ROYAL CANADIAN SEA CADETS

PHASE FIVE

INSTRUCTIONAL GUIDE

SECTION 3

EO C523.02B – COMPLETE A FIXING PAPER

Total Time: 90 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the completion of this self study package are listed in the lesson specification located in A-CR-CCP-605/PG-001, *Phase Five Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the self study package within the section for which they are required.

Self study packages are intended to be completed by the cadet independently. More information about self study packages can be found in the foreword and preface.

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

Photocopy the self study package located at Attachment A for each cadet.

Photocopy the answer key located at Attachment B but **do not** provide it to the cadet.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

A self study was chosen for this lesson as it allows the cadet to complete a fixing paper at their own learning pace. This encourages the cadet to become more self-reliant and independent by focusing on their own learning instead of learning directed by the instructor.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have completed a fixing paper.

IMPORTANCE

It is important for the cadet to complete a fixing paper as it allows them to practice their navigation skills in a safe and controlled environment. The fixing paper will require the cadet to use their knowledge to perform chartwork, work out a result and respond with the correct information as if they were on the bridge of a vessel.

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SELF STUDY PACKAGE INSTRUCTIONS

OBJECTIVE

The objective of this self study package is to have the cadet complete a fixing paper.

RESOURCES

- Self study package,
- *Chart 3441 Haro Strait, Boundary Pass and / et Satellite Channel*,
- Navigation instruments, and
- Pen / pencil.

ACTIVITY LAYOUT

Provide the cadet with a classroom or training area suitable to complete the self study package.

ACTIVITY INSTRUCTIONS

1. Provide the cadet with a copy of the self study package located at Attachment A, *Chart 3441 Haro Strait, Boundary Pass and / et Satellite Channel*, navigation instruments and a pen / pencil.

2. Allow the cadet 90 minutes to complete the self study package.

3. Provide assistance as required to the cadet.

4. Collect the self study package once the cadet has finished.

5. Correct the self study package with the fixing paper answer key located at Attachment B.

6. Provide feedback to the cadet and indicate whether or not they have completed the enabling objective (EO).

7. Return the completed self study package to the cadet for their future reference.

8. Record the result in the cadet's logbook and Cadet Training Record.

SAFETY

Nil.

END OF LESSON CONFIRMATION

The cadet's completion of the self study package will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK / READING / PRACTICE

Nil.

METHOD OF EVALUATION

Nil.

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CLOSING STATEMENT

It is important for you to complete a fixing paper as it allows you to practice your navigation skills in a safe and controlled environment. The fixing paper will require you to use your knowledge to perform chartwork, work out a result and respond with the correct information as if you were on the bridge of a vessel.

INSTRUCTOR NOTES / REMARKS

EO C523.02B (Complete a Fixing Paper) may only be completed by cadets who have completed all complementary navigation EOs during Phase Four training.

REFERENCES

C1-164 C-57-007-002/AF-001 Royal Navy. (1987). *Admiralty manual of navigation* (Vol. 1). (Rev. 1987). London, England: Her Majesty's Stationery Office.

