ROYAL CANADIAN ARMY CADETS

SILVER STAR

INSTRUCTIONAL GUIDE

SECTION 7

EO M326.05 – USE EXPEDITION EQUIPMENT

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Refer to the owner's manual for the operating instructions for the following items:

- single-burner expedition stove,
- water filter,
- fuel bottle,
- fuel,
- rope,
- pocket knife/multipurpose tool,
- carabiner, and
- headlamp.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

Demonstration and performance was chosen for this lesson as it allows the instructor to explain and demonstrate the uses of expedition equipment while providing an opportunity for the cadets to practice operating this equipment under supervision.

INTRODUCTION

REVIEW

N/A.

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OBJECTIVES

By the end of this lesson the cadet shall be expected to safely employ equipment required during an expedition.

IMPORTANCE

It is important for cadets to understand how to operate equipment being used on expedition training so that they can safely use the equipment. Proper working equipment will make expedition training safer and efficient. Correctly using equipment will ensure the equipment lasts longer and requires less maintenance.



For this skill lesson, it is recommended that instruction take the following format:

(1) Explain and demonstrate the complete skill while cadets observe.

(2) Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.

(3) Monitor the cadets' performance as they practice the complete skill.

Note: Assistant instructors may be employed to monitor cadet performance.

Teaching point 1 **Explain, Demonstrate and Have the Cadet Operate a Single-Burner Expedition Stove**

Time: 25 min Method: Demonstration and Performance



Refer to the owner's manual for the operating instructions for the single-burner expedition stove.



This TP focuses on expedition equipment that the cadets may not have been introduced to before. When available, have examples of each piece of equipment and pass them around so the cadets can see the equipment and handle it.

During an expedition it is important that cadets are aware of the equipment that is being brought. Cadets should know the various uses for each piece of equipment, how it works and how to make basic repairs as required.

The stoves used at expedition centres are single-burner expedition stoves. These stoves are used because of size, weight and functionality. Single-burner expedition stoves are portable stoves that allow cooking anywhere without having to make a fire. These stoves are stored easily and can be carried in a pack during an expedition. Single-burner expedition stoves are commonly fuelled by using white gas such as naphtha and can perform well in extreme cold and high altitudes.



The stove featured in this lesson is the Coleman Peak One, if another is used, substitute information from the owner's manual.

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IDENTIFYING PARTS AND ACCESSORIES

The Coleman Peak One single-burner expedition stove has the following characteristics:

- powerful 7500 BTUs with precise flame control,
- fold out legs that collapse for storage and keeps the stove stable,
- liquid fuel appliance offers superior operational fuel and cost efficiency,
- integrated 350-mL fuel tank,
- one fill-up per weekend of camping,
- 2-hour burn time on high, 7.5 hours on low, and
- boils 0.94 L (one quart) of water in four minutes.



The diagram provided is for part identification, not disassembly purposes.

The parts and accessories of a single-burner expedition stove are:

Burner Plate. Fitted with a grate to ensure cookware remains stable.

Stove Grate. The stove grate supports pot sets and ensures pots remain stable.

Fuel Line. The line from the fuel tank that provides the burner plate with fuel.

