ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL THREE

INSTRUCTIONAL GUIDE

SECTION 7

EO C390.02 – INTERPRET CONTOUR LINES

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-803/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.

Photocopy the handouts located at Annexes F and H for each cadet.

Create slides of Annexes G and I.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP 1 to illustrate to the cadets how to interpret contour lines.

A practical activity was chosen for TP 2 as it is an interactive way to introduce cadets to interpreting contour lines in a safe, controlled environment. This activity contributes to the development of ground navigation skills and knowledge in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have interpreted contour lines.

IMPORTANCE

It is important for cadets to be able to interpret contour lines in order for them to navigate through or around different elevations.

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Teaching point 1 **Explain How Contour Lines Are Interpreted to Indicate the Shape of the Ground**

Time: 15 min Method: Interactive Lecture

HOW CONTOUR LINES ARE INTERPRETED TO INDICATE THE SHAPE OF THE GROUND

Through learning how to interpret contour lines, cadets will be better able to understand the relationship between contour lines on the map to the features on the ground.

Relief

Relief, or elevation, is the shape of the ground on a vertical plane. Relief on a map is the representation of the height and shape of the ground in intervals of metres or feet.

There are two distinct elements in the representation of relief, including:

- **Representation of Height.** This is a fact-based representation of the height of the land and of landforms. Differences in appearance on the map (as compared to the ground) will arise from the type, density and accuracy of the information provided.
- **Representation of Shape.** This may be largely artistic, and the methods used will vary between maps.

Contour Lines and Intervals

A contour line joins points of equal elevation in relationship to sea level, and is the standard method of showing relief on topographical maps.

Contour lines are shown at a regular vertical interval. This difference in height between contours lines is called contour interval. The contour interval is always stated in the margin of the map, normally near the graphic scales.

Contour lines are normally drawn as continuous brown lines. Every fourth or fifth contour line is called an “Index Contour” and is shown by a thicker brown line. This helps when reading and counting the contour lines to determine a height.

The Shape of the Ground

Interpreting contour lines provides a visualization of the shape of the ground, which is shown on the map by contour lines and contour intervals. Correct interpretation of the shape of the ground from interpreting contour lines requires practice. It is essential to study the various features, comparing the map to the ground in each case.

Types of Slopes

- **Steep.** Contour lines are close together. There is less distance to travel to gain or lose elevation.

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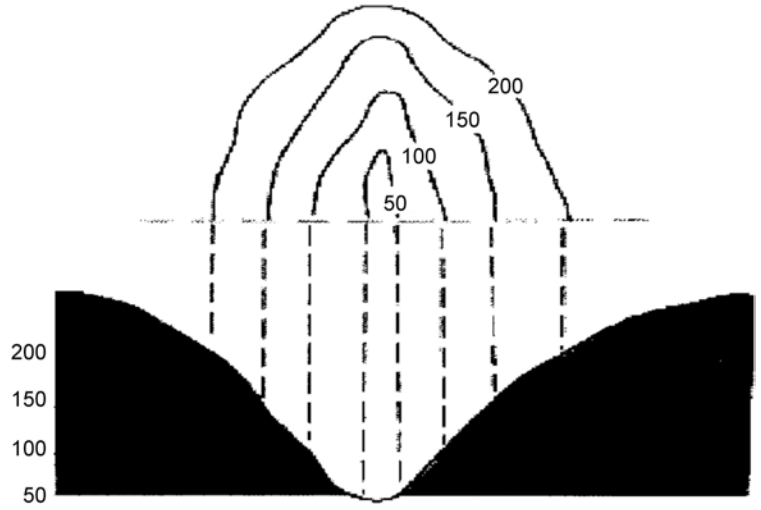

Canadian Forces, Maps, Field Sketching, Compasses and the Global Positioning System, Department of National Defence (p. 32)

Figure 1 Steep Slopes

- **Gentle.** Contour lines are further apart. There is a greater distance to travel to gain or lose elevation.

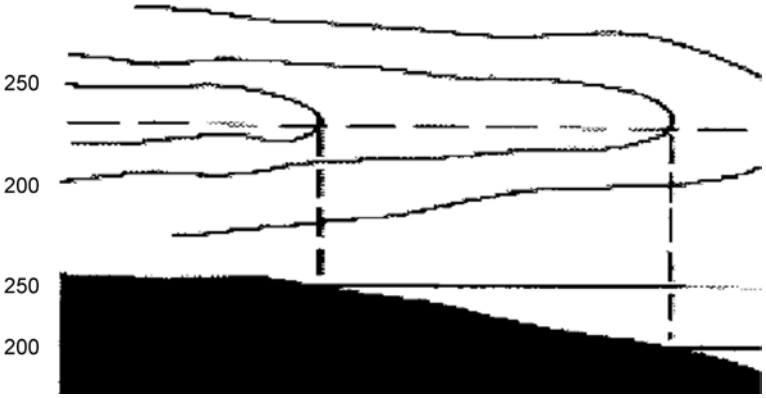

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Figure 2 Gentle Slope

- **Uniform.** Contours are an equal distance apart. The slope remains constant in its rise/decline, whether the slope is steep or gentle.
- **Convex.** The spacing between contour lines moving down a slope decreases. The middle of the slope seems to bulge outward – appearing convex.

