. A safety lever.

d. A safety pin.

e. On the top of the body between the mechanism holder and the lip of the grenade are four emission holes. The holes are sealed with pressure sensitive tape or coated with a primer paint.

13. **Identification**. The grenades are painted pale green and have the following information stencilled in black on the body:

a. type of grenade; and

b. lot number.

14. *Knowledge check using questions*.

CHARACTERISTICS

15. **Explanation**. HC C1 series smoke grenade has the following characteristics:

a. weight—0.45 kg;

b. height—137 mm;

c. diameter—61 mm;

d. time delay—emission starts in 2 to 5 seconds;

e. emission duration—60 seconds;

f. delivery—hand thrown; and

g. danger zone—none.

16. *Knowledge check using questions*.

WARNING

Personnel must don gas masks before using smoke and remain masked until the smoke has dissipated.

The smoke must not be directed towards a military or civilian establishment or towards trenches containing personnel who are not protected or unable to don masks.

Hexachlorethene smoke (HC) must not be used when there is a danger of obscuring public roads, railways, aircraft landing areas, etc.

Smoke must not be directed towards FIBUA sites, casemates or vehicles in which it cannot disperse easily.

Before using Hexachlorethene smoke, all personnel not involved in training will leave the area.

Personnel who are taking part in exercises where Hexachlorethene smoke will be present must, prior to the start of each exercise, receive a briefing on the health hazards and mandatory preventive safety precautions.

Hexachlorethene smoke grenades can set fire to dry grass and must therefore be used with caution.

Hexachlorethene smoke grenades must not be used within 25 m of highly inflammable substances.

Do not use smoke grenades near electronic circuit boards or delicate parts, as the residue produced could have a detrimental impact on their operation.

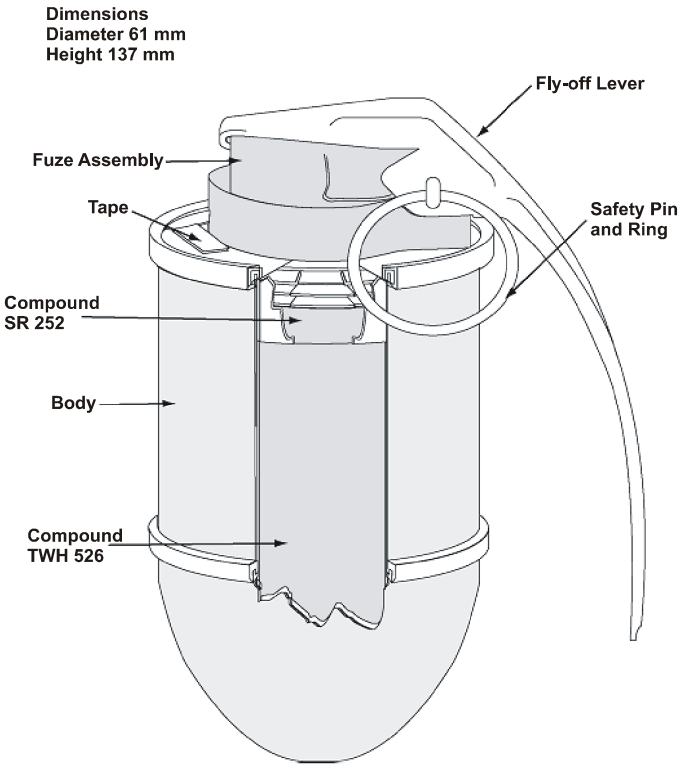

Figure 2-10: HC C1 series smoke grenade

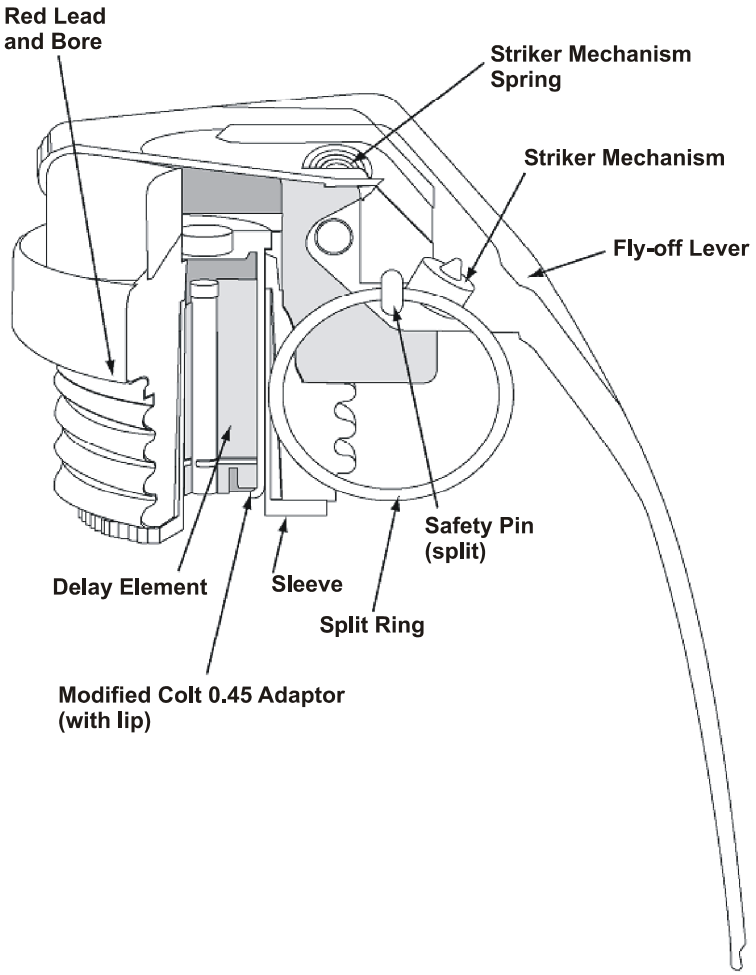

Figure 2-11: HC C1 series smoke grenade C19 fuze

SAFETY PRECAUTIONS *(Explanation, demonstration, imitation)*

17. The HC C1 series smoke grenade is issued primed. Ensure that the safety pin is securely in place.

18. When emitting smoke, the grenade becomes very hot and can cause severe burns.

19. Gas masks must be worn when using the HC C1 series smoke grenade.

20. *Knowledge check using questions and practice drills*.

OPERATION (*Explanation*)

21. The HC C1 series smoke grenade is issued with the striker and spring in the "primed position". They are held in place by the safety lever, which is clipped to the front and held against the body of the grenade by the safety pin.

22. When the safety pin is removed and the safety lever is released, the primer spring causes the primer to rotate on its axis and strike the fuze. Simultaneously, the spring projects the fly-off lever far from the grenade.

23. The fuze fires the delay element, which burns for approximately five seconds before firing the charge. A thick grey smoke is emitted through the four openings in the top of the grenade.

FIRING INSTRUCTIONS

24. *Explanation, demonstration, imitation*. Proceed as follows to hand deliver the HC C1 series smoke grenade:

a. ensure that the safety precautions are applied;

b. hold the grenade firmly, placing the safety lever in the palm of the hand, between the thumb and forefinger;

c. pull firmly on the safety pin; and

d. immediately throw the HC C1 series smoke grenade.

25. *Knowledge check using questions and practice drills*.

MISFIRE PROCEDURES

26. **Explanation**. HC C1 series smoke grenades which do not work will be destroyed in accordance with publication C-009-008-002/FP-000.

PACKAGING

27. **Explanation**. Every HC C1 series smoke grenade is packed in an individual metal container. These containers are placed twenty-five (25) to a wire-bound wooden box on which the type and number of the grenade are stencilled (figure 2-12).

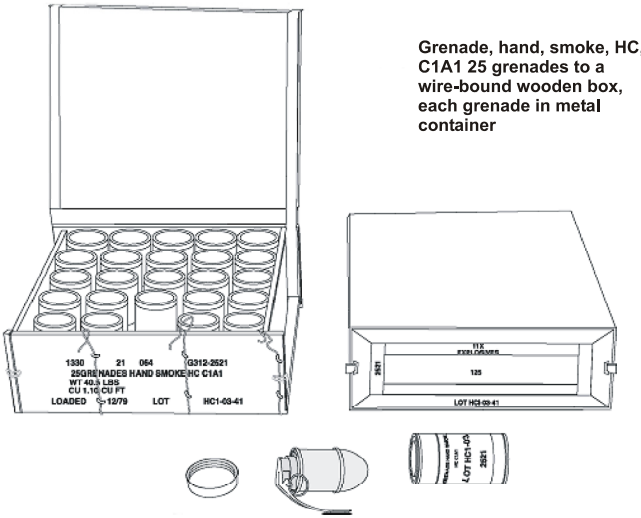

Figure 2-12: Packaging for the grenade, hand, smoke, HC, C1 series

28. *Knowledge check using questions*.

29. **Conclusion**:

a. question period;

b. knowledge check using questions and practice drills;

c. carry out safety precautions;

d. pack the equipment; and

e. **review**:

(1) the HC C1 series smoke grenade must never be used in an enclosed space or without wearing a gas mask; and

(2) grenades when ignited become very hot.

LESSON 5
GRENADE THROWING TECHNIQUES

NOTES FOR THE INSTRUCTOR

1. **Purpose**. The purpose of this lesson is to teach students how to throw fragmentation grenades safely in a variety of positions.

2. **Main teaching points**:

   a. ready position;

   b. preparing to throw;

   c. throwing;

   d. standing position;

   e. kneeling position;

   f. modified kneeling position;

   g. prone position; and

   h. lobbing the grenade.

3. **Duration**. Two x 40 minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. area with obstacles appropriate to this lesson; and

   b. one dummy hand-grenade per student.

6. **Preparation**:

   a. conduct a thorough reconnaissance of the area to be used outside;

   b. place one dummy hand-grenade on the ground in front of each student; and

   c. check each dummy hand-grenade.

WARNING

Do not introduce practice or demonstration items in class without checking in advance that they are safe. Teach the students how to recognize dummy items.

CONDUCT OF THE LESSON

7. **Preliminaries**:

   a. inspect all dummy hand-grenades;

   b. ensure that the students do not touch any dummy hand-grenade before they have been given permission to do so; and

   c. number off the students and explain that they will be working on their own during the practical drills.

8. **Review**. N/A

9. **Introduction**:

   a. Grenades can be lobbed underhand or thrown overhand. Students may choose whichever method they prefer, as long as accuracy is achieved. The instructor should not change the student's style of throwing.

   b. Smoke grenades may be rolled or dropped if necessary due to the fact that the thrower does not need to be protected from the explosion, as is the case with fragmentation grenades.

   c. In order to land a grenade accurately behind cover protecting an enemy, it must be thrown at a steep angle.

   d. The methods taught in this lesson will enable students to throw a grenade achieving maximum distance and height, especially with grenades weighing 0.45 kg and over.

WARNING

Never hang the grenades from equipment, straps or pockets by the safety pin pull ring, the fly-off lever or the safety pin. Use approved bandoliers or transport the grenades in the combat jacket pocket.

READY POSITION *(Explanation, demonstration, imitation)*

10. A right handed thrower will hold the grenade in his right hand in an overhand grip (figure 2-13). The safety lever is retained in the palm of the hand between the thumb and forefinger.

11. With the thumb and forefinger of the left hand, he grasps the protruding part of the safety clip. He will rotate to the left so that his shoulders point towards the target.

12. A left-handed thrower will hold the grenade in his left hand in an overhand grip. The safety lever is retained in the palm of the hand between the thumb and forefinger.

13. With the thumb and forefinger of the right hand, he grasps the protruding part of the safety clip. He will rotate to the right so that his shoulders point towards the target.

14. *Knowledge check using questions and practical drills.*

Figure 2-13: Ready position

PREPARATION FOR THROWING *(Explanation, demonstration, imitation)*

15. On the command **IN POSITION**, the thrower will first pull the safety clip on the safety lever, then rotate the safety clip as far as possible counterclockwise.

16. When the safety clip is raised, the thrower will slip the forefinger or middle finger of his free hand into the safety pin ring.

17. *Knowledge check using questions and practical drills*.

THROWING *(Explanation, demonstration, imitation)*

18. On the command THROW, the thrower will hold the safety pin ring firmly at belt height, pull the hand holding the grenade down and backwards, thereby releasing the grenade from the safety pin.

19. The thrower will look at the grenade to ensure that the safety pin has been removed and that the safety lever is still in place (figure 2-14).

20. He will then look at the target and check that his shoulder is pointing towards it. He will then stretch his free arm towards the target.

21. He will then swing his body back as far as possible, allowing the left arm and left foot if necessary to come up naturally

(figure 2-15). Then, without pause, the body and the straight right arm holding the grenade are swung quickly forward in an arc and the grenade is released as the hand reaches its highest point above the shoulder (figure 2-16).

22. The fall of the grenade should be watched. The sequence described above should be performed in a single movement.

23. Avoid releasing the grenade before or after the hand reaches, or after it has passed, the highest point above the shoulder, otherwise there is a loss of distance.

24. The grenade will fall wide of the target if the shoulder is not kept in line with the target.

Figure 2-14: The thrower checks that the pin has been removed and the lever is in place

25. *Knowledge check using questions and practical drills*.

STANDING POSITION *(Explanation, demonstration, imitation)*

26. The thrower will use the standing position when he is in a trench or behind high cover.

27. The thrower will adopt the throwing position and, making maximum use of the cover available, throw the grenade and shelter behind the cover. If possible, he will watch where the grenade falls.

28. *Knowledge check using questions and practical drills*.

Figure 2-15: Throwing (movement 1)

Figure 2-16: Throwing (movement 2)

KNEELING POSITION *(Explanation, demonstration, imitation)*

29. The kneeling position is used when the thrower is behind cover of medium height such as an embankment, ditch, low wall, etc.

30. The thrower kneels on his left knee, bends his right leg and keeps the right foot flat on the ground at a right angle to his body. A

right handed thrower will ensure that his left shoulder is pointing towards the target.

31. The thrower then swings his body quickly backwards, throws the grenade and immediately lies down behind the cover (figure 2-17).

32. If possible, he will watch where the grenade falls. When the cover is too low, he may adopt the modified kneeling position.

Figure 2-17: Kneeling position

MODIFIED KNEELING POSITION *(Explanation, demonstration, imitation)*

33. In this position, the right handed thrower kneels on his left knee but extends his right leg straight out behind him. To adopt an even lower position, the thrower can bend forward.

34. A right handed thrower must ensure that his left shoulder is pointing in the direction of the enemy. He then swings his body quickly backwards, throws the grenade, and immediately lies down behind his cover (figure 2-18). If possible, he will watch where the grenade falls.

Figure 2-18: Modified kneeling position

35. *Knowledge check using questions and practical drills*.

Figure 2-19: Prone position

PRONE POSITION *(Explanation, demonstration, imitation)*

36. When there is virtually no cover, the thrower will adopt the prone position (figure 2-19).

37. For the right handed thrower, the left shoulder is pointed in the direction of the enemy. The body should be swung quickly backwards, and after the grenade is released, the thrower must take extra care to ensure his whole body is behind cover. If possible, he will watch where the grenade falls.

38. *Knowledge check using questions and practical drills*.

LOBBING THE GRENADE (*Explanation, demonstration, imitation)*

39. When fighting in close country or in a built-up area, it may be necessary to "plant" or lob a grenade through a window or doorway or into a clump of bushes.