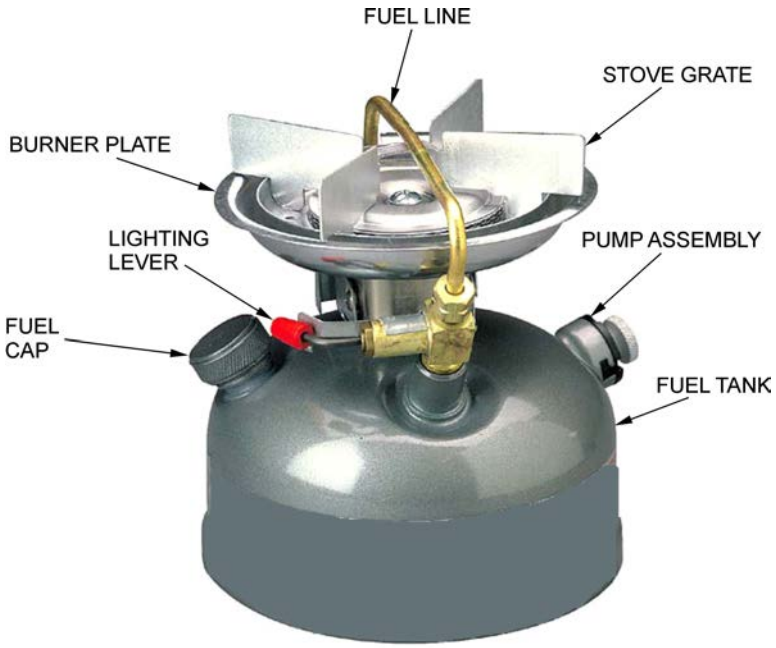
Pump Assembly. The pump assembly is fitted into the tank and is held in place by a locking mechanism.

Lighting Lever. The lighting lever is the on/off switch for the stove.

Fuel Cap. The fuel cap keeps the fuel from spilling.

Fuel Tank. The fuel tank is on the bottom of the stove. This tank is only intended to be filled to three quarters full, allowing air in for pressurization.

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"Backpackgear Online", Copyright 2007 by Maguire and Johnson Web Services. Retrieved March 28, 2007, from http://www.coleman.com/coleman/colemancom/detail.asp?product_id=533B705&categoryid=2020

Figure 1 Single-Burner Mountain Stove

IDENTIFYING FUEL TYPE AND OPERATIONAL TEMPERATURES

The stove uses naphtha fuel.

It is operational in all types of temperatures.

ASSEMBLY

The single-burner expedition stove comes assembled. The fold out legs only need extending.

LIGHTING AND EXTINGUISHING

Precautions

Hazards are few if precautions are taken. Follow these few simple rules:

- Never leave the stove unattended.
- Do not use a stove as a heating device or in enclosed spaces such as buildings, tents or caves.
- Never loosen the filler cap on the fuel tank while the stove is in operation.
- Always fill and light the stove outside in a well ventilated area, away from open flame, heat and combustibles.
- Use only naphtha fuel.
- Store away from open flame or excessive heat.
- Before transporting or storing, ensure the stove is cool. Loosen the filler cap to release air pressure and retighten. Turn the control knob off.
- If the stove catches fire, turn off the fuel supply.
- When using the stove ensure a fire extinguisher is available.

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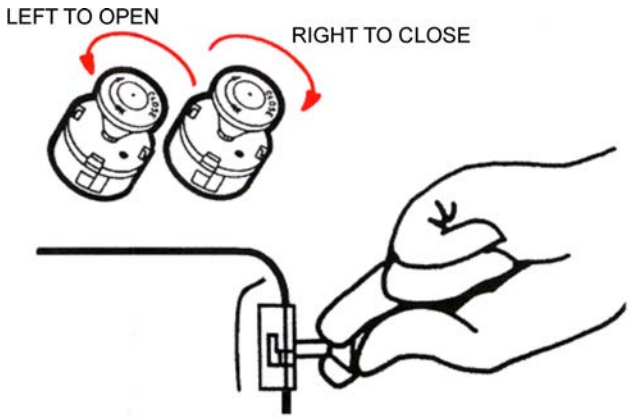
Stoves must not be used in enclosed spaces such as buildings and tents. The burning of naphtha and other fuels results in the release of carbon monoxide. Carbon monoxide binds with hemoglobin 200–250 times better than oxygen, and disrupts almost all physiologic and neurologic systems, even in fairly low concentrations. The gas is heavier than air, and pools in the low ground of tents and caves where outdoor enthusiasts sleep, and will not go away for days unless it is forced out by a strong, persistent direct draft of cold air at the height of the pooled gas. Preventing the problem in the first place requires a similarly active draft at the bottom of the stove, not at the top of the tent or cave as was once thought.