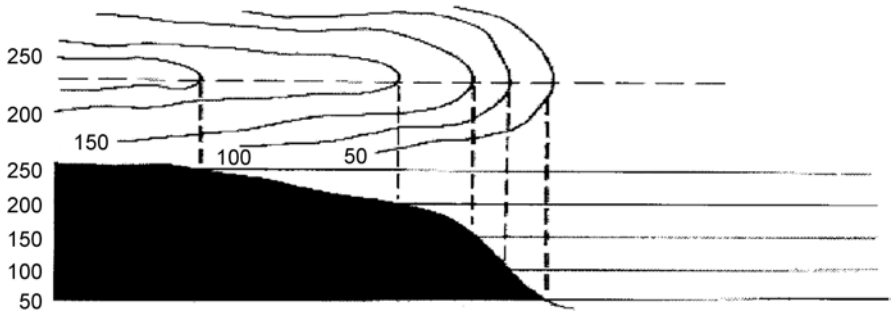

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Figure 3 Convex Slope

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- **Concave.** The spacing of the contour lines increases towards the bottom of the slope. The middle of the slope seems to depress inward – appearing concave.

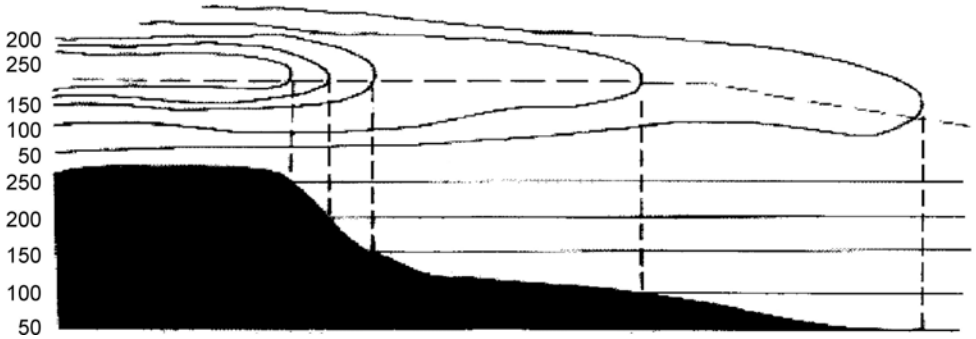

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Figure 4 Concave Slope

- **Spurs.** A contour feature that extends out from a slope.
- **Re-Entrants.** A contour feature that cuts back into a slope.

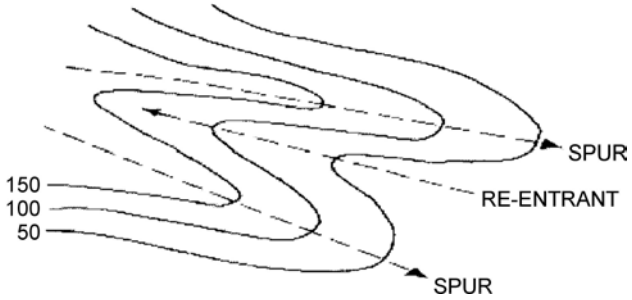

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Figure 5 Spurs and Re-Entrant



Distribute Annex F to each cadet and have them complete the worksheet. Correct the answers using the answer key located at Annex G.

CONFIRMATION OF TEACHING POINT 1

The cadets' completion of the matching contour line worksheet will serve as the confirmation of this TP.

Teaching point 2 **Have the Cadets Interpret Contour Lines**

Time: 10 min Method: Practical Activity



Have cadets work independently (or in small groups if it suits the needs of the class).

The cadets will choose the easiest route, based on slope as indicated by the contour lines.

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ACTIVITY

OBJECTIVE

The objective of this activity is to have the cadet interpret contour lines on a map.

RESOURCES

- Contour line worksheet located at Annex H, and
- Relief version of map located at Annex I.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Hand out contour line worksheet.
2. Have cadets draw a route, based on the features (especially elevations), on their map.
3. Have cadets explain why they chose their route, emphasizing the contour lines that would be traversed.
4. When cadets have finished, display the slide of Annex I and discuss the terrain and its affects on possible routes.



Inform the cadets that there is no right answer. Routes chosen can be based on many factors, such as: differing hiking abilities, fitness levels, personal preferences, etc.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' completion of the two contour line worksheets will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

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CLOSING STATEMENT

It is important for cadets to be able to interpret contour lines in order to navigate through or around differences of elevation. This skill will require practice.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A2-041 B-GL-382-005/PT-001 Canadian Forces. (2006). *Maps, Field Sketching, Compasses and the Global Positioning System*. Ottawa, ON: Department of National Defence.

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