



YACHTMASTER EXERCISES FOR SAIL & POWER

Questions & Answers for the
RYA Coastal & Offshore Yachtmaster Certificate

2ND EDITION



ALISON NOICE

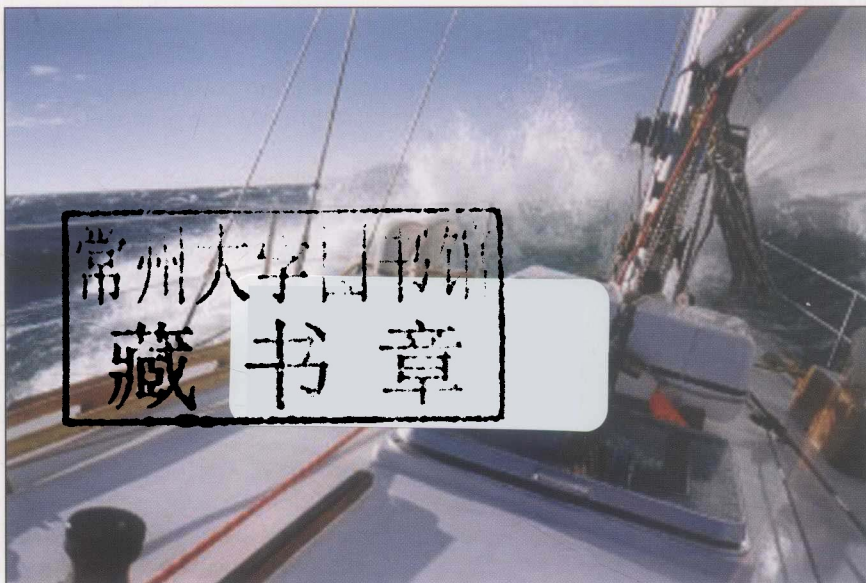
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Introduction

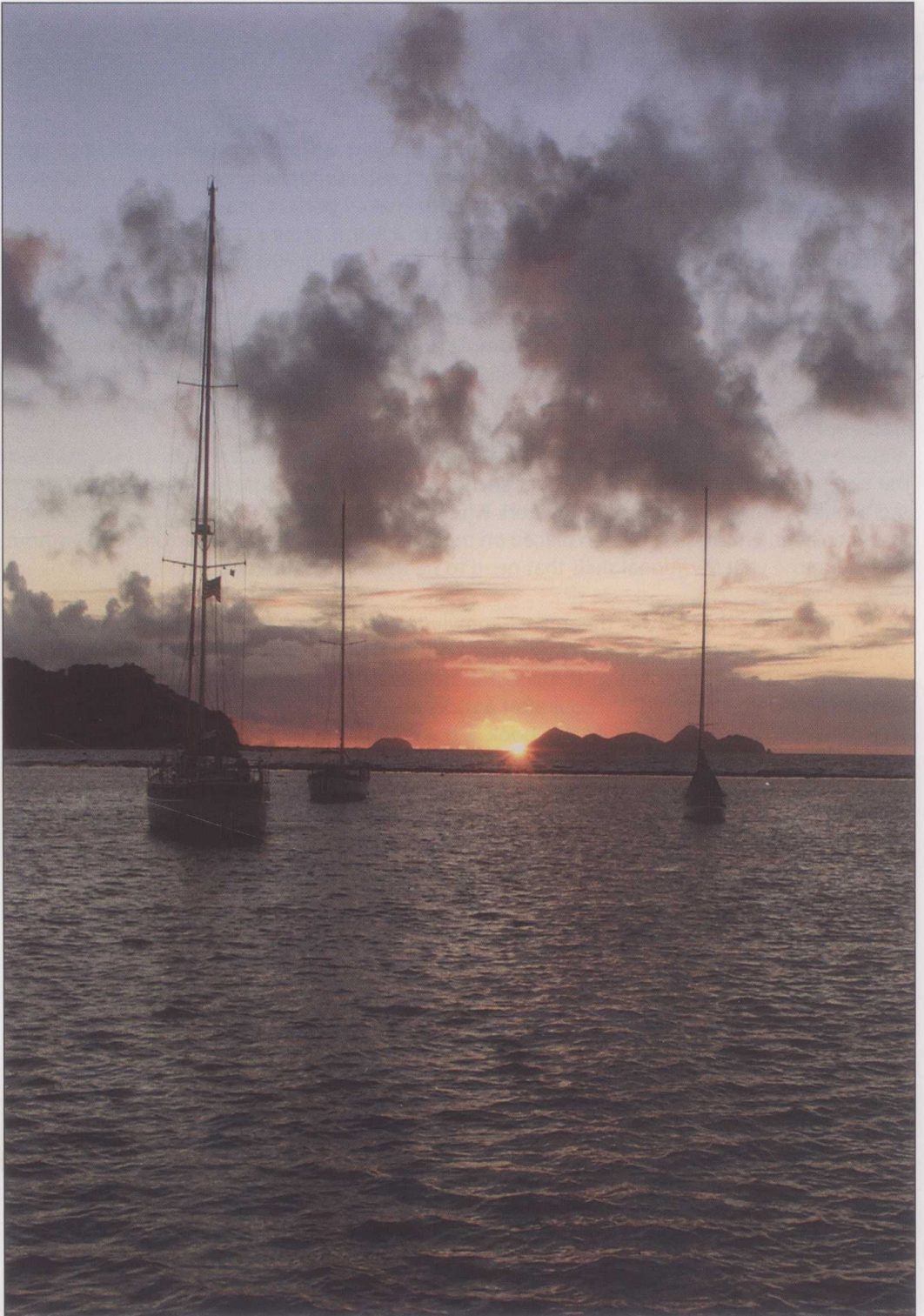
This book of exercises has been written to give student navigators the chance to perfect chartwork and seamanship skills learned from books such as *Yachtmaster for Sail and Power* or from RYA Navigation courses. The saying 'practice makes perfect' may sound trite, but it is infinitely preferable to get to grips with a subject in a warm, secure classroom than when the wind and sea are making life uncomfortable!

