ROYAL CANADIAN SEA CADETS

PHASE FOUR

INSTRUCTIONAL GUIDE

SECTION 5

EO C423.01 – PLOT A POSITION USING A THREE-BEARING FIX

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-604/PG-001, *Phase Four Qualification Standard and Plan*, 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.

Set up the classroom or training area so that cadets can work in pairs at tables suitable for chartwork.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A demonstration and performance was chosen for TP 1 as it allows the instructor to explain and demonstrate a three-bearing fix while providing an opportunity for the cadet to practice the skills under supervision.

A practical activity was chosen for TP 2 as it is an interactive way for the cadets to plot a position on a chart using a three-bearing fix. This activity contributes to the development of navigation skills in a fun and challenging way.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall be expected to plot a position using a three-bearing fix.

IMPORTANCE

It is important for cadets to plot a three-bearing fix as it is an accurate way of fixing a position by a visual means. Plotting a fix ensures the small vessel's safety during navigation.

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Teaching point 1 **Demonstrate and have the cadets plot a position on a chart using a three-bearing fix.**

Time: 25 min Method: Demonstration and Performance



To better understand the principles outlined, it is important to know the following terms:

Heading. The direction in which the bow of the small craft is pointing. Headings are expressed in degrees (°)—000 through 360.

Bearing. A line of position sighted from a small craft to another object. Only true bearings can be plotted on charts.

Lines of Position (LOPs). Lines that are plotted on a chart for the bearings taken of objects.

A fix. The intersection of two or more LOPs. While a fix can be made with two LOPs, it is considered more accurate to use three LOPs in every fix. An ideal three-bearing fix should have 60-degree angles between the LOPs.



True bearings are obtained from a gyrocompass. Small craft are not normally fitted with a gyrocompass due to their weight and size.

If taking bearings from a small craft, a handheld magnetic compass may be used to obtain the bearings. However, these bearings must be converted to true bearings before plotting them on a chart.



Throughout this TP, all bearings given in examples and exercises are to be considered true bearings.

Three-Bearing Fix

In order to plot a three-bearing fix, three LOPs must cross at a specific point.



Cadets will follow along with the instructor as the following bearings are plotted.

Example: Plot the following fix on *Chart 3441*:

	East Pt. light	010°
0800	Skipjack I. light	085°
	Monarch Hd.	326°

1. Align the parallel ruler with the centre of the compass rose and 010° on the outer ring of the compass rose.
2. Roll the ruler along the chart until the edge aligns with East Pt. light.
3. Draw a line from the light along the ruler.

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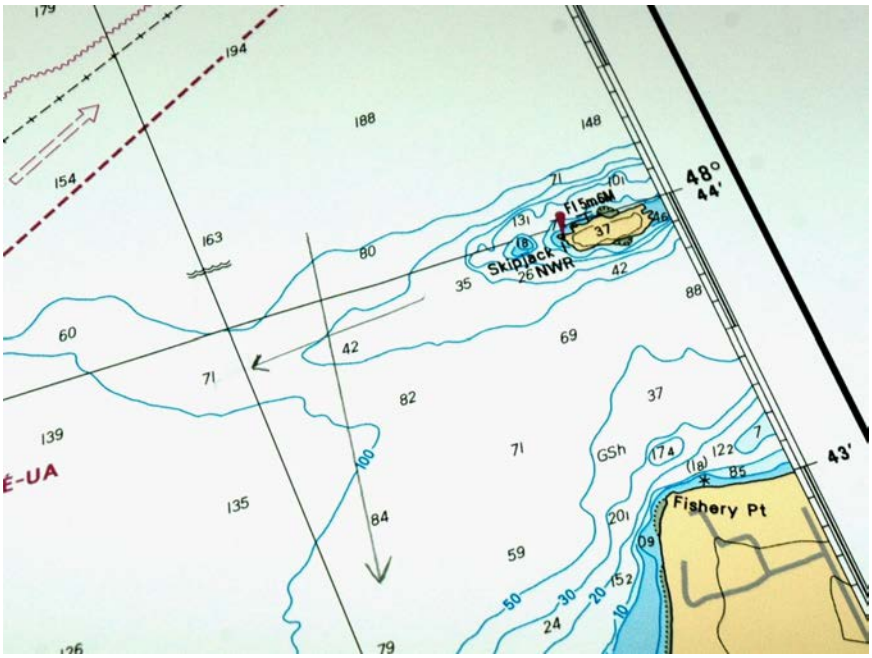
4. Repeat Steps 1–3 for the other two bearings. After the first LOP is plotted, the remaining LOPs are only drawn across the first LOP plotted.



Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Figure 1 Three-Bearing Fix Step 4

5. Once an LOP is drawn it can be shortened to the same size as the diameter of a quarter.



Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Figure 2 Three-Bearing Fix Step 5