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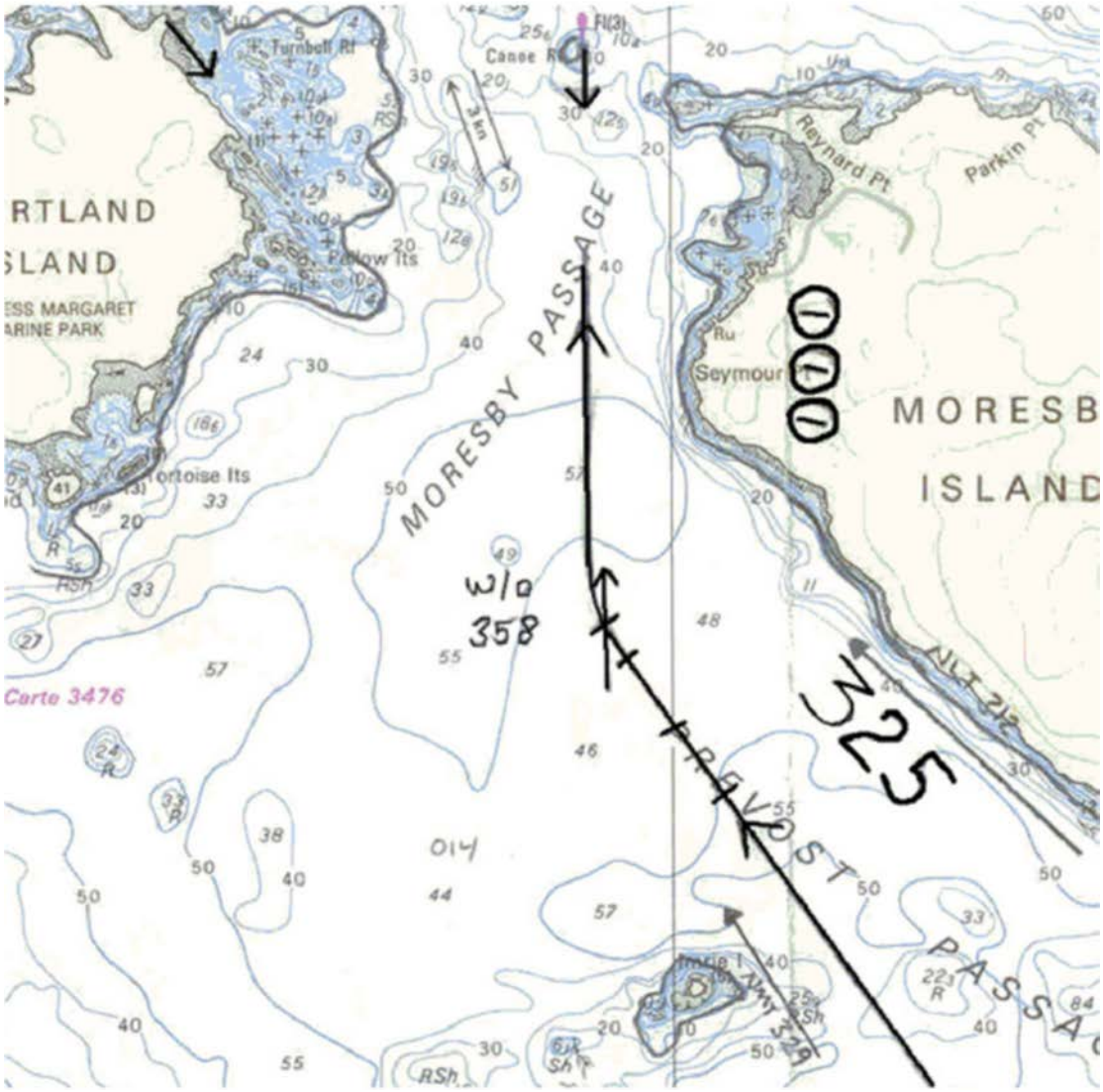
COMPLETE A FIXING PAPER



Self Study Package

Section 1: FIXING PAPER TERMINOLOGY

Section 2: COMPLETE A FIXING PAPER

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SECTION 1
FIXING PAPER TERMINOLOGY

INTRODUCTION

A fixing paper is a set of written instructions that simulate the execution of a ship's passage, allowing the navigator to practice their skills in a safe and controlled environment. Each instruction requires the navigator to use their knowledge to perform chartwork, work out a result, and respond with the correct information as if they were on the bridge of a vessel.

FIXING PAPER TERMINOLOGY

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

Course Made Good / Course to Steer (CMG / CTS)

The vessel's direction is affected by wind and current, which is sometimes difficult to predict. After taking two good fixes, the vessel's actual course or CMG can be found. The CMG shall be labelled using a three-digit number and two open arrowheads on the track. The CTS is the actual course that the helmsman steers and is indicated in brackets when it differs from the CMG.