The subjects covered in the exercises are those in the RYA Coastal and Yachtmaster syllabus, and each exercise is graded with the more complex questions at the end. A Stanfords Channel Island chart has been included for the chartwork and passage planning exercises; this has proved ideal for the job as it gives a variety of places to visit, and rocky channels for pilotage problems.

The comprehensive step-by-step answer section explains how a solution has been achieved and should help establish an order of work when solving problems involving tidal height and course to steer. Emphasis has been placed on the use of modern electronic equipment without neglecting the vital traditional skills that need to be used in conjunction with them.

Finally, remember that all this theoretical knowledge needs to be put to good use where it matters most – out on the water. A few days spent navigating a boat on a coastal cruise is of more value than weeks spent in the classroom. There is nothing that surpasses the joyous feeling of entering a peaceful harbour after a tricky but safe passage with good friends as crew. After all, isn't that why you bought this book in the first place?

Alison Noice



Sunrise over Tortola

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1 | Charts

1.1

Is a straight line drawn on a Mercator chart:

- a) a rhumb line? b) a great circle?

1.2

Are the lines of latitude and longitude curved or straight on a Mercator chart?

1.3

From where can you obtain corrections for Admiralty charts?

1.4

How can electronic charts be updated?

1.5

What are the meanings of the following chart symbols?

- a)  b)  c)  d)  e)  f) 

1.6

In which Admiralty publication can the symbols above (and more) be found?

1.7

Charts can be based on a number of different datum. Which datum is used for the Stanfords chart enclosed with this book of exercises?

1.8

WGS 84 is the datum normally used by satellite navigation systems. What correction should be applied to WGS positions before it is plotted onto the Stanford's chart?



Safely moored.

2 | Compass

Use the Stanfords Channel Island chart to assist with answers to questions 2.1, 2.5, 2.10 and 2.11.

2.1

What is the magnetic variation to the west of Jersey in the year 2010?

2.2

A compass can suffer from deviation. Explain the meaning of this statement. What are some of the possible causes of deviation?

2.3

Your autopilot is fitted with an electronic compass. Is this device subject to deviation?

2.4

You are at a boat jumble looking for a new steering compass for your fast sports boat. The vendor tells you that the one he is offering has been taken off a small yacht.

Will it be suitable for your boat? Give reasons.