According to one recent research study, asphyxiation in tenting situations kills three times as many people yearly than mountaineering does. Other research has linked even moderate exposure to carbon monoxide to significant long-term effects, including depressed mood, apathy, disorientation, irritability and amnesia. Several of these symptoms occur in 100 percent of individuals exposed and can be measured years after the initial exposure. Risks also increase in higher altitudes.

Priming the Single-Burner Expedition Stove

To prime the single-burner expedition stove follow these steps:

1. Make sure the control knob is in the OFF position.
2. Turn the pump rod two full turns counter-clockwise to open.
3. Place the thumb over the air vent of the pump rod handle.
4. Pump 30–40 strokes to pressurize the fuel tank.
5. Turn the pump rod clockwise until it is closed tight.



The Canadian Coleman Co., Coleman Camp Stove Model M425F710C Instructions for Use, The Canadian Coleman Co.

Figure 2 Priming the Fuel Tank

Lighting the Burner

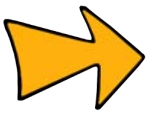
To light the burner follow these steps:

1. Do not lean over the stove while lighting.
2. Hold a lit match near the burner.
3. Turn the control lever to the LIGHT position.

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4. Monitor the flame.

5. When the flame turns blue in colour (approximately one minute), turn the instant light lever down and turn the control knob to the desired heat setting (HI–LO).



Should the stove fail to light or the match goes out before ignition, turn the control lever to the OFF position and wait two minutes before attempting to light the stove again.

Extinguishing the Burner

To extinguish the burner follow these steps:

1. Remove cookware from the stove and turn the instant light lever to the OFF position.

2. Turn the control lever clockwise to the OFF position and close firmly.

Storing After Use

To store the single-burner expedition stove follow these steps:

1. Allow the stove to cool before packing.

2. Ensure the stove is clean and any dirt, matches, etc are removed.

3. Empty all fuel from the stove.

4. Store the stove in a cool, dry location.

CONFIRMATION OF TEACHING POINT 1

The cadets' participation in lighting a stove will serve as the confirmation of this TP.

Teaching point 2 **Explain, Demonstrate and Have the Cadet Operate a Water Filter**

Time: 5 min Method: Interactive Lecture

A water filter can be used to strain out most parasites and micro-organisms by pumping the water through a filter. A filter is made of a thick porous material such as carbon or ceramic which trap particles as the water flows through it.



Contamination by wildlife, farm animals, pollutants or other hikers may introduce micro-organisms into water sources that can cause intestinal problems. It is imperative that all collected water is treated before being consumed. Filtering is the best way.

IDENTIFYING CHARACTERISTICS



Refer to the owner's manual for the operating instructions for the water filter.

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The following are characteristics of the ceramic water filter:

- filters at a 1 L per minute flow rate;
- effective against all protozoa, most bacteria, and chemicals including iodine and chlorine; and
- includes foam pre-filter.

The MSR WaterWorks water filter (as illustrated in Figure 3) is a rugged and lightweight water filter. Its polyurethane construction and carbon-cored ceramic filter element removes larger bacteria and some chemicals (iodine and chlorine) along with odours and tastes.

A gauge is supplied to determine when the ceramic filter needs replacing.

IDENTIFYING PARTS AND ACCESSORIES

The diagram provided is for part identification, not disassembly purposes.



"Mountain Equipment Coop", Copyright 2007 by Mountain Equipment Coop. Retrieved November 16, 2007, from http://www.mec.ca/Products/product_detail.jsp?PRODUCT%3C%3Eprd_id=845524442372421&FOLDER%3C%3Efolder_id=2534374302696689&bmUID=1195238644467

Figure 3 Water Filter

Pumping Handle. The lever that allows the user to pump the water.

Filter Cap. A protective covering that covers the ceramic filter.

Ceramic Filter. Located within a plastic enclosure, the water filter has a 0.2 micron membrane that removes bacteria and acts as a second line of defence around the ceramic filter. The wide-mouth base reduces spillage and the risk of cross-contamination with unfiltered water.