40. It is not possible to lay down hard and fast rules for these situations, but certain points to note are as follows:

a. it may be practical to remove the safety pin before moving to the position from which the grenade is to be delivered;

NOTE

The safety pin should never be removed before moving on exercise or during training with live grenades.

b. it is important to select cover before delivering the grenade; and

c. the thrower must deliver the grenade in the manner most likely to ensure accuracy.

41. *Knowledge check using questions and practical drills*.

42. **Conclusion**:

a. question period;

b. knowledge check using questions and practical drills;

c. carry out safety precautions;

d. pack the equipment; and

e. **review**:

(1) always obey the safety rules you have been taught when handling grenades; and

(2) always adopt the correct throwing position.

ANNEX A
GRENADE, HAND, FRAGMENTATION, DELAY C13

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **EXECUTE SAFETY PRECAUTIONS**		
1	Remove the cover from the container. Do not remove the grenade from the container.		
2	Inspect the top of the grenade to ensure that the safety pin and the cartridge safety clip are in place.	(*)	
3	If the safety pin or the cartridge safety clip are loose or missing, or if the grenade is reversed in the container, do not remove the grenade from the container.		
4	Only remove the safety pin and cartridge safety clip if the grenade is to be thrown.		
5	If the safety pin and the safety clip are properly in place, the grenade can be removed from the container.		
6	Check whether the body of the grenade is cracked.		
7	Check whether the fly-off lever is broken or if the safety pin, the cartridge safety clip or the ring are damaged.		
8	Damaged grenades will be treated as duds. They must be placed in the area designated for destruction.		

ANNEX B
GRENADE, HAND, PRACTICE, DELAY M69

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **LOAD THE GRENADE, HAND, PRACTICE, DELAY M69**		
1	Execute safety precautions as taught for the grenade, hand, practice, delay M69. (Reference: Chapter 2, Lesson 2)	(*)	
2	Screw the fuze M228 on the upper part of the grenade body until it rests firmly against its neck.		
3	Ensure that the safety pin is properly fixed onto the practice grenade and around the safety lever.		

ANNEX C
GRENADE, HAND, COLOURED SMOKE C8 AND NO 4

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS WITH THE GRENADE, HAND, COLOURED SMOKE C8 AND NO 4**		
1	Check that the cap is in place.	**(*)**	
2	Do not use smoke grenades in a confined space, as the smoke makes breathing difficult.		
3	Avoid breathing the smoke for long periods as it is slightly toxic.		
4	When ignited, the grenade becomes very hot and can cause serious burns.		
B	**COMMAND** **THROW THE SMOKE GRENADE**		
1	Check the colour of the grenade.		
2	Hold the grenade firmly in the hand.		
3	Unscrew the cover and pull the cord.		
4	Pull firmly on the cover to activate the trigger.		
5	Throw the grenade immediately.		

ANNEX D
GRENADE, HAND, SMOKE HC C1

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS FOR THE GRENADE, HAND, SMOKE HC C1**		
1	Ensure that the safety pin is in place.	**(*)**	
2	When ignited, the grenade becomes very hot and can cause serious burns.		
3	Wearing a gas mask is mandatory when using this grenade.		
B	**COMMAND** **THROW THE SMOKE GRENADE**		
1	Check that the safety precautions have been taken.		
2	Hold the grenade firmly in the hand, placing the fly-off lever in the palm, between thumb and forefinger.		
3	Pull firmly on the safety pin.		
4	Throw the grenade immediately.		

ANNEX E
THROWING THE GRENADE

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **ADOPT THE READY POSITION**		
1	Hold the grenade in the right hand in an overhand grip.		
2	Retain the safety lever in the palm of the hand between the thumb and forefinger.		
3	Grab the extended portion of the safety clip with the thumb and forefinger of the left hand.		
4	Hold the grenade against the body at belt height.		
5	Turn the body so that the left shoulder and foot are pointing toward the target.		
	NOTE Left handed throwers may keep their position. All movements are the same, but change left for right and right for left.		
B	**COMMAND** **ADOPT THE THROWING POSITION**		
1	Twist and withdraw the safety pin. When the rotation is complete, pass the forefinger		

Check	Skill to be performed	Pass Fail	Remarks
	or middle finger of the left hand into the safety pin ring.		
2	Again, check visually that the safety clip has been removed from the grenade.		
3	Observe the target and ensure that the left shoulder is still pointing towards it.		
	NOTE Left handed throwers may keep their position. All movements are the same, but change left for right and right for left.		
C	**COMMAND** **THROW**		
1	Hold the safety pin ring firmly at belt height and pull the right hand downward and to the rear to disengage the grenade from the safety pin.		
2	Look at the grenade to check that the pin has been removed and that the fly-off lever is still in place.		
3	Look at the target, ensuring that the left shoulder is still pointing towards it.		
4	Extend the left arm towards the target.		
5	Lean the body as far as possible to the rear, raising		

Check	Skill to be performed	Pass Fail	Remarks
	the left arm naturally and, where necessary the left foot, without stopping.		
6	Project the body and the right arm straight forward and release the grenade when the hand reaches its highest point above the shoulder.		
7	Watch the grenade fall.		
	NOTE Left handed throwers may keep their position. All movements are the same, but change left for right and right for left.		

ANNEX F
THROWING FROM BEHIND COVER

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **ADOPT THE STANDING POSITION**		
1	Assume the ready position, using the cover as much as possible.		
2	Give the order ready and throw. The thrower will perform the movements described in lesson 5.		
3	Watch the grenade fall and then take cover.		
	Standard Throw a grenade into a circle six m in diameter while standing 20 m from the centre of the circle.		
B	**COMMAND** **ADOPT THE KNEELING POSITION**		
1	Kneel on the left knee, bend the right leg and keep the right foot flat on the ground.		
2	Give the order ready and throw. The thrower will perform the movements described in lesson 5.		
3	Watch the grenade fall and then take cover.		

Check	Skill to be performed	Pass Fail	Remarks
	NOTE Left handed throwers may keep their position. All movements are the same, but change left for right and right for left.		
	Standard Throw a grenade into a circle six m in diameter while standing 15 m from the centre of the circle.		
C	**COMMAND** **ADOPT THE MODIFIED KNEELING POSITION**		
1	Kneel on the left knee, with the right leg straight out to the rear.		
2	To adopt an even lower position, the thrower can bend forward.		
3	**NOTE** Left handed throwers may keep their position. All movements are the same, but change left for right and right for left.		
4	**Standard** Throw a grenade into a circle six m in diameter while standing 15 m from the centre of the circle.		

Check	Skill to be performed	Pass Fail	Remarks
D	**COMMAND** **LOB THE GRENADE**		
	It is not possible to lay down hard and fast rules, but certain points to note are as follows:		
1	It may be practical to remove the safety ring and pin before moving to the position from which the grenade is to be delivered. Do not do this with life grenades in peacetime or on an exercise.		
2	Select cover before delivering the grenade.		
3	Deliver the grenade in the manner most likely to ensure accuracy.		
	Standard Throw a grenade through an opening (window) from a distance of seven m.		

CHAPTER 3
PYROTECHNICS

GENERAL

1. Pyrotechnics are used in the Canadian Forces, both on operations and in training, to produce smoke, light the battlefield, signal and simulate the sounds of battle.

2. Pyrotechnics are similar to fireworks in terms of their design and functioning. Pyrotechnics, like fireworks, are not dangerous to handle or use, provided the prescribed safety precautions are followed. If handled negligently, they can cause serious injury or death, in addition to seriously damaging equipment.

SAFE HANDLING OF PYROTECHNICS

3. The principles and the safety precautions set out in Chapter 2, Section 1 apply to the handling of all pyrotechnics.

4. The following pyrotechnics are currently used by the Canadian Forces and are described in detail in this Chapter:

a. signal illumination, hand fired, Comet 1260;

b. flare C1A1;

c. simulator projectile, ground burst C1A1; and

d. signal illumination, ground (projector M207).

LESSON 1
SIGNAL ILLUMINATION, HAND FIRED, COMET 1260

NOTES TO THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the Comet 1260 illumination signals and use them safely.

2. **Main teaching points**:

   a. description of the signal illumination, hand fired, Comet 1260;

   b. characteristics of the signal illumination, hand fired, Comet 1260;

   c. safety precautions;

   d. functioning;

   e. launching instructions;

   f. malfunctions; and

   g. packaging.

3. **Duration**. One 40-minute period.

4. **Method**. Basic instruction period.

5. **Equipment**. One signal illumination, hand fired, Comet 1260 per student.

6. **Preparation**:

   a. make a thorough reconnaissance of the outdoor area to be used;

   b. place one signal illumination, hand fired, Comet 1260 in front of each student; and

   c. check each signal illumination, hand fired, Comet 1260.

7. **Miscellaneous**:

   a. during the lesson, be sure to make any corrections required to the way the signal illumination, hand fired, Comet 1260 is held and handled; and

b. stress the importance of conducting the safety precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. inspect all the signal illumination, hand fired, Comet 1260;

b. ensure that the students do not touch any of the signal illumination, hand fired, Comet 1260s before they have been given permission to do so; and

c. number off the students and explain that they will be working on their own during the practice drills.

9. **Review**. N/A

10. **Introduction**. The signal illumination, hand fired, Comet 1260 is a light terrain illumination device used at night by ground forces for training and operational purposes.

DESCRIPTION. *Explanation* (Figure 3-1).

11. The signal illumination, hand fired, Comet 1260 consists of a launching tube with an ignition system and a carrier.

12. The carrier of the signal illumination, hand fired, Comet 1260 consists of a fuze motor, a delay element and a flare tube. The carrier is used to carry the flare in the desired direction, after which the flare ignites and descends, braked by the parachute.

13. The flare produces a flare intensity of approximately 150,000 candle power for 30 seconds at a range of approximately 500 m when fired at an angle of 35 or 40 degrees elevation.

14. The launching tube of the signal illumination, hand fired, Comet 1260 is olive drab and the rotating cap is mid-brown. The inscriptions are white and include (figure 3-2) :

a. nomenclature;

b. filled lot number; and

c. operating instructions.

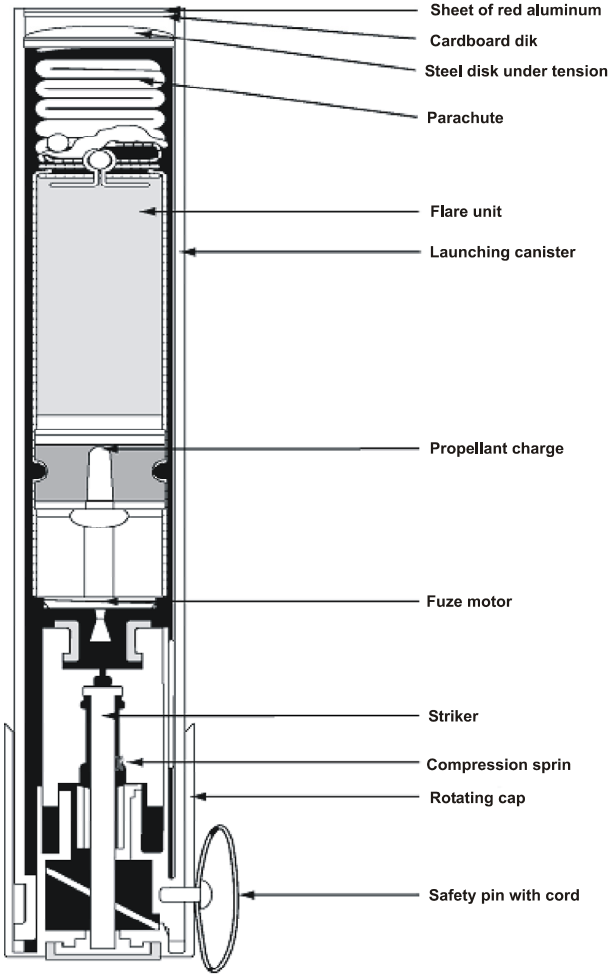

Figure 3-1: Description of the signal illumination, hand fired, Comet 1260

15. *Knowledge check with questions*.

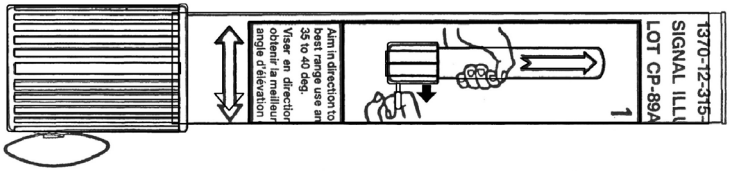

Figure 3-2: Operating instructions—Comet 1260

CHARACTERISTICS

16. **Explanation**. The signal illumination, hand fired, Comet 1260 has the following characteristics:

a. Length: 300 mm.

b. Diameter of the launching tube: 44.4 mm.

c. Diameter of the rotating cap: 52.0 mm.

d. Weight: 0.490 kg.

e. Ignition: instantaneous.

f. Delay: 9 seconds between ignition and flare.

g. Range: 500 m.

h. Flare intensity: 150,000 candle power for 30 seconds.

17. *Knowledge check with questions*.

WARNING

Precautions must be taken when flares are used in the vicinity of aircraft, especially helicopters participating in night exercises, as there is a danger that the pilots will lose their night vision. The use of pyrotechnics, other than emergency signals, within 50 m of an aircraft is prohibited.

Do not carry the flare ready for launching. Keep the safety pin in place at all times.

SAFETY PRECAUTIONS

18. *Explanation, demonstration, imitation*. The following safety precautions will be taken:

a. ensure that the safety pin is in place;

b. prior to using the signal illumination, hand fired, Comet 1260, ensure that the outer tube is not damaged;

c. read the instructions on the tube carefully.

d. the signal illumination, hand fired, Comet 1260 may not be altered or modified in any way;

e. before firing, ensure that there are no obstacles (trees, helicopters, etc.) in the trajectory of the flare;

f. before firing, ensure that the flare will not fall near any highly inflammable substances, such as a fuel depot, a wooded or dry area, bivouac or residential neighbourhood;

g. before firing, the user must ensure that no one is in front of or behind the flare; and

h. never aim the flare less than 35 to 40 degrees elevation.

19. *Knowledge check with questions and practical exercises*.

FUNCTIONING *(Explanation)*

20. The striker is attached to the rotating cap by a steel split disk. When the cap is turned, the curved surfaces inside the cap and the launching tube rub and prime the striker.

21. When the movement of the striker reaches its highest point (corresponding to approximately a quarter-turn of the cap), the compression of the spring is optimal. The striker releases when the split in the steel disk and the fins of the striker align.

22. Pushed by the spring, the striker strikes the fuse, which ignites the charge, which in turn ignites the solid fuel. The combustion gasses escape through the nozzle and propel the carrier out of the launching tube.

23. Two secondary tubes with holes at the base of the motor provide a rotating movement which stabilizes the flare in flight.

24. The ignition charge also ignites the slow fuse, which burns for approximately nine seconds before igniting the ejection charge. The latter expels the flare canister from the carrier and ignites the ignition charge, which then ignites the chemical flare compound.