2.5

You are in the vicinity of Plateau des Roches Douvres (left-hand side of the practice chart) and wish to fix your position using a handbearing compass.

Would a position so found be accurate or have a possible error? Give reasons.

2.6

What is the MAGNETIC bearing for each of the following?

- a) 034°T Variation 12°W
- b) 001°T Variation 3°E

2.7

What is the TRUE bearing for each of the following?

- a) 180°M Variation 2°W
- b) 351°M Variation 12°E

2.8

Use the deviation card (Fig 2.1) to calculate the TRUE course for each of the following. Variation is 3°W.

- a) 157°C c) 000°C
- b) 215°C d) 310°C

2 • EXERCISES • 2

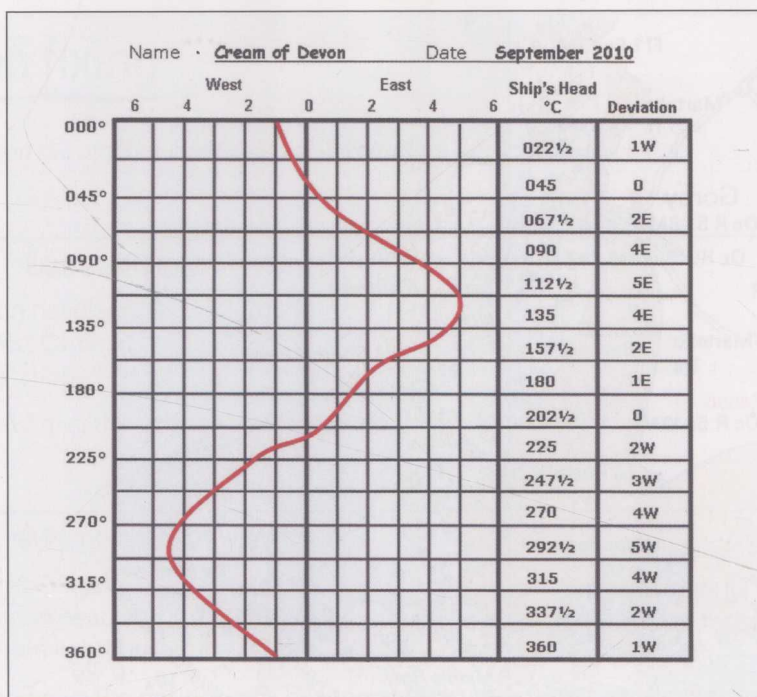


Fig 2.1 Deviation card.

2.9

You are shaping a course to steer on the chart and will have to adjust for leeway in addition to variation and deviation before a compass course can be given to the helmsman.

In what order should the corrections be applied?

2.10

A helmsman is approaching Guernsey from the southeast, keeping the Lower Heads South Cardinal Buoy in transit with the Al WR (alternating white and red) light on St Peter Port breakwater. The stream is slack and the magnetic variation is 3°W.

What is the deviation if the compass reading is 309°C? (Use the inset chart on the left-hand side of the practice chart).

2.11

In 2010, a boat is approaching Gorey (on the eastern side of Jersey) at slack water. The helmsman is using the leading lights in line to check the compass as he enters the harbour (see Fig 2.2).

If the compass reads 304°C, what is the deviation, if any? (Use the compass rose to the south of Jersey and round up or down to the nearest whole degree.)