Filter Gauge. Gauge used to determine when filter requires replacement.

ASSEMBLY

The water filter should be assembled and ready to use. To use:

1. Remove the filter cap.
2. Begin pumping the handle in a steady manner to pump water.

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MAXIMUM FILTERING CAPACITY

Normal conditions will allow a user to filter between 10–20 L of water between cleanings.

PUMPING WATER

To pump water:

1. Place the hose with the float end in the water source. (If a bucket or pot is available, collect water in the bucket or pot and filter from there). This will assist in keeping dirt out of the filter.
2. Attach the filter to a wide-mouth bottle.
3. Pump the pumping handle a few times to prime the pump.
4. Pump the handle to draw water until the bottle is full.

DISMANTLING AND CLEANING

Any excess water should be released from the filter and the filter should be allowed to air dry. This will prevent the growth of mold, mildew and bacteria.

When storing for long term, the ceramic filter should be removed and air dried for 3–5 days. Wash and dry other filter parts thoroughly.

CONFIRMATION OF TEACHING POINT 2

The cadets participation in using a water filter will serve as the confirmation of this TP.

Teaching point 3 **Explain, Demonstrate and Have the Cadet Safely Use Expedition Equipment**

Time: 15 min Method: Demonstration and Performance



Refer to the owner's manual for the operating instructions for the fuel bottle, rope, pocket knife, carabiner and headlamp.



When using equipment, everyone should:

- Store equipment in a secure place. Never leave equipment lying around or touching the ground.
- Always use the right tool for the job.
- Follow the safety procedures for using the equipment.
- Keep the edges of blades sharp and handles tight.
- Clean and lightly oil steel parts before storage.

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FUEL BOTTLE

Fuel is carried in a separate container to ensure there is no spillage of fuel in the pack. Fuel containers are either aluminum or plastic. Aluminum containers are usually a cylindrical aluminum bottle. Plastic bottles are usually red in colour and have a fluoropolymer inner coating that resists both gasoline and alcohol. Plastic fuel bottles should never be used as a tank for a stove or be pressurized with a pump. Once a container is used for a particular type of fuel it should not be used for another fuel, as the substances will combine and deteriorate the container or combust.



"Mountain Equipment Coop", Copyright 2007 by Mountain Equipment Coop. Retrieved March 28, 2007, from http://www.mec.ca/Products/product_detail.jsp?PRODUC%3C%3Eprd_id=845524441772275&FOLDER%3C%3Efolder_id=2534374302696497&bmUID=1175178016804

Figure 4 Aluminum Fuel Bottle

Storing Techniques

During expedition training, fuel bottles will be stored with cooking equipment or in the designated location specified by the instructors.

Fuel bottles should be stored empty whenever possible.

If the bottle is being stored with fuel, it should be stored in a locked area, away from any flammables and other explosive materials.

Transferring Fuel to and From the Fuel Bottle

When transferring fuel to and from the fuel bottle, a funnel or spigot should be used to prevent splashes, leaks and spills.

ROPE

While rope can be heavy to carry, it is an extremely advantageous piece of expedition equipment. A length of rope, approximately 15 m, can be used to hang food in the food hang, make a clothesline to dry clothing or tie a tarp to make a shelter when there is inclement weather. It can also be used to complete minor field repairs.

Cleaning

Ropes should be washed frequently with a soap. Hang the rope to dry, out of direct sunlight.

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Storing

Storing a rope should only be done when it is completely dry, free of knots and coiled loosely. Ropes should be stored in a cool, dry place away from sunlight, heat, and chemicals.

Coiling

Depending on the length of the rope, rope should be coiled using a mountaineer's coil or a butterfly coil.

POCKET KNIFE/MULTIPURPOSE TOOL

A pocket knife or multi-purpose tool is essential for repairing equipment and cutting rope, cord or bandages. The key is to find a knife or tool that is small but has a blade, scissors, and screwdriver that are required while out on an expedition.