25. The parachute then opens and brakes the descent of the flare unit throughout the entire time it burns.

26. *Knowledge check with questions.*

INSTRUCTIONS FOR FIRING

27. *Explanation, demonstration, imitation*. Proceed as follows to launch the flare:

a. Tear the protective plastic bag level with the pre-perforated area and discard it.

b. To prime the flare, withdraw the pin by pulling on the cord.

c. Hold the launching tube in one hand, near the rotating cap. With the other hand, grasp the rotating cap firmly.

d. In a standing position, hold the flare at hip height.

e. In a kneeling or sitting position, support the tube on the ground.

f. In all cases, the flare will be pointed at the target, at an angle of at least 35 to 40 degrees elevation.

g. The flare can also be fired vertically to illuminate the surrounding ground.

h. Ensure that the firing area is clear.

i. Before firing, ensure that there are no obstacles (trees, helicopters, etc.) in the trajectory of the flare.

j. Before firing, ensure that the flare will not fall near any highly inflammable substances, such as a fuel depot, a wooded or dry area, bivouac or residential neighbourhood.

k. Before firing, the user will make absolutely certain that no one is in front of or immediately behind the flare.

l. Turn the cap one quarter-turn in either direction to fire.

28. *Knowledge check with questions*.

MALFUNCTION PROCEDURES

29. *Explanation, demonstration, imitation*. There are two types of malfunction that can occur, one mechanical and the other pyrotechnic.

a. A mechanical malfunction occurs when the ignition mechanism malfunctions, preventing the striker from hitting the fuse. Such malfunctions are characterized by the fact that the rotating cap remains attached to the launching tube after the attempted launch.

b. A pyrotechnic malfunction occurs when the striker fulfills its function but the pyrotechnic chain is extinguished before the solid fuel ignites. When this type of malfunction occurs, the cap detaches from the launching tube.

c. In either case, the firer will hold the flare pointed towards the firing area for 30 seconds.

d. If the malfunction is mechanical (the cap remains attached and the 30-second delay has expired), put the cap back to safety and replace the safety pin. The flare, locked in this way, can be sent to the ammunition depot for destruction.

e. If the malfunction is pyrotechnic (with the cap detaching) and once the 30-second delay has elapsed, place the flare carefully on the ground, pointing towards the firing area, then remove personnel for at least 30 minutes. When the 30-minute waiting period is over, destroy the flare in accordance with publication C-009-008-002/FP-000.

30. *Knowledge check with questions and practical exercises*.

PACKAGING

31. **Explanation**. Signal illumination, hand fired, Comet 1260 are packed individually in plastic bags, then in wooden boxes, 60 bags to a box (figure 3-3).

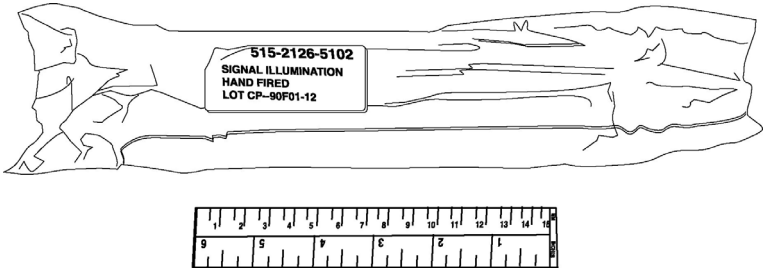

Figure 3-3: Packaging—Comet 1260

32. *Knowledge check with questions*.

33. **Conclusion**:

a. question period;

b. knowledge check with questions and practical exercises;

c. carry out the safety precautions; and

d. pack the equipment;

e. **review**:

(1) always obey the safety rules when using the Comet 1260 flare; and

(2) never fire the flare at less than 35 to 40 degrees or towards inflammable objects or aircraft.

LESSON 2
THUNDERFLASH C1A1

NOTES TO THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the thunderflash C1A1 and use it safely.

2. **Main teaching points**:

   a. description of the thunderflash C1A1;

   b. safety precautions;

   c. functioning;

   d. firing instructions;

   e. operating incidents; and

   f. packaging.

3. **Duration**. One 40-minute period.

4. **Method**. Basic instruction period.

5. **Equipment:**

   a. diagram of the thunderflash C1A1; and

   b. one thunderflash C1A1 per student.

6. **Preparation**:

   a. make a thorough reconnaissance of the outdoor area to be used; and

   b. place one thunderflash C1A1 in front of each student.

7. **Miscellaneous**:

   a. during the lesson, be sure to make any corrections required to the way the thunderflash C1A1 is held and handled; and

   b. stress the importance of carrying out the safety precautions.

CONDUCT OF THE LESSON

8. Preliminaries:

   a. carry out the safety precautions on the thunderflash C1A1;

   b. ensure that the students do not touch any of the thunderflash C1A1 before they have been given permission to do so; and

   c. number off the students and explain that they will be working on their own during the practice drills.

9. **Review**. N/A

10. **Introduction**. The thunderflash C1A1 is the Canadian version of a Norwegian simulator. It is used to imitate the report of an exploding grenade and the sounds of battle during exercises. It contains an explosive charge which can cause injury if not used safely.

DESCRIPTION *(Explanation)*

11. The thunderflash C1A1 is 21.3 cm long and 3.3 cm in diameter. It consists of the following main parts (figure 3-4):

   a. **Explosive charge assembly**. This consists of a paper cylinder 7.6 cm long, closed at one end by a cardboard disk, which contains a report composition and a delay column assembly. The delay column assembly consists of a match head type of igniter, a 6.4 cm length of safety fuze and a short length of quickmatch in a gelatine capsule. The safety fuze is centred in the cylinder and protrudes from the cylinder a sufficient distance to expose the igniter. The charge is retained by a rubber joint. The rim consists of a disk glued to the end of the cylinder.

   b. **The expansion chamber**. This holds in place the explosive charge assembly by means of two cylinders stuck together; the outer cylinder is curved onto a cardboard disk and the inner cylinder onto the fuze lip.

   c. **The holder**. The holder is a tube, the upper part of which encloses the expansion chamber. The lower

part is reinforced by a shorter cylinder, stuck inside, which serves as a handle. A cap, formed by a short tube bent back onto a disk, slides on the exposed portion of the expansion chamber. The igniter composition is wrapped around the inner edge of the cap, which is retained by an adhesive tape.

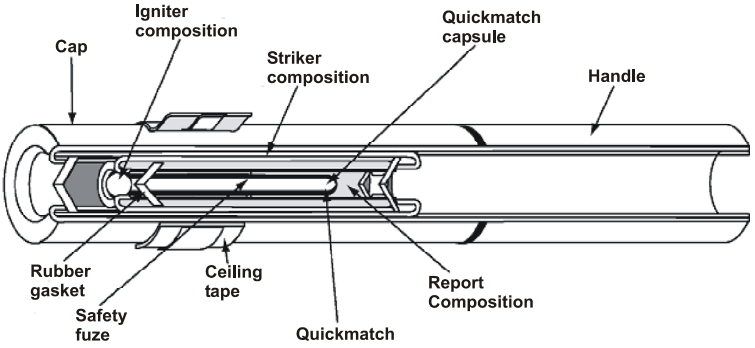

Figure 3-4: Description of the thunderflash C1A1

12. **Markings**. A label with instructions is wrapped around the holder. It contains the designation of the thunderflash, complete firing instructions and a reminder that the thunderflash must be thrown immediately after igniting. The filled lot number is also shown (figure 3-5).

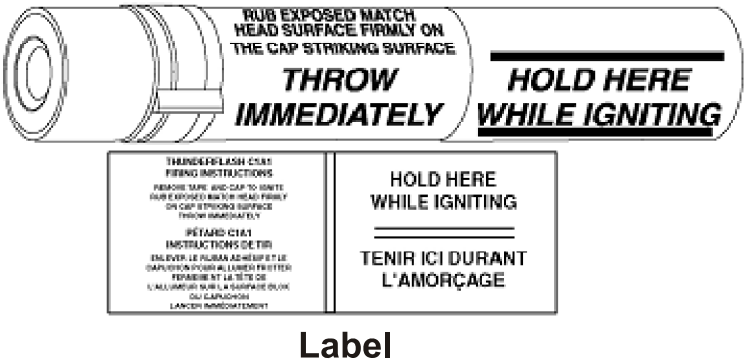

Figure 3-5: Markings on the thunderflash C1A1

13. **Diver recall signal**. A modified version of the thunderflash C1A1, called the diver recall SC–810, is used to communicate with divers underwater. On this model, an inert weight of iron powder is

placed inside the handle so that the recall signal sinks after the diver has entered the water. It is, otherwise, identical to the thunderflash and functions the same way.

WARNING

Do not throw the thunderflash less than five metres from personnel or less than 25 m from a volatile substance, equipment or vehicles.

14. *Knowledge check with questions*.

SAFETY PRECAUTIONS

15. *Explanation, demonstration, imitation*. The following safety precautions will be taken:

a. The thunderflash C1A1 will be ignited and thrown

b. Instructions on the thunderflash label will be followed.

c. The sealing tape will not be removed until the thunderflash is ready for use.

d. Thunderflashes will not be carried prepared.

e. Thunderflashes will be ignited and thrown one at a time. When igniting a thunderflash, point the cap composition away from persons. Care must be taken to avoid burns caused by striker composition adhering to the striker.

f. Do not use the thunderflash in confined spaces such as rooms, trenches, weapon pits, etc., because such areas dangerously increase the effects of the explosion.

g. The construction of a thunderflash will not be tampered with nor attempts made to modify it in any way.

16. *Knowledge check with questions*.

FUNCTIONING

17. **Explanation**. The striker composition is exposed by withdrawing the sealing tape and removing the cap. The striker is then rubbed briskly on the striker composition to ignite it. This ignites the safety fuze which burns for approximately seven seconds until ignition, which explodes the report composition.

18. *Knowledge check with questions*.

IGNITION INSTRUCTIONS *(Explanation, demonstration, imitation)*

19. The instructions are also printed on the thunderflash:

a. Hold the thunderflash by the handle (the portion of the thunderflash that states “hold here while igniting”).

b. Tear off the sealing tape.

c. Remove the cap.

d. Rub the igniter sharply across the cap striker composition surface, thus causing the igniter to ignite. This shall be accomplished whether left- or right-handed by always rubbing across the striker in the direction that carries the thunderflash away from the body and the hand holding the striker.

e. Throw the thunderflash immediately.

20. **Malfunctions.** Unexploded, misfired, outdated or deteriorated thunderflashes will be destroyed in accordance with Canadian Forces Technical Order (CFTO) C-09-008-002/FP-000, *Disposal of Misfires and Unexploded Ordnance*.

21. *Knowledge check using questions and practical exercises*.

PACKAGING

22. **Explanation**. Thunderflashes are packed 10 to a cardboard box covered with a plastic bag. The boxes are packed 10 to a fibreboard carton (figure 3-6).

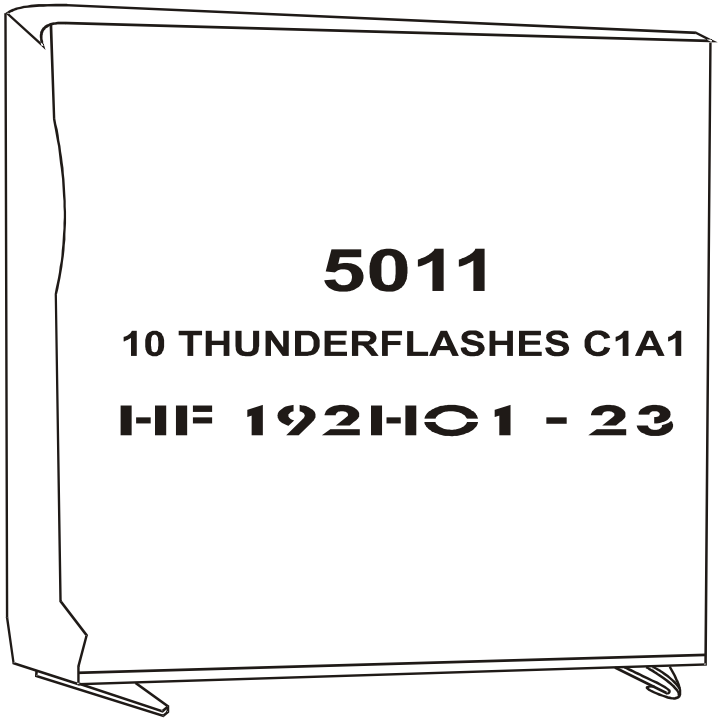

Figure 3-6: Packaging of thunderflashes C1A1

23. *Knowledge check using questions*.

24. **Conclusion**:

    a. Question period.

    b. Knowledge check with questions and practical exercises.

    c. Pack the equipment.

    d. **Review**. Always use thunderflashes C1A1 as taught, obeying the safety rules.

LESSON 3
SIMULATOR, PROJECTILE, GROUND BURST C1A1

NOTES TO THE INSTRUCTOR

1. **Aim.** The aim of this lesson is to teach students how to recognize the simulator, projectile, ground burst C1A1 and to use it safely.

2. **Main teaching points**:

   a. description of the simulator, projectile, ground burst C1A1;

   b. safety precautions;

   c. functioning;

   d. priming instructions;

   e. malfunctions; and

   f. packaging.

3. **Duration.** One 40-minute period.

4. **Method.** Basic instruction period.

5. **Equipment**:

   a. diagram of the simulator, projectile, ground burst C1A1; and

   b. one simulator, projectile, ground burst C1A1 per student.

6. **Preparation**:

   a. make a thorough reconnaissance of the outdoor area to be used; and

   b. place one simulator, projectile, ground burst C1A1 in front of each student.

7. **Miscellaneous**:

   a. during the lesson, be sure to make any corrections required to the way the simulator, projectile, ground burst C1A1 is held and handled; and

b. stress the importance of carrying out the safety precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. carry out the safety precautions on the simulator, projectile, ground burst C1A1;

b. ensure that the students do not touch any of the simulator, projectile, ground burst C1A1 before they have been given permission to do so; and

c. number off the students and explain that they will be working on their own during the practical drills.

9. **Review**. N/A

10. **Introduction**. The simulator, projectile, ground burst C1A1 is used to imitate the report and flash of a bursting artillery or mortar projectile during training. It contains an explosive charge which could cause serious injury if not used safely.

DESCRIPTION *(Explanation)*

11. The simulator, projectile, ground burst C1A1 is 18.0 cm long and 4.9 in diameter. It consists of the following parts (figure 3-7):

a. **M3A1 fuze igniter**. Standard friction igniter protected by a steel safety wire.

b. **Safety fuze**. Burns from 6 to 10 seconds to give the operator sufficient time to throw the simulator.

c. **Canister**. Tube of Kraft paper.

d. **Whistle**. Contains five g of whistling composition.

e. **Body**. Contains 45.5 grams of type 1 photoflash powder.

