ROYAL CANADIAN ARMY CADETS

RED STAR

INSTRUCTIONAL GUIDE

SECTION 8

EO C224.02 – PREPARE A SIGNAL FIRE

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-702/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.

Prior to conducting this lesson, prepare the following:

- a three fire triangle;
- a torch tree; and
- a luminous cone fire.

Instructors will only demonstrate lighting the first of the prepared signal fires.

Additional supervision is required during the lighting of the signal fires. Fire safety equipment shall also be present.

The fire index is to be checked and appropriate authorities (e.g. local police, forestry service, and/or airport authority) shall be notified of the lighting of the signal fires. Authorities will be provided with the following information:

- corps contact name;
- contact number;
- location including grid reference;
- estimated time of lighting; and
- the duration the fire is expected to be lit.



Some localities may require the issue of special permission to conduct open/signal fires. Be sure permission is granted by the appropriate authorities listed above.

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PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 and TP2 to introduce the types of signal fires and to identify locations to prepare signal fires.

Demonstration was chosen for TP3 as it allows the instructor to explain or demonstrate preparing a signal fire.

A practical activity was chosen for TP4 as it is an interactive way to allow cadets to prepare a signal fire and witness the lighting of the signal fire in a safe and controlled environment.

INTRODUCTION

REVIEW

The review for this lesson will be from EO M224.05 (Prepare, Light, Maintain, and Extinguish a Fire), to include:

Selecting and Preparing Kinder. Tinder is any kind of material that a minimum amount of heat will ignite. Good tinder is dry and needs only a spark to set it ablaze. Birch bark, dry grass, fine wood shavings, bird down, waxed paper and cotton fluff from clothing all make good tinder. It is a good idea to carry tinder in a waterproof container.

Selecting and Preparing Kindling. Kindling is the wood used to raise flames from the tinder so larger, less combustible materials can be burned. The best kindling consists of small, dry twigs and small pieces of softwood. Kindling should not be collected straight from the earth because it is usually damp. It should be gathered from standing deadwood.

Selecting and Preparing Fuel. Fuel is anything that will burn in the fire. Dry wood from standing trees should be used to get fires going. Once the fire is established, greener and damp wood may be used. Hardwoods including hickory, beech, maple and oak burn well, give off heat and last as long as hot coals. The fire can be maintained for a long period of time using hardwoods.

Softwoods burn very quickly and give off sparks and can be used when lighting the fire. Softwoods include cedar, alder, hemlock, spruce, pine, chestnut and willow. After the fire is burning steadily, fuel that is three to four times the size of the kindling can be added.

OBJECTIVES

By the end of this lesson the cadets shall be expected to prepare and light a signal fire.

IMPORTANCE

It is important for cadets to be able to signal search and rescue services should they become lost during an expedition. One method of signalling, which can identify a cadet’s location by air or ground searchers, is the use of signal fires. Signal fires represent an important survival skill that may one day save a cadet’s life.

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Teaching point 1 **Determine Types of Emergency Signal Fires**

Time: 5 min Method: Interactive Lecture

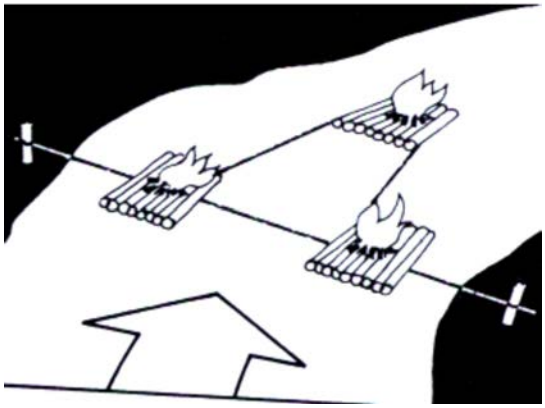


As each signal is discussed, show cadets an example of each. Make sure cadets fully understand how to ignite each fire.

EMERGENCY SIGNAL FIRES

Three Fire Triangle Pattern

Three fires is the internationally recognized distress signal. Ideally, they should be placed in a triangle at equal distances apart, an arrangement which also makes them easier to feed with fuel. If this is not possible, any grouping will do, provided the fires are clearly separated. However, if fuel is scarce, or if one is too badly injured to maintain several fires, use only your campfire.