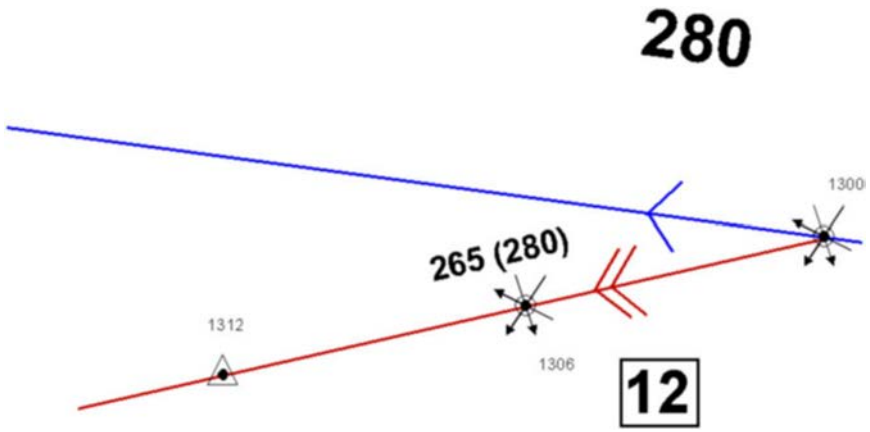

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Figure BA-1 CMG / CTS

Speed Made Good / Speed Rung On (SMG / SRO)

The vessel's set speed, or speed rung on, is also affected by wind and current. By measuring the distance between two good fixes and dividing by the time interval between them, the SMG can be calculated.

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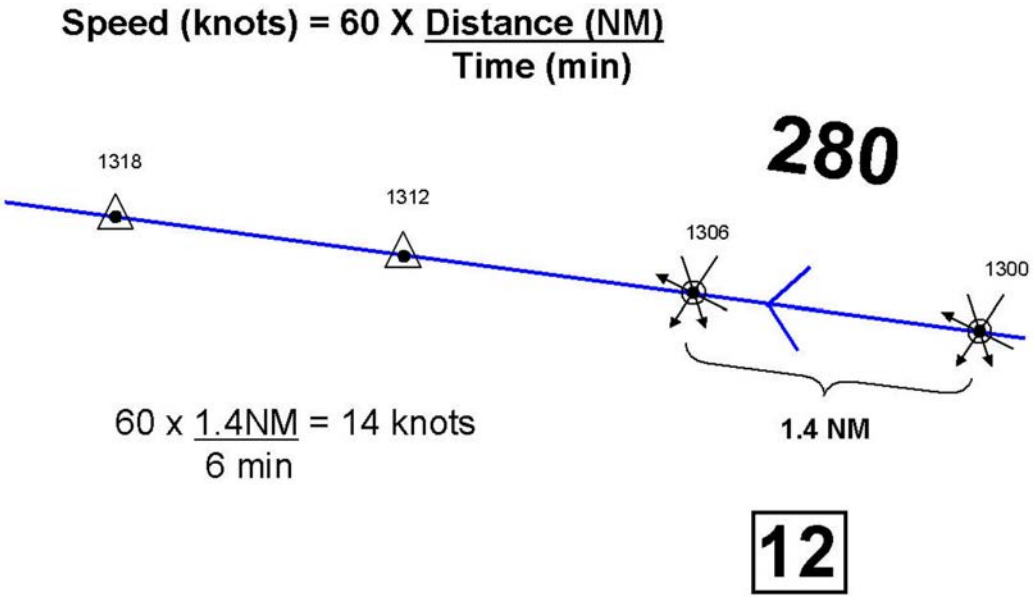

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Figure BA-2 SMG / SRO

Estimated Position (EP)

An EP is the continuous plotting of a course and position based on the vessel travelling at a constant speed over a set time period. As learned previously, a dead reckoning (DR) assumes the vessel's actual speed was the same as that ordered by the engine telegraphs. If the navigator has calculated the actual speed of the vessel, a more precise estimate of where the vessel will be in the future can be made. The symbol to denote an EP is a dot surrounded by a triangle, drawn in a north–south orientation.