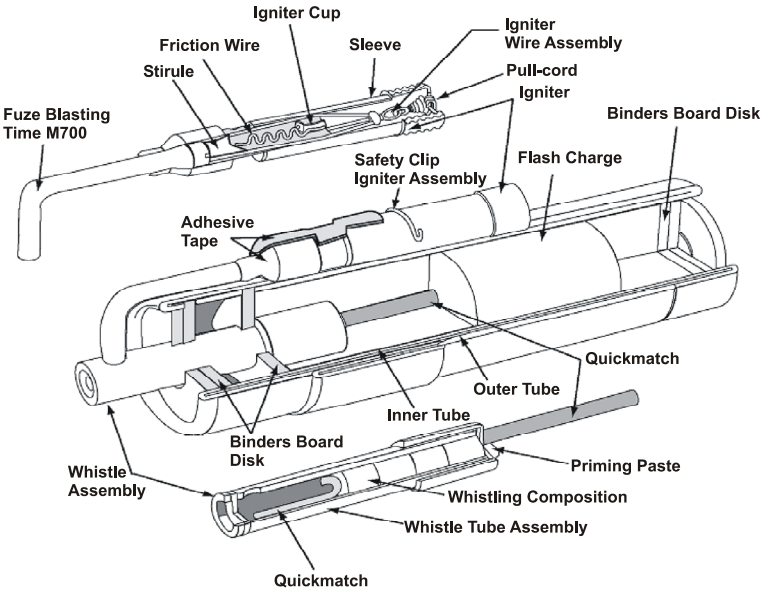

Figure 3-7: Simulator, projectile, ground burst C1A1 (cross-section)

12. **Markings**. The simulator is white and carries the following markings in black:

a. the designation;

b. filled lot number;

c. firing instructions;

d. a brief description of the main dangers in use; and

e. safety precautions.

13. *Knowledge check using questions*.

WARNING

Never use the C1A1 simulator on land that does not belong to the Department of National Defence (DND).

SAFETY PRECAUTIONS

14. *Explanation, demonstration, imitation.* The following safety precautions will be taken:

a. Do not remove the safety clip and pull the firing wire until immediately before firing.

b. The simulator is extremely powerful and can cause serious injury and material damage. The explosive violence of the simulator is such that gravel, sticks and similar objects may be projected at high velocity. Therefore, care should be taken to see that the device is thrown on ground that is free of potential missiles.

c. Instructions regarding the firing of the simulator, together with the applicable safety precautions, are marked on the simulator. They must be read prior to use.

d. A safety distance of 15 m must be maintained from personnel to avoid the risk of injury or damage to the hearing.

e. Any person within 35 m must expect dangerous projectiles and must protect any exposed parts of the body, such as the face.

f. When the general public is present, the danger area is 100 m.

g. It must be borne in mind that dry grass and leaves may be set alight by the explosion of the simulator.

h. The simulator can cause serious injury if improperly used. It will be ignited and thrown by hand only, without any mechanical device.

i. The simulator must be thrown immediately after ignition.

j. Simulators are to be ignited and thrown one at a time. They will not be fastened together either for carrying or for use.

k. The simulator will not be used in confined spaces such as rooms, trenches or weapon pits, because this

may dangerously increase the effect of the explosion.

l. The construction of the simulator will not be tampered with nor any attempt made to modify it in any way.

15. *Knowledge check using questions*.

FUNCTIONING

16. **Explanation**. When the cord is pulled, the friction wire is drawn through an igniter composition. The resultant flame ignites the safety, which burns for six to ten seconds before igniting the whistle charge. The burning whistle charge emits a high-pitched whistle for two to four seconds. This is followed by ignition of the photoflash powder, which produces a flash and a loud report.

17. *Knowledge check using questions*.

IGNITION INSTRUCTIONS

18. *Explanation, demonstration, imitation*. The instructions are printed on the simulator:

a. hold the simulator by the bottom;

b. remove the igniter safety clip;

c. pull slowly on the cap to release the igniter wire; and

d. pull on the igniter wire and throw the simulator immediately.

MALFUNCTIONS

19. **Explanation**. If a simulator fails to explode, a waiting period of 30 minutes must be observed before approaching it. If the igniter mechanism is intact, the simulator can be tried again. If not, it must be destroyed by explosion, in accordance with the instructions contained in Canadian Forces Technical Order (CFTO) C-09-008-002/FP-000, *Disposal of Misfires and Unexploded Ordnance*.

20. *Knowledge check using questions and practical exercises*.

PACKAGING

21. **Explanation**. The simulators are packed separately, five to a cardboard box and placed in sealed plastic bags. The boxes are packed five to a card satchel and the card satchels are packed two to a wooden crate (figure 3-8).

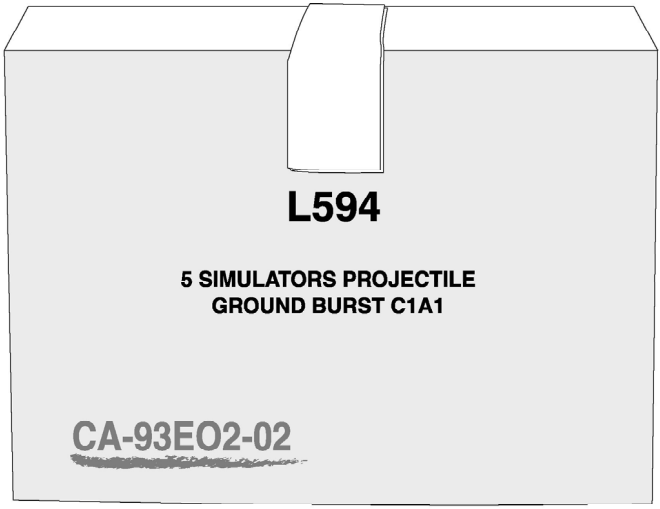

Figure 3-8: Packaging of the simulator, projectile, ground burst C1A1

22. *Knowledge check using questions*.

23. **Conclusion**:

    a. question period;

    b. knowledge check using questions and practical exercises;

    c. carry out the safety precautions; and

    d. pack the equipment;

    e. **review**:

        (1) the simulator is extremely powerful and can be very dangerous if used inappropriately; and

(2) always obey all the safety rules when using the simulator, projectile, ground burst C1A1.

LESSON 4
SIGNAL ILLUMINATION GROUND (M207 PROJECTOR)

NOTES TO THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the signal illumination, ground and the M207 projector and to use it safely.

2. **Main teaching points**:

   a. description of the M207 projector and the cartridge;

   b. safety precautions;

   c. firing instructions; and

   d. packaging.

3. **Duration**. One 40-minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. one M207 projector per student;

   b. one green cartridge per two students; and

   c. one red cartridge per two students.

6. **Preparation**:

   a. make a thorough reconnaissance of the outdoor area to be used;

   b. place one M207 projector in front of each student; and

   c. check each M207 projector.

7. **Miscellaneous**:

   a. during the lesson, be sure to make any corrections required to the way the M207 projector is held and handled; and

   b. stress the importance of conducting the safety precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

   a. inspect all the M207 projectors;

   b. ensure that the students do not touch any of the M207 projectors before they have been given permission to do so; and

   c. number off the students and explain that they will be working on their own during the practical drills.

9. **Review**. N/A

10. **Introduction**. The signal illumination, ground fired with the M207 projector can be used day or night. The signal illumination is available in three colours: red, green and white.

DESCRIPTION *(Explanation)*

11. The M207 projector consists of a black anodized aluminium housing, spring, firing pin, release button and flare holder.

12. All internal parts are corrosion-resistant steel. Overall dimensions are 140 mm long, diameter 20 mm and weight 71 grams (figure 3-9).

13. **Cartridge data**:

   a. Colours available: red, green and white.

   b. Burn time: 7 to 15 seconds for red, 4 to 12 seconds for green and white.

   c. Firing ceiling: 122 m.

   d. Height of flight: 213 to 427 m.

   e. Flare intensity: 10,000 candle power for the red and white and 8,000 candle power for the green.

14. **Cartridge**:

   a. Cartridges are rocket-propelled and fin-stabilized.

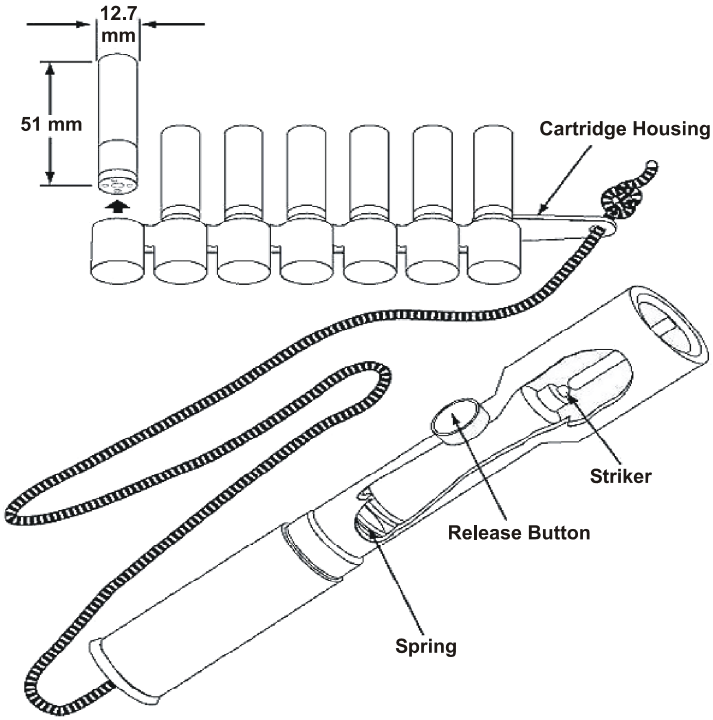

Figure 3-9: M207 projector

b. The cartridge consists of two cylindrical sections (steel rear and aluminium front), which are assembled by a press fit. The steel section houses the following components (figure 3-10):

(1) rocket motor nozzle plate with a centrally located primer;

(2) spacer;

(3) propellant; and

(4) delay column.

c. The rocket nozzle motor plate has two central gas exit holes and is held in place by a rolled crimp.

d. The candle composition is consolidated directly into the aluminium front section. The overall dimensions are 51 mm long, 13 mm in diameter and approximately five grams in weight.

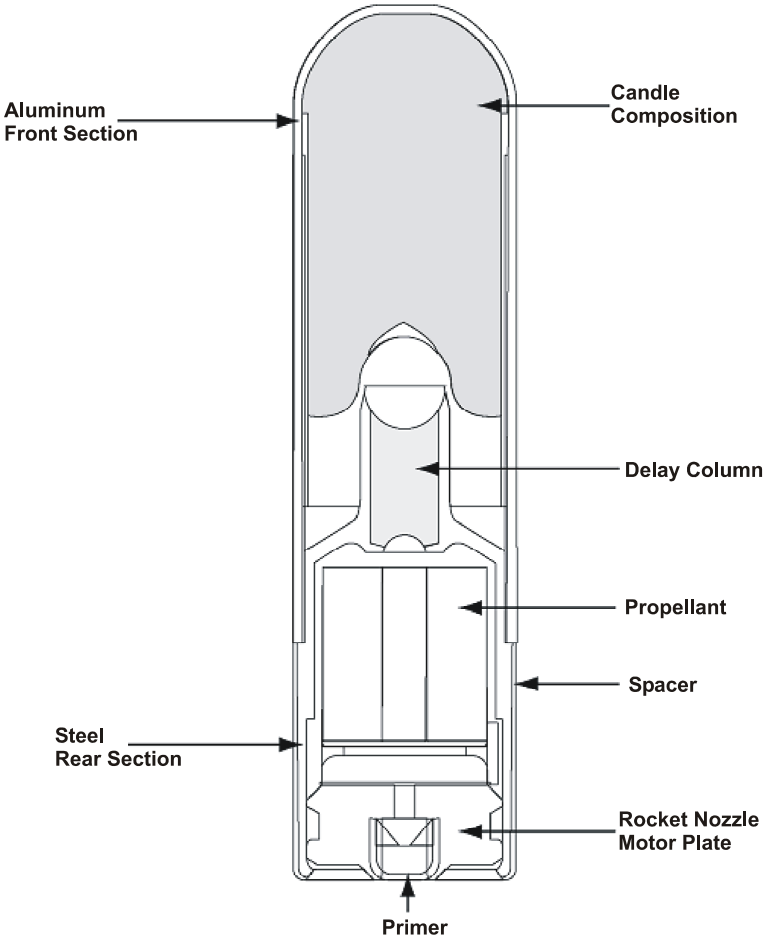

Figure 3-10: Description of the M207 cartridge

15. *Knowledge check with questions*.

WARNING

Never throw the mini-flare near wooded areas or dry brush, residential or storage areas, inflammable materials, etc.

SAFETY PRECAUTIONS

16. The following safety precautions will be taken:

    a. under no circumstances may a damaged cartridge be placed on the M207 projector;

    b. during loading, firing and unloading, the projector must always be pointed in a safe direction, away from personnel, equipment or aircraft;

    c. the projectors will not be loaded until immediately prior to use;

    d. when used for training, the M207 projector is limited to 30 firings; and

    e. when contained in survival kits, the M207 projector is limited to seven firings.

17. *Knowledge check with questions*.

FIRING INSTRUCTIONS

18. Proceed as follows to use the M207 projector:

    a. inspect the retainer (open end) for foreign matter;

    b. inspect the cartridge for damage;

    c. the flat end of the flare is inserted into the retainer end of the projector;

    d. ensure the flare is completely bottomed in the retainer; and

    e. using the thumb, pull the trigger to the fully retracted position of the trigger slot and release it.

19. *Knowledge check with questions and practical exercises*.

PACKAGING

20. The cartridges are packed 100 to a card box divided into separate compartments for each cartridge. Four of these boxes are then packed in a waterproof cardboard box.

21. *Knowledge check with questions*.

22. **Conclusion**:

a. Question period.

b. Knowledge check using questions and practical exercises.

c. Carry out safety precautions.

d. Pack the equipment.

e. **Review**. make sure that the projector is pointed in a safe direction before firing and obey all the safety rules.

ANNEX A
SIGNAL ILLUMINATION, HAND FIRED, COMET 1260

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS TO BE FOLLOWED WITH THE SIGNAL ILLUMINATION, HAND FIRED, COMET 1260**		
1	Check that the safety pin is in place.	(*)	
2	Check whether the exterior tube is damaged.		
3	Read the instructions stencilled on the tube.		
4	The signal illumination must not be altered or modified in any way.		
B	**COMMAND** **FIRE THE SIGNAL ILLUMINATION**		
1	Tear the protective plastic bag.		
2	Withdraw the safety pin by pulling on the cord.		
3	Hold the launching tube in one hand, placed close to the rotating cap and with the other hand, grasp the rotating cap firmly.		
4	Ensure that the firing zone is clear.		
5	Turn the cap one quarter-turn in either direction to fire.		