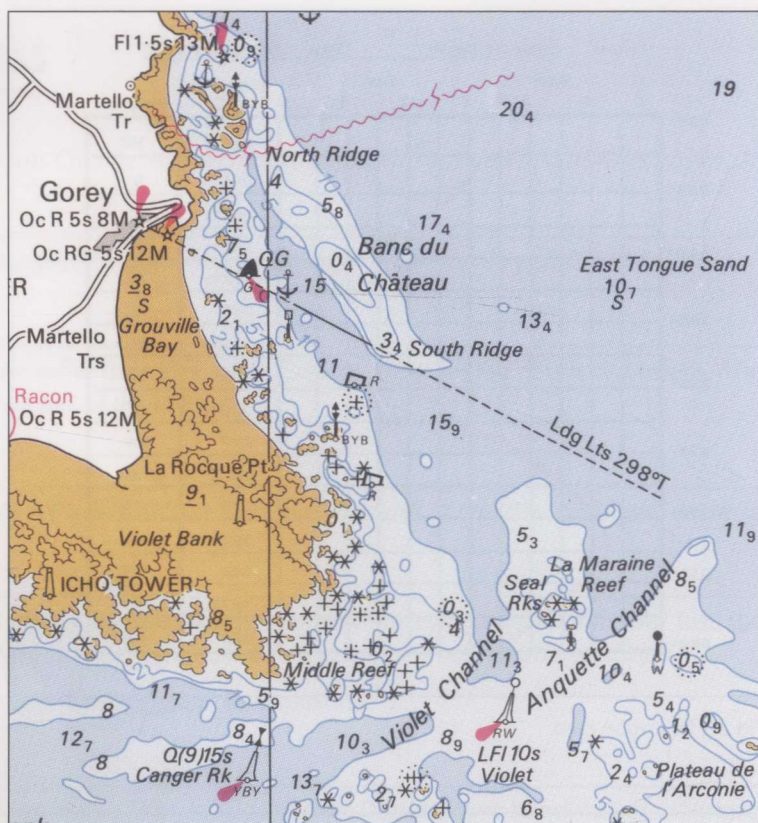


Fig 2.2 Leading lights for Gorey.

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3 Position fixing

Plot the fixes on the practice chart using $3^{\circ}W$ variation.

3.1

At 0930, the following bearings were taken to the northeast of St Malo:

Monument on headland	209°M
Rochefort West Cardinal	260°M
Coastguard station	171°M

Plot the fix and give the latitude and longitude.

3.2

At 1030, the following bearings were taken.

Water tower at Cancale	241°M
Signal station on headland	293°M
Pierre de Herpin lighthouse	350°M

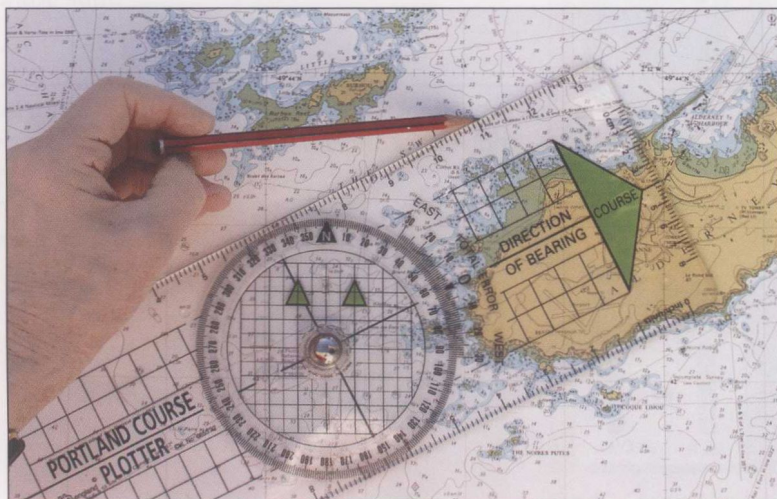
Plot the fix and give the position as a bearing and distance from Cancale breakwater light.

3.3

At 0740, the following bearings were taken in moderate to poor visibility from a boat to the northeast of St Malo:

Rochefort West Cardinal	073°M
St Servantine Buoy	232°M

Comment on the reliability of this fix.



Marking a position line to plot a fix.

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3.4

At 1430, when a boat on passage is near the southeast corner of Îles Chausey, the navigator notices that Le Pignon East Cardinal Mark is coming into transit with La Haute Foraine East Cardinal Mark. She takes a bearing on Les Huguenans isolated danger mark as they come into line. The bearing is 278°M .

Plot the fix. What is the depth below chart datum in that position?

3.5

The skipper of a boat on passage between Granville and St Malo has entered a special GPS waypoint at the centre of the compass rose closest to St Malo, to make position plotting less prone to error. At 1330, the position is given as 023°T 4.9M to the waypoint.

Plot this position and comment on how the position could be confirmed.

3.6

A boat with no GPS is on passage between St Malo and Granville on a night when the forecast is for fog banks. About halfway through the passage, the boat enters a fog bank but the skipper decides to continue towards Granville while keeping an accurate plot.