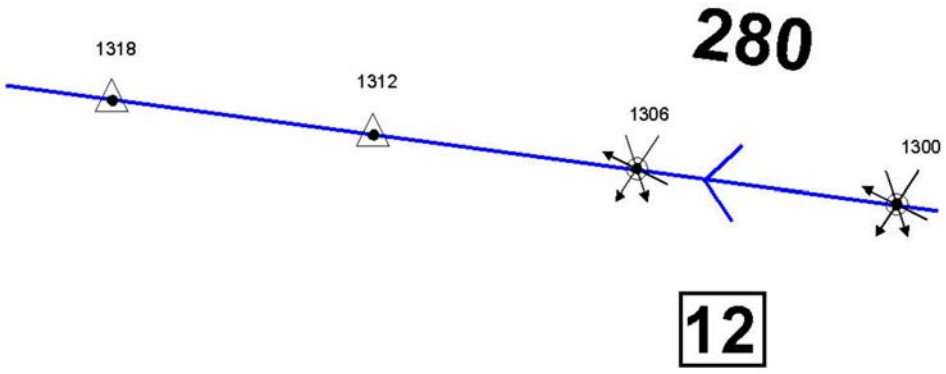

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Figure BA-3 Estimated Position

Gyro Error

A gyrocompass is a navigational instrument used on a vessel to indicate its direction in relation to True North. Due to the electromechanical nature of a gyrocompass, errors can exist in the direction indicated. Therefore, the gyrocompass should be checked throughout the voyage. If a gyrocompass is not correct, any fixes taken

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with it will also exhibit the same error. For example, a three-bearing fix is taken that produces a fix known as a cocked hat (as illustrated in Figure 4).

1300	Danger Shoal	155
	Arachne Reef	267
	LHE D'Arcy Island	195

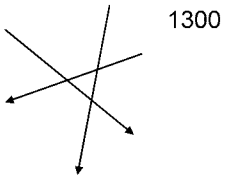

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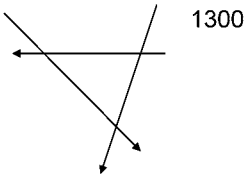
Figure BA-4 Cocked Hat

By using a trial and error type procedure known as fix reduction, degrees can be manually added or subtracted from the three bearings (as illustrated in Figure 5) to find the gyro error. If the gyrocompass reads higher than the actual bearing, the error is high and must be subtracted.

ADD 1

1300	Danger Shoal	155	**156**
	Arachne Reef	267	**268**
	LHE D'Arcy Island	195	**196**

Result: Larger cocked hat



SUBTRACT 2

1300	Danger Shoal	155	**153**
	Arachne Reef	267	**265**
	LHE D'Arcy Island	195	**193**

Result: Fix, Gyro Error is 2° high

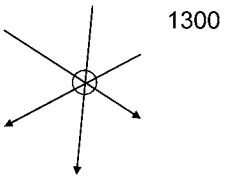


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Figure BA-5 Fix Reduction

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SECTION 2
COMPLETE A FIXING PAPER

Using *Chart 3441 Haro Strait, Boundary Pass and / et Satellite Channel*, complete the fixing paper below. Show all work on the chart using the correct symbology. Answer any questions in the space provided.

Q#	TIME	QUESTION	ANSWER
1	1030	Use *Chart 3441 Haro Strait, Boundary Pass and / et Satellite Channel*. The ship's position was read from the GPS as: 48° 41.0'N, 123° 05.0'W. You are steering course 310° and have Speed 10 rung on. Show DRs for 6 and 12 minutes.	
2	1036	Skipjack I light 048° RHE Stuart I 268° RHE Blunden I 322° Plot the fix.	
3		Where are you in relation to your track? Explain how far off, to which side and why you could be off track.	
4		Properly label CMG, SMG and the EP for minute 42 on the chart.	
5	1048	Gowlland Pt 1.91NM Satellite I 1.95NM Sandy Pt 3.32NM Plot the fix. Show two DRs.	
6		Alter course to 275° Speed 12. Lay down and label the new track from the last fix.	
7	1056	Turn Pt light 227° Tilly Pt 344° Gowlland Pt light 023° Plot the fix. Show SMG and DRs for 6 and 12 minutes.	
8	1108	Turn Pt 208° at 1.68NM Plot the fix. Show 6 and 12 minute EPs.	
9	1114	Pelorus Pt 1.32NM Parkin Pt 2.02NM Parkin Pt 282° Plot the fix.	
10		A fishing vessel has been reported taking on water in position 48° 38.0'N, 123° 15.1'W. Plot the vessel's position. Determine the CTS and DR time to the vessel at your current speed.	
11	1116	Pt Fairfax light in transit with Dock I light 233°	