ANNEX B
THUNDERFLASH C1A1

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **LIST THE SAFETY RULES TO BE FOLLOWED WITH THE FLARE C1A1**		
1	The C1A1 will be launched by hand only. Never use mechanical devices to launch it.		
2	Follow the instructions on the label of the flare.		
3	Do not remove the adhesive tape before the flare is ready for use.		
4	Do not transport flares when they are ready to be used.		
5	Ignite and launch flares one at a time.		
6	Do not use the flare in a confined space.		
7	Never modify the flares.		
B	**COMMAND** **FIRE A FLARE C1A1**		
1	Hold the flare by the handle; the part labelled “hold here”.		
2	Tear the adhesive tape.		
3	Remove the cap.		
4	Rub the igniter against the rough surface of the cap.		
5	Throw the flare immediately.	**(*)**	

ANNEX C
SIMULATOR, PROJECTILE, GROUND BURST C1A1

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS TO BE FOLLOWED WITH THE SIMULATOR, PROJECTILE, GROUND BURST C1A1**		
1	Ensure that the safety clip is securely in place.	**(*)**	
2	Check that the body of the simulator is not damaged.		
3	Read the instructions on the body.		
4	The simulator, projectile, ground burst C1A1 must not be altered or modified in any way.		
5	The simulator must be ignited and delivered by hand only, one at a time.		
6	Do not use the simulator in a confined space.		
B	**COMMAND** **THROW THE SIMULATOR**		
1	Hold the simulator by the bottom.		
2	Remove the igniter safety clip.		
3	Pull the plug slowly to release the friction wire.		
4	Pull the friction wire to fire.		
5	Throw the simulator.	**(*)**	

ANNEX D
SIGNAL ILLUMINATION, GROUND
(PROJECTOR M-207)

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS TO BE FOLLOWED WITH THE SIGNAL ILLUMINATION, GROUND AND THE M-207 PROJECTOR**		
1	Damaged cartridges will under no circumstances be placed on the M-207 projector.		
2	When handling the M-207, always point it in a safe direction away from personnel, equipment or aircraft.	**(*)**	
3	The projectors must not be loaded until immediately prior to use.		
B	**COMMAND** **FIRE THE SIGNAL ILLUMINATION, GROUND WITH THE M-207 PROJECTOR**		
1	Inspect the locking cap and remove any foreign material.		
2	Inspect the cartridge for damage.		
3	Insert the flat portion of the cartridge into the locking cap of the M-207.		

Check	Skill to be performed	Pass Fail	Remarks
4	Ensure that the cartridge is inserted fully into the locking cap.		
5	With the thumb, pull the trigger back, slide it to the end of the slot and release it.	**(*)**	

CHAPTER 4
FLARE, SURFACE, TRIP M49A1

GENERAL

1. The flare, surface, trip M49A1 is designed to warn troops of nocturnal infiltration by the enemy, without revealing the friendly position. When someone pulls, cuts or stumbles on the wire, the flare ignites, illuminating the surroundings. It is not the purpose of this device to relieve the soldier of the need for vigilance at night, but when used properly, it gives defensive troops improved warning and increased visibility.

2. The flare, surface, trip M49A1 is potentially very dangerous and the soldier must thoroughly understand how it works. Only trained personnel are authorized to handle this type of device.

TYPES

3. The flare, surface, trip M49A1 is currently used by the Canadian Forces and is described in detail in Lesson 10, under the designation Flare, Surface, Trip M49A1.

SAFE HANDLING OF THE FLARE, SURFACE, TRIP M49A1

4. The principles and safety precautions set out in Chapter 2, Section 1 apply to the handling of the flare, surface, trip M49A1.

LESSON 1
FLARE, SURFACE, TRIP M49A1 OR C6

NOTES FOR THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the M49A1 or C6 trip flare and use it safely.

2. **Main teaching points**:

   a. description of the M49A1 or C6 trip flare;

   b. safety precautions;

   c. functioning;

   d. malfunctions;

   e. precautions to be taken during use;

   f. installing to a tree or board by nailing;

   g. installation by clamping on a post;

   h. installation on the ground;

   i. priming the M49A1 or C6 trip flare;

   j. unpriming the M49A1 or C6 trip flare; and

   k. packing.

3. **Duration**. Two x 40 minute periods.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. diagram of the M49A1 or C6 trip flare;

   b. boards, nails, iron stakes, hammers, etc., for installation; and

   c. one M49A1 or C6 trip flare per two students.

6. **Preparation**:

   a. make a thorough reconnaissance of the outdoor area to be used; and

   b. place one M49A1 or C6 trip flare on the ground in front of each two students.

7. **Miscellaneous**:

a. during the lesson, be sure to make any corrections required to the ways to install the M49A1 or C6 trip flare; and

b. stress the safety precautions.

CONDUCT OF THE LESSON

8. **Preliminary**:

a. carry out the safety precautions on the M49A1 or C6 trip flare;

b. ensure that the students do not touch any of the M49A1 or C6 trip flares before they have been given permission to do so; and

c. number off the students and explain that they will be working in pairs during the practice drills.

9. **Review**. N/A

10. **Introduction**. The M49A1 or C6 trip flare is used to reveal the presence of enemy troops by illuminating the infiltration area. When the flare is activated, the illuminating pyrotechnic composition fires immediately and emits a yellowish light for 55 to 70 seconds. The intensity of the light is approximately 40,000 candle power, thereby illuminating a radius of up to 275 m, depending on the terrain. The M49A1 or C6 trip flare is triggered by a trip wire.

DESCRIPTION *(Explanation)*

11. The M49A1 or C6 trip flare is equipped with a U-shaped mounting bracket and consists of the following main components (figure 4-1):

a. The illuminant assembly consists of an aluminium case 10.4 cm long and 3.89 cm in diameter, containing:

(1) three identical illuminant pallets, with 36 grams of chemical illuminant composition; and

(2) a 30 gram pallet of chemical illuminant composition topped with six grams of first fire composition.

b. The cover loading assembly consists of the following component:

(1) a zinc alloy cover to which are assembled a percussion primer M42;

(2) an intermediate charge;

(3) a disc;

(4) a hinge pin;

(5) a striker;

(6) a spring;

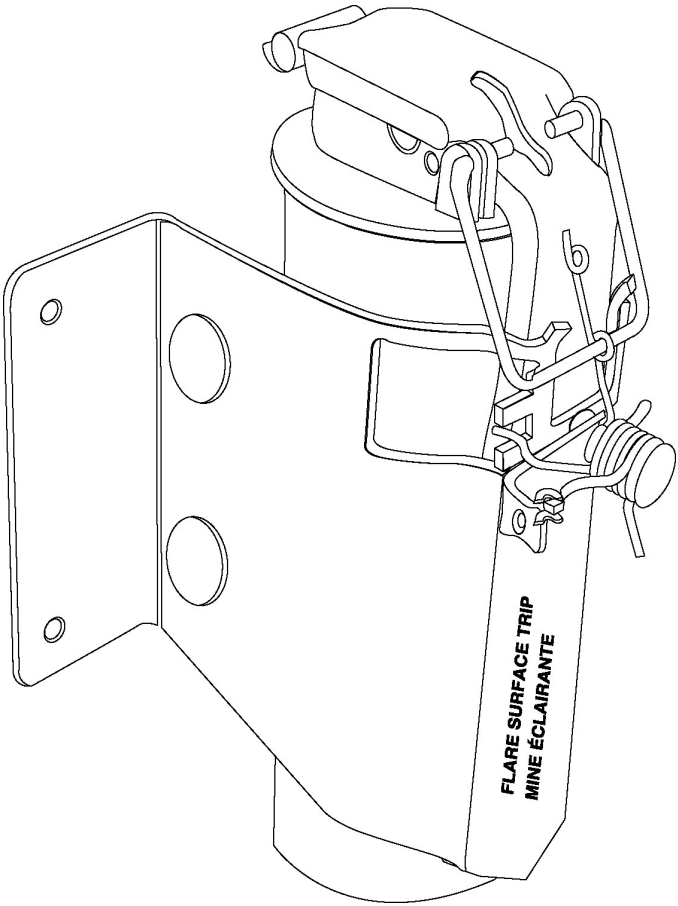

Figure 4-1: M49A1 trip flare

(7) a lever; and

(8) a safety clip with pull pin.

c. The mounting bracket consists of a U-shaped steel bracket, two carriage bolts with wing nuts, and a trigger assembly (figure 4-2).

12. **Marking**. The M49A1 or C6 trip flare and bracket are painted olive drab. The nomenclature and the lot number are stencilled or stamped in black.

13. *Knowledge check using questions*.

Personnel, with the exception of those responsible for setting flares, must never be closer than 50 m from the flares.

WARNING

The location must not be near to highly inflammable materials.

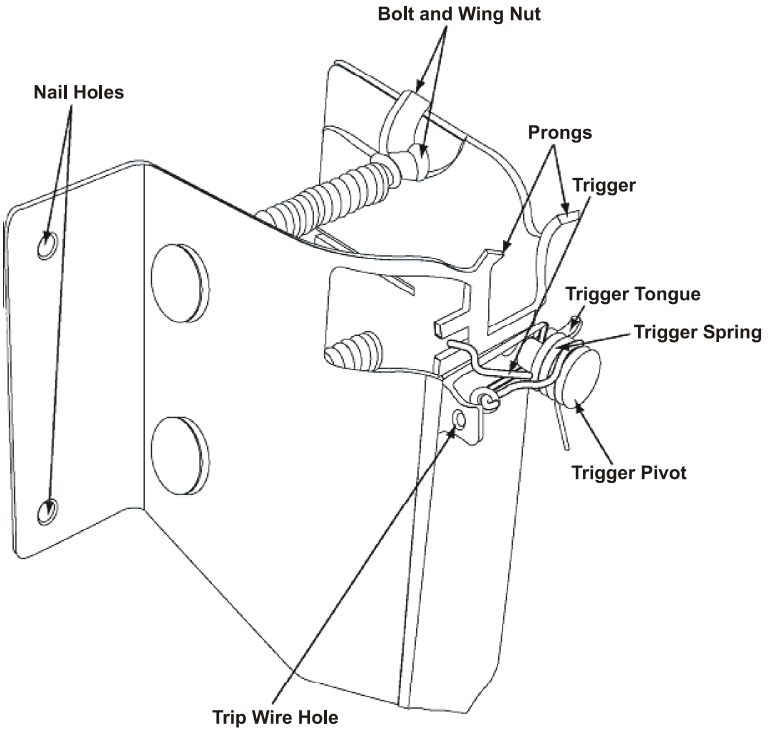

Figure 4-2: M49A1 trip flare bracket assembly

SAFETY PRECAUTIONS *(Explanation, Demonstration, Imitation)*

14. Examine the safety clip to ensure that it engages correctly in the holes provided for it in the cover loading assembly.

15. The cover loading assembly will be inspected for corrosion and looseness. No attempt will be made to tighten or reassemble a

loose cover loading assembly. If the cover loading assembly is distorted, deformed or shows signs of corrosion, the M49A1 or C6 trip flare will be disposed of in accordance with the instructions contained in Canadian Forces Technical Order (CFTO) C-009-008-002/FP-000, *Disposal of Malfunctions and Unexploded Ordnance*.

16. Check whether the M49A1 or C6 trip flare and mounting bracket assembly are deformed.

17. The trigger spring will be inspected for proper tension and position. The trigger will be rotated approximately 2,400 mils in a counter-clockwise direction. It should turn sufficiently, under load, to a position corresponding to that required to obtain release of the fly-off lever as a result of increased tension on a trip wire. It should return to the normal position (as issued) when released.

18. *Knowledge check using questions and practice drills*.

FUNCTIONING

19. **Explanation**. The trip flare functions as follows:

a. When armed using the bracket trigger assembly, the flare is installed with a taut wire which holds the trigger in a vertical position against the pressure of the trigger spring (figure 4-3).

b. The safety clip is then removed and the flare is armed with the fly-off lever held by the trigger tongue only. A pull of 0.9 kg to 4.0 kg on the trip wire rotates the trigger tongue in a counter-clockwise direction against the pressure of the trigger spring.

c. If the trip wire is severed, the spring forces the trigger tongue in a clockwise direction.

d. In either case, the movement of the trigger tongue releases the fly-off lever.

e. When the fly-off lever is released, the striker spring forces the striker to rotate. In so doing, it throws the fly-off lever clear and forces the firing pin onto the primer M42, which is ignited.

f. The primer ignites the intermediate charge which in turn ignites the first fire composition of the ignition

pellet. When the ignition pellet functions, it blows off the cover and ignites the illuminant pellets.

g. When the M49A1 or C6 trip flare is armed, using the pull pin inserted in the safety clip holes, a pull of 0.96 kg to 2.0 kg withdraws the pull pin and releases the fly-off lever, causing the flare to function as described above.

NOTE

When the M49A1 or C6 trip flare is armed using the pull pin, severance of the trip wire does not ignite the flare.

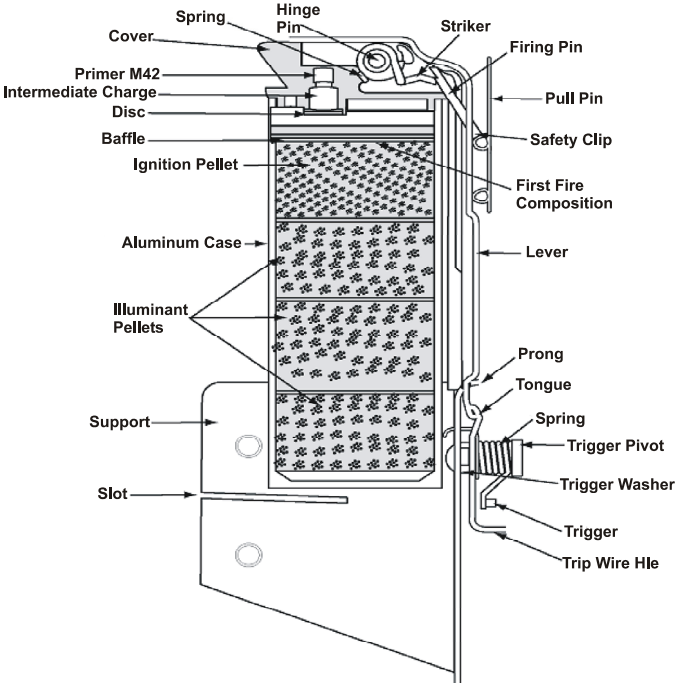

Figure 4-3: Mechanism of M49A1 trip flare with bracket (cross section)

MALFUNCTIONS

20. **Explanation**. If the M49A1 or C6 trip flare fails to ignite, it will be deemed a misfire and destroyed in accordance with CFTO C-09-008-002/FP-000, *Disposal of Misfires and Unexploded Ordnance*.

21. *Knowledge check using questions*.

PRECAUTIONS IN INSTALLATION *(Explanation)*

22. Since the trigger assembly is spring loaded, it is possible that some kinks or bends in the trip wire may straighten after installation. This will cause the lever to be released. This would cause the M49A1 or C6 trip flare to function. Always ensure, therefore, that the trip wire is free of kinks and bends.

23. Install the flare in firm ground, since softening of the ground due to rain or thaw may allow the flare or the item to which the trip is anchored to become dislodged. This may cause the flare to function prematurely.

24. If the trip wire is attached to the pull pin, the trip wire must be sufficiently taut so that it is above the ground. If it rests on the ground, it may be stepped over or stepped on and thus fail to initiate the M49A1 or C6 trip flare.

25. *Knowledge check using questions*.

INSTALLATION BY NAILING ON A TREE OR BOARD

26. *Explanation, demonstration, imitation*. The procedure for installing the M49A1 or C6 trip flare by nailing on a tree or board is as follows:

a. The M49A1 or C6 trip flare can be installed on a tree or board, on a post, or on the ground. The location chosen for the installation should be in the logical path of infiltrating troops and so positioned that the field toward the enemy will be illuminated while friendly defence positions will not be disclosed. (figure 4-4).

b. The procedure given in this para should be followed for the installation of a flare on a tree or sturdy board, by nailing (figure 4-5):

(1) Carry out the safety precautions.

(2) Loosen the wing nuts on the brackets.

(3) Remove the M49A1 or C6 trip flare by sliding it upwards through the bracket.

(4) Place the M49A1 or C6 trip flare in a safe location until it is ready to use.

(5) Mount the bracket using two of the nails provided. The bracket must be as vertical as possible and at a height of 38 to 45 cm above the ground.