Wiseman, J., The SAS Survival Handbook, HarperCollins Publishers (p. 505)

Figure 1 Three Fire Triangle Pattern

A Torch Tree

Small isolated trees make excellent fire signals. Build a fire between the boughs by placing dry wood in the lower branches and ignite it so the flames flare up and ignite the foliage. Before the primary tree is consumed, cut and add more small green trees to the fire to produce more smoke. If a tree is dead, start a fire at its base. It will burn for a long time, leaving you free to attend to other signals.

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"Signalling Techniques", by Wilderness Survival. Copyright 2007 by Jalic Inc. Retrieved 12 March 2007, from http://www.wilderness-survival.net/chpt19.php

Figure 2 A Torch Tree



Always select an isolated tree to ignite to avoid starting a forest fire.

Luminous Cone Fire

On a clear and open site, make a tripod with a platform to support a fire. The platform keeps the tinder off damp ground and elevates the fire allowing it to ignite the boughs. Additional fire wood can be stored beneath it. If available, cover the cone with brightly coloured material when the fire is not lit. This will not only keep the fire dry and ready to burn, but the material itself will be noticeable and may attract attention. Remove the brightly coloured material when lighting the fire.

Keep these tripods well maintained, ensuring that wood is dry enough to light at a moment's notice. These fires are not expected to last very long as the tripod is made of wood and wood burns! Be sure to light the signal fire when someone will see it (e.g. when one hears a plane).

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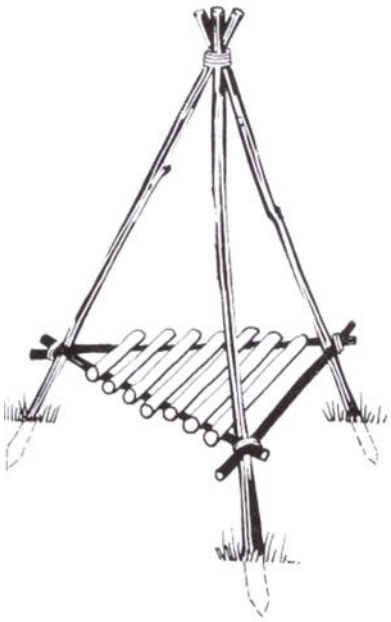

Wiseman, J., The SAS Survival Handbook, HarperCollins Publishers (p. 506)

Figure 3 A Luminous Cone Fire



Atlin Community Network Retrieved 12 March 2007, from http://www.atlin.net/Rangers.htm

Figure 4 Cone Fire

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Name three types of emergency signal fires.

Q2. Why is it important to make sure that a pot is stable when boiling?

Q3. What is an internationally recognized distress signal?

ANTICIPATED ANSWERS

A1. They are the three fire triangle pattern, the torch tree, and the luminous cone fire.

A2. Always select an isolated tree so that you do not start a forest fire and endanger yourself and others.

A3. An internationally recognized distress signal is three fires.

Teaching point 2 **Identify a Location to be Seen From the Air**

Time: 5 min Method: Interactive Lecture

BEST LOCATIONS FOR A SIGNAL FIRE TO BE SEEN FROM THE AIR

Elevated Ground. Choose the highest points of terrain for lighting signals.

Highly Visible. Find a natural clearing or the edge of a stream where one can build fires that foliage will not obscure the fire from overhead.

Fuel Source. Construct fires in an area where there are readily available fuel sources for the signal fire.

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Examples of fuel sources include:

- dry, standing wood, and dry, dead branches;
- dry inside (heart) of fallen tree trunks and branches;
- green wood that is finely split;
- dry grasses twisted into bunches;
- peat dry enough to burn;
- dried animal dung;
- animal fats;
- coal, oil shale, or oil laying on the surface; and
- rubber, plastic or heavy oil to produce thick black smoke.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is the best terrain for the location of a signal fire?

Q2. What is a highly visible location?

Q3. What are some examples of fuel sources?

ANTICIPATED ANSWERS

A1. The highest point of terrain is the best location.

A2. It is a natural clearing or edge of a stream.

A3. Some examples of fuel sources are:

- dry, standing wood, and dry, dead branches;
- dry inside (heart) of fallen tree trunks and branches;
- green wood that is finely split;
- dry grasses twisted into bunches;
- peat dry enough to burn; dried animal dung;
- coal, oil shale, or oil laying on the surface; and
- rubber, plastic or heavy oil to produce thick black smoke.