Sharpening

Blades should be sharpened regularly with a proper sharpening stone or tool. It is important to follow the manufacturer's directions regarding care.

Holding

A firm grip should be taken on the handle of any knife. If the pocket knife has a locking mechanism, it should be used.

Storing

All pocket knives should be cleaned before storage. Pocket knives should be stored in their sheaths and oiled prior to long-term storage.



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Figure 5 Multi-Purpose Knife



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Figure 6 Multi-Purpose Tool

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CARABINER

A carabiner is a common piece of equipment used primarily in mountaineering activities such as climbing and abseiling. On an expedition, a carabiner is an essential piece of equipment as it can be used in a variety of circumstances, such as:

- attaching the tether line in the canoe or to a pack;
- clipping a water bottle to the outside of a pack;
- stringing up a food hang or clothesline; and
- attaching a throw bag to the thwart of the canoe.

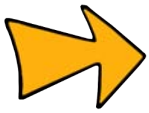
HEADLAMP

A headlamp is simply a flashlight that has been attached to an adjustable strap that fits around the user's head. It is very beneficial while out on an expedition as it frees up the user's hands to complete tasks after dark, such as reading a map, lighting a stove, setting up a tent or finding the bathroom.



"Mountain Equipment Coop", Copyright 2007 by Mountain Equipment Coop. Retrieved November 16, 2007, from http://www.mec.ca/Products/product_detail.jsp?PRODUCT%3C%3Eprd_id=845524442621000&FOLDER%3C%3Efolder_id=2534374302697057&bmUID=1195238790425

Figure 7 Headlamp



Headlamps can use a combination of light-emitting diodes (LED) and halogen bulbs. Choosing a headlamp will vary depending on use. Halogen bulbs offer the brightest output, but use battery power fast. LED bulbs give off sufficient light and are very efficient.



Extra batteries must always be brought to supplement those currently in the headlamp.

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CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. Why is it preferable to have a headlamp with both LED and halogen bulbs?

Q2. What are some of the materials that water filters are made from?

Q3. What can a carabiner be used for?

ANTICIPATED ANSWERS

A1. Halogen bulbs offer the brightest output, but use battery power very fast. LED bulbs do not give off as much light, but are very efficient.

A2. Filters can be made from a thin sheet with precisely-sized pores which prevent all objects larger than the pores from moving through it or from thick porous materials such as carbon or ceramic which trap particles as the water flows through it.

A3. Carabiners can be used for:

- attaching the tether line in the canoe or to the expedition field pack;
- clipping a water bottle to the outside of the expedition field pack;
- stringing up a food hang or clothesline; and
- attaching a throw bag to the thwart of the canoe.

END OF LESSON CONFIRMATION

The cadets' participation in using expedition equipment will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 8 (326 PC).

CLOSING STATEMENT

Knowing how to properly use, and store expedition equipment will allow the cadets to successfully complete training without added assistance from instructors or staff.

INSTRUCTOR NOTES/REMARKS

Additional staff may be required to supervise cadets using expedition equipment.

Instructors should refer to the owner's manual for the operating instructions for the single-burner expedition stove.

Instructors should refer to the owner's manual for the operating instructions for the water filter.

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Instructors should refer to the owner's manual for the operating instructions for the fuel bottle, rope, pocket knife, carabiner and headlamp.

It is recommended that this EO be taught where opportunities exist rather than in a structured 60-minute period.

Expedition centres are required to select two dynamic modes of travel from EO M326.02a (Paddle a Canoe, Section 2), EO M326.02b (Ride a Mountain Bike, Section 3), and EO M326.02c (Hike Along a Route, Section 4) to incorporate into their weekend training.

This EO has been allocated one period in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Timings for this EO will vary. While there is a requirement for some initial training, the focus should be on having the cadets practice hiking techniques through practical application.

Upon arrival at the expedition centre cadets will be broken into teams/groups. These teams/groups will remain the same for the duration of the weekend.

REFERENCES

N/A.

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