(6) Mount the M49A1 or C6 trip flare by aligning the lever with the trigger pivot and carefully sliding the flare downward into its bracket until the bottom edge of the lever is not more than 1.6 mm above the bracket but not past it. The bottom edge of the lever must clear the bracket by no more than 1.6 mm to prevent the lever from slipping out of the trigger when the safety clip is removed.

(7) Clamp the M49A1 or C6 trip flare in its bracket by tightening the upper wing nut with sufficient force to grip the flare firmly.

(8) Form arming as indicated further in this lesson.

27. *Knowledge check using questions and practice drills*.

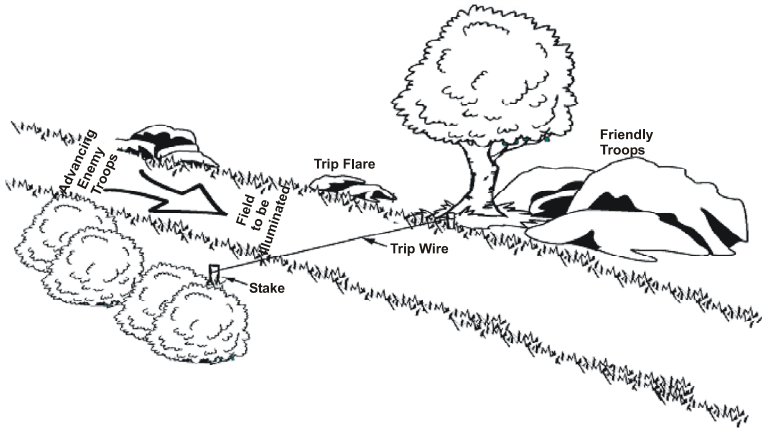

Figure 4-4: Installation of the flare and trip wire

INSTALLATION ON A POST BY CLAMPING

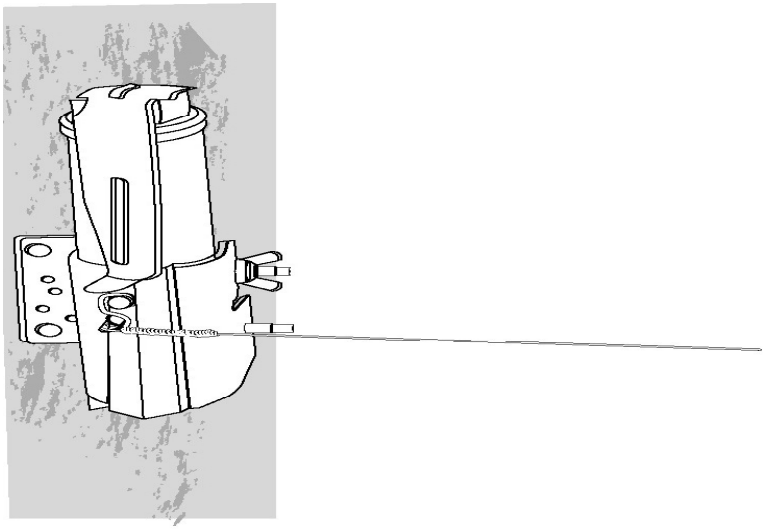

Figure 4-5: Installation by nailing

28. *Explanation, demonstration, imitation.* The procedure for installing the M49A1 or C6 trip flare by clamping on a post, stake or sturdy stick is as follows:

a. Carry out the safety precautions.

b. The item to which the M49A1 or C6 trip flare will be clamped should be approximately 38 mm in diameter, to ensure a firm grip.

c. As for the installation of the M49A1 or C6 trip flare on a tree, the location chosen for installation by clamping should be in the logical path of infiltrating troops and so positioned that the field toward the enemy will be illuminated while friendly defence positions will not be disclosed.

d. Loosen both wing nuts on the bracket and slide the flare upwards until the base of the flare is aligned with the top of the slot or slightly above it.

e. Clamp the post in the bracket by tightening the lower wing nut with sufficient force to grip the post firmly.

f. Perform arming of the M49A1 or C6 trip flare as indicated further on in this lesson.

29. *Knowledge check using questions and practice drills*.

INSTALLATION ON THE GROUND

30. *Explanation, demonstration, imitation*. In this installation, arming with the pull pin should be planned, since the bracket trigger mechanism will not function due to interference from the ground. The correct sequence for installing the M49A1 or C6 trip flare on the ground is as follows:

a. Carry out the safety precautions.

b. Remove the lower wing nut and bolt and retain for future use.

c. Loosen the upper wing nut and remove the flare by sliding it upward through the bracket.

d. Place the M49A1 or C6 trip flare in a safe location until it is ready to use.

e. Install the bracket on a mount or raised area by forcing the point of the bracket into firm ground at least up to the slot. If this cannot be done by hand,

the foot should be used to force down on the rear portion of the bracket.

f. Clamp the M49A1 or C6 trip flare in its bracket by tightening the upper wing nut with sufficient force to grip the flare firmly.

g. Perform arming the M49A1 or C6 trip flare as indicated farther on in this lesson.

31. *Knowledge check using questions and practice drills*.

ARMING PROCEDURES FOR THE M49A1 OR C6 TRIP FLARE *(Explanation, Demonstration, Imitation)*

32. Depending on the type of installation, arming will be carried out using the bracket trigger assembly or the pull pin.

33. **Method number 1**. To arm the M49A1 or C6 trip flare using the bracket trigger assembly, the following will be carried out:

a. Fasten one end of the trip wire to a post, stake or other rigid object at the desired distance (usually 12 m) from the flare and to the right of the flare when facing the flare trigger. The trip wire should be at right angles to the axis of the trigger so that there will be no binding at the trigger pivot when the trigger is cocked.

WARNING

Do not place the foot on the thin section near the trigger assembly, as bending of the lever may prevent the M49A1 or C6 trip flare from functioning.

b. Press the lever down against the flare body with one hand. With the other hand, rotate the trigger one quarter turn counterclockwise against the spring pressure to a vertical position so that the lower end of the lever is behind the tongue (upper end) of the trigger.

c. Pull the loose end of the trip wire taut and fasten to the hole in the lower end of the trigger.

d. At this point, ensure that:

(1) the trip wire is taut and fastened at both ends;

(2) the trigger is in a vertical position; and

(3) the end of the lever behind the tongue of the trigger, so that when the safety slip assembly is removed, the lever will still be held by the trigger.

e. Hold the lever with one hand while carefully removing the safety clip assembly.

f. Very carefully release the hold on the lever, while making sure that the lever will be held in place by the tongue of the trigger.

34. **Method number 2**. To arm the M49A1 or C6 trip flare with the pull pin, the following will be carried out:

a. fasten one end of the trip wire to a post, stake or other rigid object at the desired distance (usually 12 m) from the flare and to the right or left of the flare when facing the flare trigger;

b. press the lever down with one hand and remove the safety clip assembly;

WARNING

Do not release the lever because this will cause the M49A1 or C6 trip flare to function.

c. while still holding the lever, insert the pull pin, which is attached to the safety clip, through the two safety clip holes of the cover loading assembly;

d. pull the loose end of the trip wire taut and fasten it to the loop in the pull pin;

e. very carefully, release the hold on the lever, making certain that the pull pin is retained in the safety clip holes by the lever; and

f. ensure visually that the trip wire is taut and fastened at both ends.

35. *Knowledge check using questions and practice drills*.

DISARMING *(Explanation, Demonstration, Imitation)*

36. Disarming procedures for the M49A1 or C6 trip flare will be carried out as follows:

a. If arming was done using the release mechanism:

(1) carefully depress and hold the lever against the body of the m49a1 or c6 trip flare;

(2) secure the lever by inserting one end of the safety clip through one of the safety clip holes of the cover holding assembly;

(3) snap the other end of the safety clip into the other safety clip hole;

(4) release the trigger; and

(5) detach the trip wire from the trigger.

b. If arming was done using the pull pin:

(1) carefully depress and hold the lever against the body of the m49a1 or c6 trip flare;

(2) remove the pull pin;

(3) secure the lever by inserting one end of the safety clip through one of the safety clip holes of the cover holding assembly;

(4) snap the other end of the safety clip into the other safety clip hole;

(5) release the trigger; and

(6) detach the trip wire from the pull pin.

37. *Knowledge check using questions and practice drills*.

PACKAGING

38. **Explanation**. M49A1 or C6 trip flares are packed with their brackets in lots of 32 in wooden boxes. The boxes also contain nails and reels of trip wire.

39. *Knowledge check using questions*.

40. **Conclusions**:

a. question period;

b. knowledge check using questions and practical drills;

c. carry out safety precautions;

d. pack the equipment; and

e. **review**:

(1) handle and carefully install the m49a1 or c6 trip flares; and

(2) avoid installing the flares near highly inflammable materials.

ANNEX A
FLARE, SURFACE, TRIP M49A1 OR C6

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS TO BE FOLLOWED WITH THE FLARE, SURFACE, TRIP M49A1 OR C6**		
1	Examine the safety clip to ensure that it engages correctly in the appropriate holes on the lid.		
2	Examine whether the lid assembly is loose or shows signs of corrosion.		
3	Check whether the flare and the bracket are deformed.		
4	Check whether the tension and the release position are correct.	**(*)**	
B	**COMMAND** **INSTALL THE FLARE, SURFACE, TRIP M49A1 OR C6 BY NAILING ON A TREE OR BOARD**		
1	The location chosen should be on a logical route and be located so as to illuminate the ground towards the enemy.		
2	Carry out the safety precautions.	**(*)**	
3	Unscrew the bracket wing nuts.		

Check	Skill to be performed	Pass Fail	Remarks
4	Remove the trip flare from the bracket by sliding it upwards.		
5	Place the flare in a safe place.		
6	Nail the bracket using the two nails supplied. It must be placed as close as possible to the vertical, approximately 40 cm from the ground.		
7	Mount the flare by aligning the lever with the trigger spring tongue and slide the flare downward into its bracket until the bottom edge is 1.6 mm above the bracket.		
8	Clamp the flare in the bracket by tightening the top wing nut.		
C	**COMMAND** **ARM THE FLARE, SURFACE, TRIP M49A1 OR C6 USING METHOD NO 1**		
1	Fasten one end of the trip wire at the desired distance from the flare to the right when facing the trigger (and at right angle to the access of the trigger to avoid blockage.)		
2	Press the lever down against the flare body and rotate the trigger to a vertical position.		
3	Pull the wire taut and fasten it to the hole on the lower end of the trigger.		
4	Ensure that:	**(*)**	

Check	Skill to be performed	Pass Fail	Remarks
	a. The trip wire is taut and fastened at both ends. b. The trigger is in a vertical position. c. The end of the lever is behind the tongue of the trigger.		
5	Hold the level with one hand and carefully remove the safety clip assembly.		
6	Very carefully release the hold on the level, ensuring that the lever will be held by the tongue of the trigger.		

CHAPTER 5
SMOKE POTS

GENERAL DESCRIPTION

1. Essentially, smoke pots are smoke grenades that are larger and have greater capacity and produce an extensive smoke screen in training and on operations.

TYPES

2. The following smoke pots are in current use in the Canadian Forces and are described in detail in Lesson 11:

a. smoke pot, ground type, white, 1 min (SC 840);

b. smoke pot, ground type, white, 3 and 5 mins;

c. smoke pot, ground type, orange, 3 mins; and

d. smoke pot, ground type, white, HC No 24 MK 2.

SAFE HANDLING OF SMOKE POTS

3. The principles and safety precautions set out in Chapter 2, Section 1, apply to the handling of all smoke producing equipment.

WARNING

All personnel must wear a gas mask in the vicinity of smoke, as some smoke pots and grenades contain toxic elements.

LESSON 1
SMOKE POT, GROUND TYPE, WHITE, 1 MINUTE (SC 840), SMOKE POT, GROUND TYPE, WHITE, 3 AND 5 MINUTES, SMOKE POT, GROUND TYPE, ORANGE, 3 MINUTES, SMOKE POT, GROUND TYPE, WHITE, HC Nº 24 MK 2.

NOTES FOR THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to recognize the various smoke pots and to use them safely.

2. **Main teaching points**:

   a. description and identification of the various smoke pots;

   b. identification of smoke pots;

   c. safety precautions;

   d. instructions for initiation;

   e. malfunctions; and

   f. packaging.

3. **Duration**. One x 40 minute period.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. diagram;

   b. smoke pot, ground type, white, 1 minute (sc 840);

   c. smoke pot, ground type, white, 3 minutes;

   d. smoke pot, ground type, orange, 3 minutes; and

   e. smoke pot, ground type, white, HC Nº 24 MK 2.

6. **Preparation**:

   a. conduct a thorough reconnaissance of the area to be used outside;

   b. check each smoke pot; and

   c. ensure that all students have their gas masks (in working order) in their possession.

7. **Miscellaneous**:

a. There are several different models of smoke pots in the Canadian Forces. The ones described below are those most frequently used. The other models are described in publication C-74-365-BAO/TA-000.

b. During the lesson, make the necessary corrections on the way to handle and identify the various smoke pots.

c. Emphasize the safety precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. inspect all the smoke pots;

b. ensure that the students do not touch any smoke pots before they have been given permission to do so; and

c. number off the students and explain that they will be working under your supervision.

9. **Review**. N/A

10. **Introduction**. Smoke pots (previously called smoke generators) are designed to provide extensive smoke screens for use during training and operations. Coloured smoke pots can be used to provide smoke signals in daylight or to check the strength and direction of the wind.

DESCRIPTION (*Explanation*)

11. The smoke pot, ground type, white, 1 minute (SC 840) is 38.1 mm in diameter and 76.2 mm high. It consists of a cylindrical card container with a 50.6 mm plastic igniter cord protruding from the top (figure 5-1).

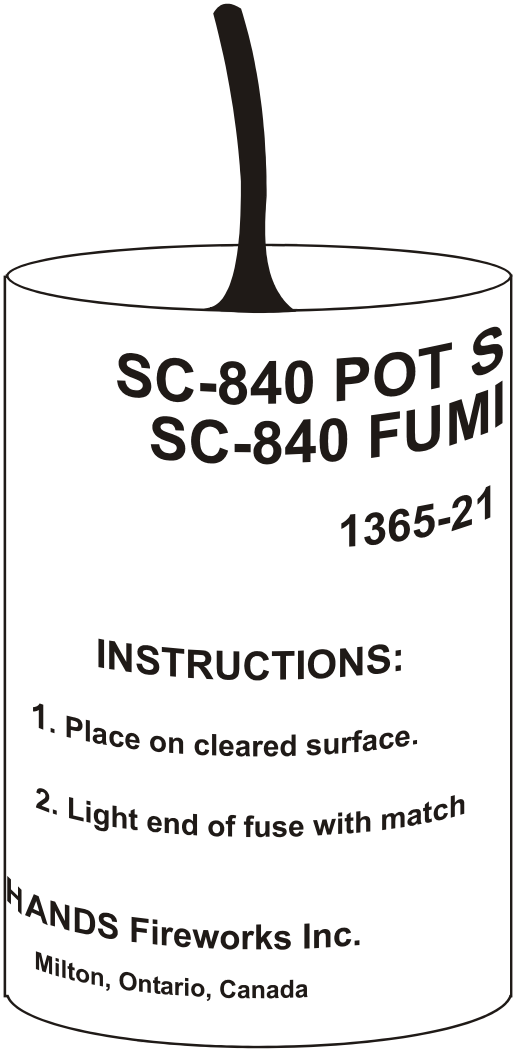

Figure 5-1: Smoke pot, ground type, white, 1 minute (SC 840)

12. Smoke pots, ground type, white, 3 and 5 minutes are identical, except that the smoke composition varies from 350 grams for the 3 minute to 580 grams for the 5 minute variant. They are 88 mm in diameter and 160 mm high. The body consists of a filled metal canister with a simple tear-off seal for lighting. The total weight is 570 grams (figure 5-2).