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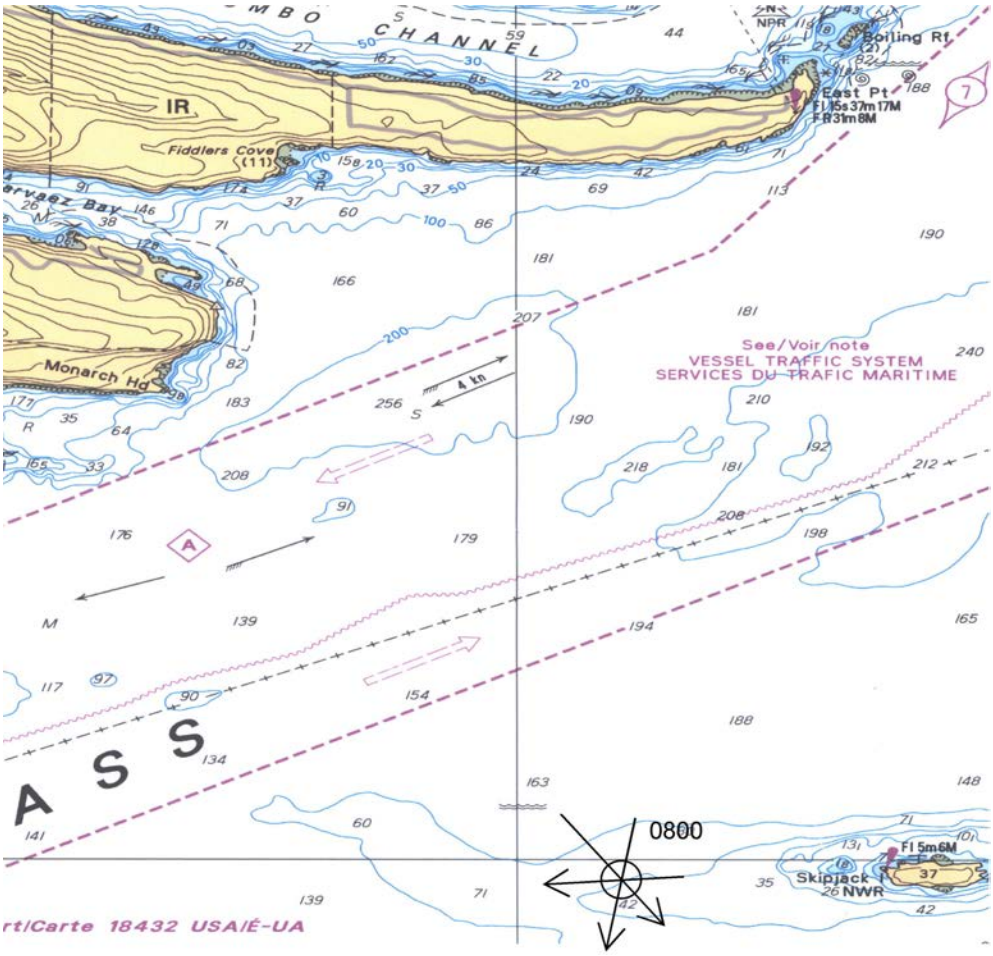
6. Draw arrows at the outer ends of the LOPs pointing away from the object. These arrows indicate the direction in which the observer must lie from the observed object.

7. Circle the intersection of the three LOPs and label with the four digit time the bearings were taken next to the fix.



Note. Created by Director Cadets 3, 2008, Ottawa, ON: Department of National Defence.

Figure 3 Three-Bearing Fix Step 7

When plotting LOPs, plot from the black dot at the bottom of the symbol or from the edge of the points of land.

When referring to edges of land, it is common to use RHE for right-hand edge and LHE for left-hand edge.

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CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. How long are the lines of the fix?

Q2. When drawing the arrows on the LOPs, which way do the arrows point?

Q3. What does LHE and RHE mean?

ANTICIPATED ANSWERS:

A1. The diameter of a quarter.

A2. Away from the object.

A3. Left-hand edge and right-hand edge.

Teaching point 2 — **Conduct an activity where the cadets will plot positions on a chart using three-bearing fixes.**

Time: 25 min — Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to familiarize the cadets with using LOPs to plot a position using a three-bearing fix.

RESOURCES

- *Chart 3441 Haro Strait, Boundary Pass and / et Satellite Channel*, and
- Navigation Instruments.

ACTIVITY LAYOUT

1. Place *Chart 3441* and navigation instruments on each table.
2. Have cadets sit in pairs at the tables.

ACTIVITY INSTRUCTIONS

On *Chart 3441*, have the cadets plot the following fixes:

	Gowlland Pt.	025°	0930	Thieves Bay light	050°
0900	Turn Pt.	225°		Canoe Rk. light	181°
	Wallace Pt.	319°		Beaver Pt. light	310°
	RHE Russell I.	000°	1030	Pt. Fairfax light	090°
1000	Isabella I. light	294°		Greig I. day mark	160°
	Kanaka Bluff light	060°		Dock I. light	190°

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If the fixes are plotted correctly, the following symbols should be identified:

0900–Border between Canada and USA.

0930–64 m depth.

1000–Contour line around 34 m hole.

1030–44 m depth.

Check to ensure the cadets are using the correct symbol for a fix:

(1) Arrows away from the object.

(2) Circle around the intersection of the LOPs.

(3) Four digit time next to the fix.

(4) Each fix no larger than the diameter of a quarter.

SAFETY

Nil.

CONFIRMATION OF TEACHING POINT 2

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

END OF LESSON CONFIRMATION

The cadets' completion of the activity in TP2 will serve as the confirmation of this lesson

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

CLOSING STATEMENT

Locating a position on a chart is an important skill which cadets can use whenever they navigate small craft. Accurate navigation will allow the cadets to safely navigate and complete their objectives.

INSTRUCTOR NOTES / REMARKS

Nil.

REFERENCES

C1-165 ISBN 1-57409-052-6 Larkin, F. (1998). *Basic coastal navigation*. Dobbs Ferry, NY: Sheridan House Inc.

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