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Q#	TIME	QUESTION	ANSWER
		Turn Pt light 151° Plot the fix.	
12		Does the chart agree with the gyro? If not, what was the gyro error?	
13	1128	Pt Fairfax light 263° Arachne Rf light 233° Turn Point light 134° Plot the fix.	
14	1132	RHE Comet I 251° Rum I light 212° Arachne Rf light 280° Plot the fix. Show the SMG, CMG, 6 and 12 minute DRs. What is the DR time to the distressed vessel?	
15		Alter course to 180° and increase speed to 20 kts from the 1132 fix.	
16		How close will you pass to the position of the fishing vessel? What time will this be?	
17		What country are you in at 1132?	
18	1146	As you stop to help the fishing vessel, the visibility closes in. When all way is off the ship the following fix is taken: RHE Mandarte I 274° LHE Halibut I 211° Hamley Pt 1.28NM Plot the fix.	
19	1206	Having saved the fishing vessel, you are now ready to proceed. LHE Halibut I 274° Halibut I 0.80NM Hamley Pt 1.28NM Plot the fix.	
20		How far have you drifted and in what direction? Calculate the speed the vessel has drifted at.	
21		From your last fix, what would be the CTS and speed needed to reach a position with Kelp Rf. light at 270° and five cables away by 1234?	



Congratulations, you have completed your self study package on EO C523.02 (Complete a Fixing Paper). Complete the following exercise and hand your completed package to the Training Officer / Course Officer who will record your completion in your Phase Five logbook.

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FIXING PAPER – ANSWER KEY

Cadet:_____ **Date:**_____

Q#	Answers	Mark
1.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12, ☐ Course Label, ☐ Speed Box, ☐ Plot Correct	/ 7
2.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	/ 4
3.	☐ 0.15NM (300x), ☐ Port, ☐ Wind or Current	/ 3
4.	☐ CMG: **299**, ☐ SMG: **11 kts**, ☐ Course Label (CMG[CTS]), ☐ EP Correct	/ 4
5.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	/ 4
6.	☐ Track correct, ☐ Course Label, ☐ Speed Box	/ 3
7.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12, ☐ SMG: **12.8 kts**,	/ 5
8.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	/ 4
9.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	/ 4
10.	☐ Plot correct, ☐ CTS: **176**, ☐ DR Time: **27 min @ 1141**	/ 3
11.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	/ 4
12.	☐ Does the chart agree? **NO, 1° LOW**	/ 1

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Q#	Answers	Mark
13.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	**/ 4**
14.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12, ☐ SMG: **12.7 kts**, ☐ CMG: **176**, ☐ DR Time: **13 min @ 1145**	**/ 7**
15.	☐ Track correct, ☐ Course Label, ☐ Speed Box	**/ 3**
16.	☐ Distance: **0.2NM (400x)**, ☐ Time: **8 min @ 1140**	**/ 2**
17.	☐ Country: **USA**	**/ 1**
18.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	**/ 4**
19.	☐ Fix, ☐ Track, ☐ DR 6, ☐ DR 12	**/ 4**
20.	☐ Distance: **0.9NM**, ☐ Direction: **164**, ☐ Speed: **2.7 kts**	**/ 3**
21.	☐ Plot position, ☐ CTS: **164**, ☐ Speed: **10**	**/ 3**
All answers should be accurate to within 100x for distances, 2 minutes for times, 2 knots for speeds and 2 degrees for bearings.		**/ 76**

Evaluator's Notes:

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