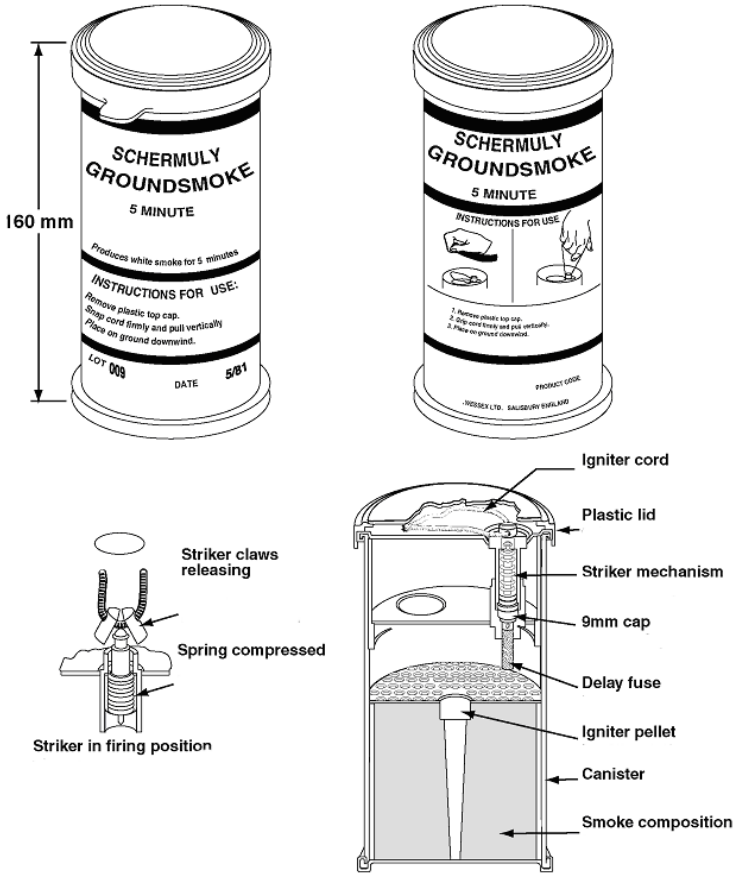

Figure 5-2: Smoke pot, ground type, white, 5 minutes

13. The smoke pot, ground type, orange, 3 minutes is 87 mm in diameter, 158 mm high and weighs 650 grams. It consists of a metal cylinder filled with a smoke-producing substance and a detachable plastic lid (figure 5-3).

Figure 5-3: Smoke pot, ground type, orange, 3 minutes

14. The smoke pot, ground type, white, HC No 24 MK 2 is 204.5 mm in diameter and 311 mm high. The body consists of a lead sheet or steel sheet cylinder, fixed at both ends by a folded seam. A steel

wire carrying handle with a wooden handle is attached by two clips welded to the top (figure 5-4).

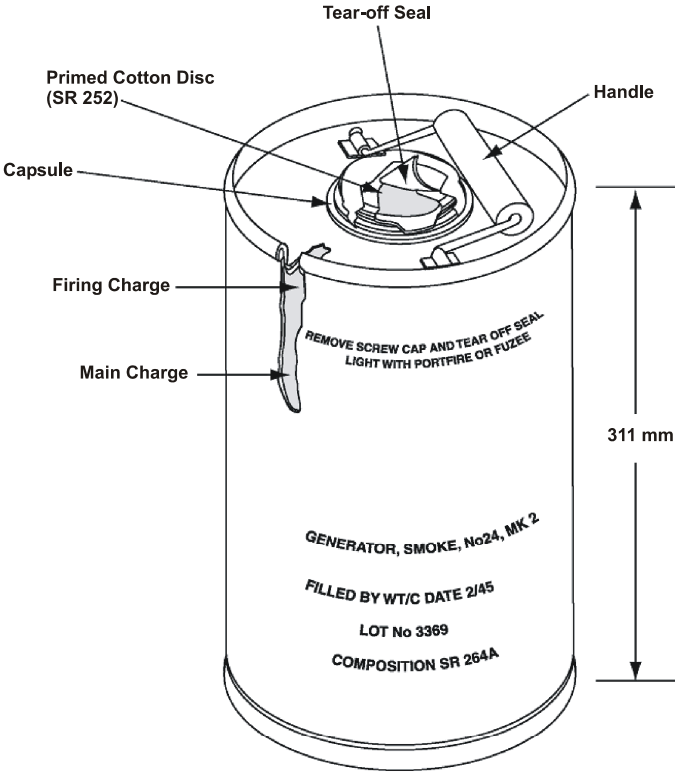

Figure 5-4: Smoke pot, ground type, white, HC N^{o} 24 MK 2

TYPE OF POT	APPLICATIONS	TOXICITY
SC 840	-Fire alarm exercise -Air conditioning and ventilation system tests -Identifying leaks in sewer and water supply systems	Low
White, 3 and 5 minute	-Fire alarm exercises -Tests of breathing apparatus -Smoke screen or positioning	Non-toxic Non-carcinogenic
Orange, 3 minutes	-Attract the attention of an aircraft crew to a point on the ground -Indicate wind strength and direction -Smoke signal in daylight	
HC No 24 MK 2	-Smoke screen (high capacity)	Toxic

Table 5-1: Applications and toxicity of smoke pots

IDENTIFICATION (*Explanation*)

15. The smoke pot, ground type, white, 1 minute (SC 840), is made of cardboard (figure 5-1).

16. Smoke pots, ground type, white, 3 and 5 minutes are light green with black markings. The plastic lid on the top is red (figure 5-2).

17. The smoke pot, ground type, orange, 3 minutes is similar to the smoke pot, ground type, white, 3 minutes (figure 5-3).

18. The smoke pot, ground type, white, HC No 24 MK 2 is light green with black markings (figure 5-4).

19. Most smoke pots contain the following information:

a. operating instructions;

b. description of the smoke pot;

c. the identity of the manufacturer, the month and year of filling;

d. lot number; and

e. filling composition.

20. *Knowledge check using questions*.

SAFETY PRECAUTIONS

21. **Explanation**. The safety precautions for the various smoke pots are as follows:

a. wearing a gas mask is mandatory in the presence of hexachloroethane (HC) smoke;

b. personnel must don gas masks before using smoke and remain masked until the smoke has dissipated;

c. the smoke must not be directed towards military or civilian establishments or towards trenches containing personnel who are not protected or unable to don masks;

d. hexachloroethane smoke must not be used when there is a danger of obscuring public roads, railways, aircraft landing areas, etc.;

e. smoke must not be directed towards fibua sites, casemates or vehicles in which it cannot disperse easily;

f. before using hexachloroethane smoke, all personnel not involved in training will leave the area;

g. personnel who are taking part in exercises where hexachloroethane smoke will be present must, prior to the start of each exercise, receive a briefing on the health hazards and mandatory preventive safety precautions;

h. hexachloroethane smoke grenades can set fire to dry grass and must therefore be used with caution;

i. hexachloroethane smoke grenades must not be used within 25 m of highly inflammable substances; and

j. do not use smoke grenades near electronic circuit boards or delicate parts, as the residue produced could have a detrimental impact on their operation.

22. *Knowledge check using questions*.

FIRING INSTRUCTIONS

23. *Explanation, demonstration, imitation.* Ensure that the safety precautions have been followed, place the smoke pot on the ground and follow the instructions stencilled on the side.

MALFUNCTIONS

24. **Explanation**. Smoke pots which do not function properly will be destroyed in accordance with Canadian Forces Technical Order (CFTO) C-009-008-002/FP-000, *Disposal of Malfunctions and Unexploded Ordnance*.

25. *Knowledge check using question and practice drills*.

PACKAGING *(Explanation)*

26. The smoke pot, ground type, white, 1 minute (SC 840) is issued in packs of five in a plastic bag. These bags are placed six to a cardboard box and the boxes two to another cardboard box, for a total of 60 smoke pots.

27. Smoke pot, ground type, white, 3 and 5 minutes are issued packed 25 to a wooden box.

28. Smoke pots, ground type, orange, 3 minutes are issued packed 20 to a wooden box.

29. Smoke pots, ground type, white, HC No 24 MK 2 are issued packed individually in a cardboard box.

30. *Knowledge check using questions.*

31. **Conclusion**:

a. question period;

b. knowledge check using questions and practical drills;

c. carry out safety precautions;

d. pack the equipment; and

e. **review**:

(1) always obey the safety rules when using smoke pots; and

(2) always ensure that the pot is in a safe place before igniting.

ANNEX A
SMOKE POTS, GROUND TYPE

Check	Skill to be performed	Pass Fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS TO BE FOLLOWED WITH SMOKE POTS**		
1	Read the instructions on the side of the pots.		
2	Inspect the general condition of the pot to ensure that it has not been damaged.	(*)	
B	**COMMAND** **INITIATE THE SMOKE POTS**		
1	Read the instructions to follow the initiation procedure.		
2	Remove the cap and tear off the seal.		
3	Light the prime cotton disc with a match fuse.		

CHAPTER 6
GRENADE LAUNCHER, SMOKE 38 MM AND GRENADE, CS, EMISSION TYPE

NOTES FOR THE INSTRUCTOR

1. **Aim**. The aim of this lesson is to teach students how to use the 38 mm CS grenades and grenade launchers safely.

2. **Main teaching points**:

   a. description of the 38 mm calibre smoke grenade launcher;

   b. description of the grenade, CS, 38 mm;

   c. characteristics of the grenade, CS, 38 mm;

   d. safety precautions;

   e. functioning;

   f. firing instructions;

   g. malfunctions; and

   h. packaging.

3. **Duration**. Two x 40 minute periods.

4. **Method**. Basic instruction period.

5. **Equipment**:

   a. diagram showing the various models of tear gas grenades;

   b. one grenade, CS, 38 mm per student; and

   c. one grenade launcher, smoke, 38 mm.

6. **Preparation**:

   a. conduct a thorough reconnaissance of the area to be used outside;

   b. place one grenade, CS, 38 mm in front of each student; and

   c. ensure that all personnel in the training area have their gas masks in their possession.

7. **Miscellaneous**:

a. during the lesson, make any corrections required on how to aim and fire the grenade launcher, smoke, 38 mm; and

b. stress the importance of safety precautions.

CONDUCT OF THE LESSON

8. **Preliminaries**:

a. carry out the safety precautions on the grenade, Cs, 38 mm and the grenade launcher, smoke, 38 mm;

b. ensure that the students do not touch any grenades, CS, 38 mm before they have been given permission to do so; and

c. number off the students and explain that they will be working under your supervision.

9. **Revision**. N/A

10. **Introduction**. The 38 mm calibre smoke grenade launcher is used in the Canadian Forces as an anti-riot weapon. It can launch four different models of grenades (all emission types): grenade, CS, 38 mm for open spaces; grenade, CS, 38 mm for enclosed spaces; grenade, SPEDHEAT, CS, 38 mm, No 560, long range; and the grenade, teargas, FLITERITE, CS, 38 mm, No 530. They are used to control or break up crowds, riots or people behind a barricade.

DESCRIPTION OF THE GRENADE LAUNCHER, SMOKE, 38 MM

11. **Explanation**. The smoke grenade launcher is of simple design and has the following characteristics (figure 6-1):

a. calibre: 38 mm;

b. weight: 3.42 kg;

c. length: 736.6 mm;

d. mechanism: double action, hammer not visible;

e. sights: breech block set at 50 yards (45.7 m); rear sight adjustable from 75 to 100 yards (68.6 and 91.4 m); and

f. safety catch.

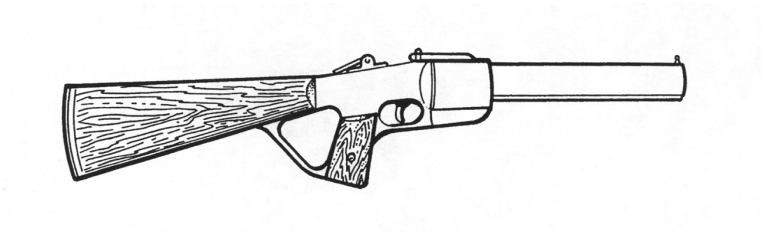

Figure 6-1: Grenade launcher, smoke, 38 mm

12. *Knowledge check using questions*.

DESCRIPTION OF CS GRENADES, 38 MM

13. **Explanation**. CS grenade, 38 mm consists of two main assemblies:

a. **The bolt**. This contains the fuze and the propellant charge, which is held in place by an over-powder wad.

b. **Projectile**. This includes a delay charge and the tear gas element, and includes gas emission holes. Some models also include stabilizer finds or a crenelated forebody to improve effectiveness under specific circumstances.

14. *Knowledge check using questions*.

CHARACTERISTICS OF GRENADES, CS, 38 MM

15. **Explanation**. The main details of each model are given below (figures 6-2 to 6-5):

	Tear gas grenade, for open areas	Tear gas grenade for enclosed spaces	SPEDHEAT No 560, long range	FLITERITE No 530
Weight	200 g	113.4 g	283.5 g	425.3 g
Delay	1 to 5 s	None	3 s	3 s
Emission time	10 to 25 s	Instantaneous emission	25 to 35 s	40 s
Muzzle velocity	100 m/s	126.5 m/s	68.6 m/s	59.4 m/s
Max range	100 m	80 m	140 m	290 m

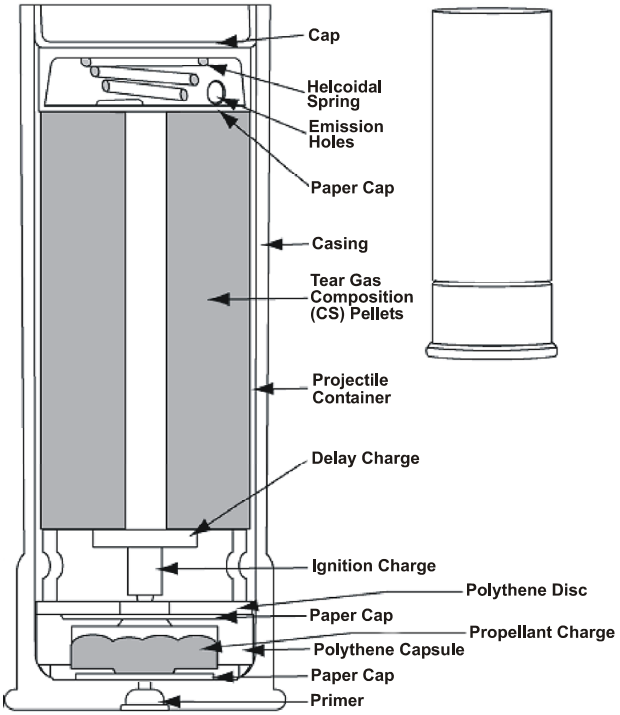

Figure 6-2: Tear gas grenade for open areas

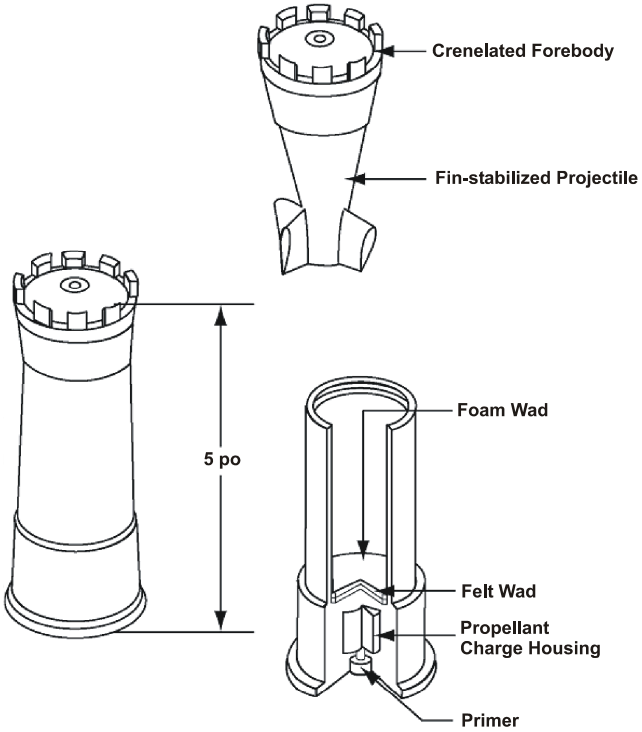

Figure 6-3: Tear gas grenade for enclosed spaces

16. *Knowledge check with questions*.