Teaching point 3 **Prepare a Signal Fire**

Time: 20 min Method: Demonstration

COMBUSTIBLE MATERIALS



Examples of combustible materials include birch bark, dry grass, fine wood shavings, bird down, waxed paper and cotton fluff from clothing.

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The luminous cone fire that has been previously constructed can act as an example for demonstration purposes.

CONSTRUCTING A LUMINIOUS CONE FIRE

To construct a luminous cone fire:

1. Locate three 2 m (about 6 feet) sticks about the thickness of an adult's wrist or thicker.

2. Stand sticks on end forming a tepee style structure. Sticks can be driven into the ground to make the structure secure.

3. Sticks should meet at a point leaving approximately 30 cm (1 foot) from the end. This will provide enough room to make a cone of boughs on top of the structure.

4. Lash the tripod together where all sticks meet.

5. Construct a platform approximately 45 cm to 60 cm below the point where the sticks meet.

6. The platform should be made of sticks that are wrist thick so when the fire is lit it will not burn rapidly through.

7. Place kindling and tinder on the platform that will easily light, producing a burst of fire.

8. Cover the top of the tripod with green boughs making a cone shape. The heat from the fire should travel directly into the cone.

9. When lit, tremendous amounts of smoke should be produced.

MAXIMIZING SIGNAL FIRE SMOKE

Smoke is a form of visual communication. Creating large amounts of smoke that are dark and can be seen over long distances is very simple. By lighting a fire and adding any of the following fuels, dark smoke will be created.

Smoke-creating fuels:

- leaves;
- green boughs;
- wet/damp wood; and
- rubber.

Maintaining Smoke. To maintain smoke, one must constantly cover the fire with fuel that causes smoke. Be cautious not to smother the fire. If green boughs are available, pile many on a fire and the smoke produced will be thick and dense. Boughs burn quickly. Be sure to have many on hand to maintain the smoke level.

Smoke can also be produced by covering the fire for a very short period of time. Covering the fire with a blanket and raising it quickly will produce a puff of smoke.

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CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. What holds the tinder and kindling in the centre of the tripod?

Q2. What do you use to keep the cone dry?

Q3. What prevents the tripod from tipping?

ANTICIPATED ANSWERS

A1. The platform holds the tinder and kindling in the centre of the tripod.

A2. Green boughs are used to keep the cone dry.

A3. Ensure pole ends are driven into the ground to prevent tipping.

Teaching point 4 **Construct and Light a Luminous Cone Signal Fire as a Member of a Group**

Time: 20 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have cadets build a luminous cone fire.

RESOURCES

- String;
- Wood;
- Boughs;
- Tinder; and
- Kindling.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide cadets into groups of no more than nine.
2. Have cadets gather tinder, kindling and sticks.
3. Have the cadets construct a cone fire by:
    a. making a tripod to support a fire;
    b. using the string to lash the top of the tripod together and the side supports together;
    c. ensuring stick (pole) ends are driven into the ground to prevent tipping;

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d. making a platform to hold the tinder, kindling and fuel;

e. placing tinder and kindling in the centre of the platform;

f. ensuring tinder and kindling are placed together in a fashion that will ignite the cone;

g. ensuring there is sufficient ventilation allowing oxygen to feed the fire when lit (a fire will suffocate if there is too much fuel);

h. covering with green boughs (if available) to keep the cone dry; and

i. ensuring there is a heat and smoke outlet at the top of the cone.



Ensure that all the cadets in the group participate in the activity.

If there are more than two groups, limit the number of signal fires to be lit. The burning of additional resources will waste materials and harm the environment.

Continually inspect the construction of each signal fire and periodically ask the cadets the questions in the confirmation of TP3 to ensure they are correctly assembling the signal fire.

SAFETY

Cadets will be supervised during the construction of the luminous cone fire.

END OF LESSON CONFIRMATION

The cadets' construction of a luminous cone fire in TP4 will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

When lost, the cadet will apply the S.T.O.P. principles. Planning will include construction of a signal fire. Knowing how to construct a signal fire in a survival situation will help attract help to the survival location. Safety is a key concern when dealing with fire. Principles of fire safety must be applied before lighting a fire.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

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