WARNING

Projectiles marked "NOT TO BE USED AGAINST CROWDS" must not be launched against personnel.

The smoke emitted is harmful and can be toxic in high concentrations

SAFETY PRECAUTIONS. *Explanation.*

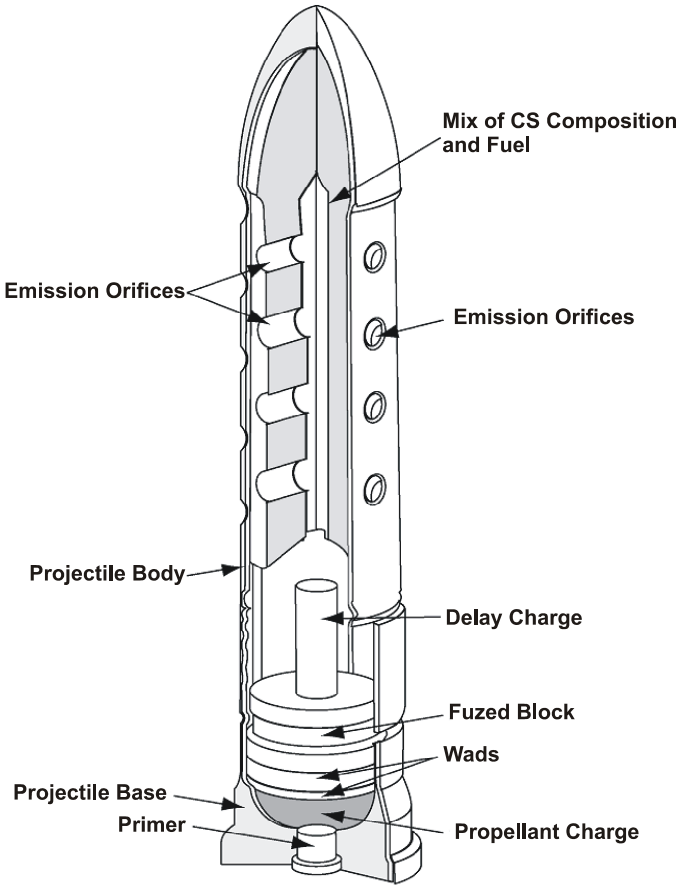

Figure 6-4: Grenade, CS, 38 mm, SPEDHEAT

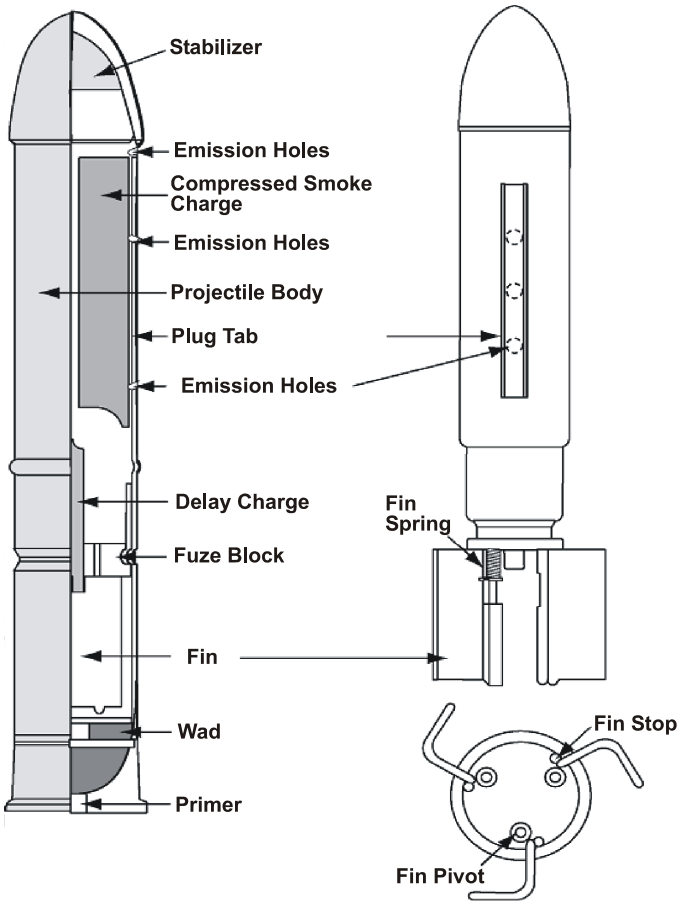

Figure 6-5: Grenade, CS, 38 mm, FLITERITE

17. The 38 mm calibre smoke grenade launcher is particularly dangerous at short range, because of the diameter of its projectile and its relative inaccuracy. This weapon, in addition, poses all the hazards peculiar to short barrelled weapons. It will be used by trained personnel only.

18. SPEDHEAT and FLITERITE projectiles can set fire to inflammable materials near the point of impact.

19. Consideration will always be given to the potential effects of gas on innocent persons or friendly forces downwind from the gas.

20. *Knowledge check using questions*.

FUNCTIONING

21. **Explanation**. After firing, the projectile is ejected from the tube. On some models, stabilizer fins open on leaving the barrel. Then, the delay element ignites and after the delay, ignites the main CS charge and allows the gas to escape through the holes in the projectile. There is no explosion or fragmentation of the projectile. Some projectiles are reinforced to enable them to go through windows, door or other flimsy structures.

22. *Knowledge check using questions*.

INSTRUCTIONS FOR FIRING

23. The grenades are issued ready for use. The 38 mm calibre CS grenade launcher is all that is required to launch them.

24. SPEDHEAT and open area grenades are designed to tumble beyond a range of 30 m in order to minimize potential injuries from a straight trajectory. Their maximum effective range is between 115 and 125 m. These projectiles are used as follows:

a. Range of 50 to 100 m. Aim by raising the rear sight so that the projectile hits the ground near the target.

b. Range under 50 m. The projectile is fired at the ground so that it will bounce or ricochet. This allows the projectile to roll and lose speed.

25. FLITERITE grenades and grenades for enclosed spaces are designed to go through doors and can cause serious injury. The FLITERITE projectiles are marked “NOT TO BE USED AGAINST CROWDS”.

26. Projectiles for enclosed spaces have a higher initial velocity, as a result of which the weapon aims high. To compensate, each box of ammunition contains a number of plastic foresights which must be affixed to the weapon's fixed foresight.

27. In contrast to the FLITERITE projectile, the grenade for enclosed spaces poses no fire hazard, as it contains a liquid charge.

MALFUNCTIONS

28. **Explanation**. Duds will be destroyed in accordance with the Canadian Forces Technical Order (CFTO) C-09-008-002/FP-000, *Disposal of Misfires and Unexploded Ordnance*.

29. *Knowledge check using questions.*

PACKAGING

30. **Explanation**. The grenade types are packed as follows:

a. grenade, CS, 38 mm, for open areas, emission type is issued in packs of 100 per wooden box;

b. grenade, CS, 38 mm for enclosed spaces, emission type is issued in packs of 100 per fibreboard box;

c. the grenade, CS, SPEDHEAT, 38 mm, no 560, long range, emission type is packed individually in a fibreboard box, then packed 26 packets to a wooden box; and

d. grenade, CS, 38 mm, FLITERITE, emission type, no 530 is packed individually in a fibreboard box, then packed in packets of 20 to a cardboard box.

31. *Knowledge check using questions*.

32. **Conclusion:**

a. Question period.

b. Knowledge check using questions and practical drills.

c. Carry out the safety precautions.

d. Pack the equipment.

e. **Review**: always obey the safety rules when using cs grenades.

ANNEX A
GRENADE LAUNCHER, SMOKE, 38 MM AND GRENADE, TEAR GAS, CS, EMISSION TYPE

Check	Skill to be performed	Pass or fail	Remarks
A	**COMMAND** **DESCRIBE THE SAFETY PRECAUTIONS WITH THE GRENADE LAUNCHER, SMOKE, 33 MM**		
1	Apply the same safety rules as with all short barrelled weapons.		
2	Only qualified individuals may use it.		
3	Take the effect of the gas into account.		
4	Smoke grenade launchers have no safety catch; they must accordingly not be loaded until immediately prior to use.	**(*)**	
5	Grenade launchers must be open during movement.		
B	**COMMAND** **FIRING THE GRENADE LAUNCHER, SMOKE, 38 MM**		
1	Inspect the smoke grenade for flaws.		
2	Insert the grenade into the launcher, the base to the rear.		
3	Close the launcher only when ready to fire.	**(*)**	
4	Fire the shot, aiming at the target, depending on the grenade used.		

CHAPTER 7
TRAINING WITH LIVE GRENADES ON THE RANGE

INTRODUCTION

1. Exercises with live ammunition inspire the thrower with confidence in his or her ability to handle a dangerous weapon.

2. Accidents are generally due to one of the following causes:

   a. ignorance;

   b. negligence;

   c. deliberate flouting of approved procedures;

   d. bravado;

   e. nervousness; and

   f. lack of confidence.

3. The first four causes can be overcome by training, supervision or disciplinary action. The last two can be mastered by practice. All can be eliminated by competent instructors who inspire confidence and who exercise efficiency and good control on the grenade range.

4. Details regarding the responsibilities of every individual, safety, action on duds and the conduct of practices are to be found in B-GL-381-001/TS-000. Instructional and range control staffs must be thoroughly acquainted with all the regulations contained therein.

CONDUCT OF EXERCISES WITH GRENADES

5. Grenades must be kept in the Preparation Bay. Movements will be carried out in the shelter of the Preparation Bay to take grenades, and then from the Preparation Bay to the throwing bay.

6. The safety assistant in the Preparation Bay will distribute the grenades to students as they arrive at his or her location from the shelter. He or she will ensure that every student carries out the safety precautions on the grenades issued to them. They will then turn the students and their grenades over to those in charge of the throwing bays.

WARNING

Grenades shall not be taken into the shelter at any time.

RANGE MANOEUVRE ORDERS

7. It is suggested that the method shown in figure 7-1 be employed to establish the procedure for a typical grenade range practice. The commands and procedures that must be employed on a conventional grenade range are shown at Table 7-1.

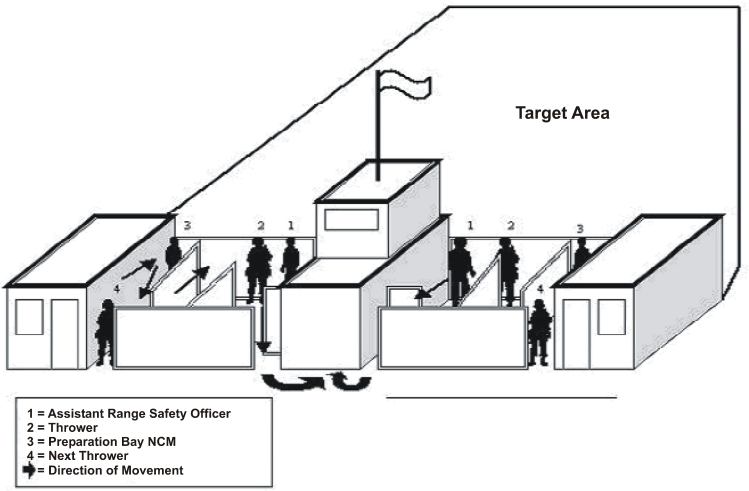

Figure 7-1: Sequence of conduct for live grenade throwing

NOTE

During a range exercise or on operations, the commands and procedures described will be changed in accordance with the circumstances. However, the thrower will always shout **GRENADE** when he or she throws the grenade, to warn his or her comrades of their actions.

RANGE EXERCISE—CONTROL OF MOVEMENTS

Serial	Range Safety Officer	Assistant Range Safety Officer	Thrower	Remarks
1	**Nos 1 and 2 move to Preparation Bay.**		Nos 1 and 2 move to Preparation Bay and pick up grenades.	Safety precautions are carried out by the throwers.
2	**Nos 1 and 2 to the Throwing Bay.**	They take control of the throwers.	Nos 1 and 2 move to their Throwing Bay.	
3	**Nos 3 and 4 to the Preparation Bay.**	They give instructions to throwers 1 and 2.	Nos 3 and 4 move to Preparation Bay and pick up grenades.	The safety precautions are carried out by the throwers.
4	**Adopt the ready position.**	They repeat the order.	Acts as taught.	
5	**No 2 Throwing Bay down.**	He repeats the order and takes cover.	He takes cover.	
6	**No 1 Throwing Bay GO ON.**	Gives the order **READY**.	Acts as taught.	
7		Gives the order **THROW**.	Acts as taught.	The thrower will shout **GRENADE**
8	**Down.**	He repeats the orders and takes cover.	He takes cover.	Everyone awaits the explosion. If there is a malfunction, they will follow the malfunction procedure.
9	**No 1 Throwing Bay down.**	He repeats the order and takes cover.	He takes cover.	
10	**No 2 Throwing Bay go on.**			Serials 6-7 and 8 are repeated.
11	**Change.**	They direct the throwers to the	Throwers 1 and 2 go to the	The procedure continues until

		shelter and receive throwers 3 and 4.	shelter; throwers 3 and 4 go to the Throwing Bay and throwers 5 and 6 go the Preparation Bay.	the last thrower has thrown.

Table 7-1: Range exercises—control of movements

NOTE

The layout of the range or exercise may vary, but the sequence of movements will remain the same

CAUSES OF DUDS

8. In most cases, the Safety Officer will establish the cause of the malfunction when the grenade is thrown.

9. If the grenade fails to explode, this may be due to one or more of the following causes:

a. the lever pin was not withdrawn;

b. the lever became jammed;

c. failure of the striker mechanism;

d. fuze fails to burn; and

e. faulty detonator.