Later, at 0215, the fog clears in the local area and the depth sounder reads 14m (reduced to CD). At the same time, the following lights can be seen:

- a) *To port* Two white lights almost in line. One of them occults 4 seconds and the other flashing every 5 seconds.
- b) *Ahead* A white light, very weak and difficult to see above the waves. One crew member thinks that it has nine flashes. It is difficult to take an accurate bearing of the buoy but it is thought to be within 5 degrees of 075°M .

Plot the boat's approximate position and draw the area of uncertainty.

Would it be safe to approach Granville if the fog comes down again?

4 Buoy, Lights and Lighthouses

4.1

What is the significance of the buoys in the photos below?

What is the colour and sequence of the light on each?

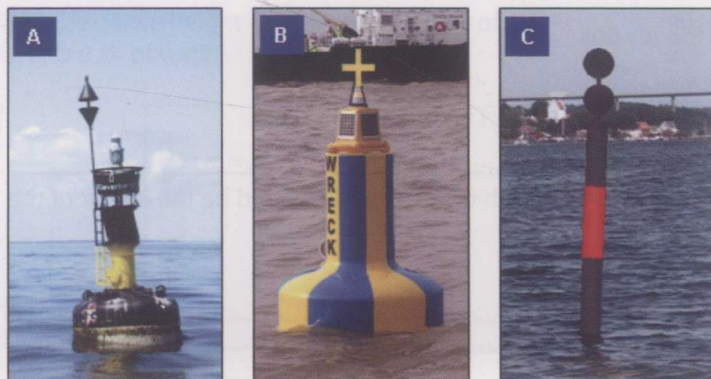


Fig 4.1 Buoys.

4.2

Using the Channel Islands chart, identify the type of buoy:

- in position $49^{\circ} 41'4N$ $01^{\circ} 44'5W$.
- in position $308^{\circ}T$ 1.9M from Le Grand Jardin lighthouse (north west of St Malo).

4.3

Explain the difference between a *flashing*, an *occulting* and an *isophase* light.

4.4

- Which of the two posts in Fig 4.2 should be inserted at the division of the two channels if the one to the right were the preferred channel?
- What colour light would this post have?
- What would be the sequence of the light?

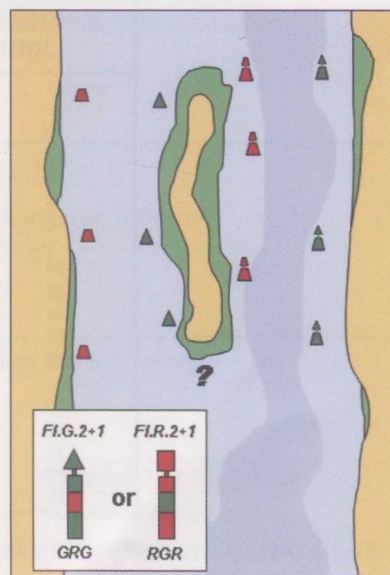


Fig 4.2 Channel buoyage.

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4.5

The leading lights into St Malo from the northwest are described as FG.

What is the meaning of this abbreviation?

4.6

Point Corbière lighthouse on the southwest corner of Jersey is shown as having the following characteristics:

Iso WR 10s 36m 18/16M Horn Mo (C) 60s

Describe *in full* what this means.

4.7

From a position $49^{\circ} 18'2N$ $002^{\circ} 08'6W$ to the north of Jersey, what would be the colour of the light at:

- Sorel Point lighthouse?
- Grosnez Point lighthouse?

4.8

Use the rising and dipping table in Figure 4.3 to determine whether it is possible to see the light on Grand Léjon from the beach at Pléhérel Plage (on the mainland to the south east of the light)?

Lights – distance off when rising or dipping					
Height of Light		Height of Eye			
metres	feet	metres	1	2	3
		feet	3	7	10
10	33		8.7	9.5	10.2
12	39		9.3	10.1	10.8
14	46		9.9	10.7	11.4
16	53		10.4	11.2	11.9
18	59		10.9	11.7	12.4
20	66		11.4	12.2	12.9
22	72		11.9	12.7	13.4
24	79		12.3	13.1	13.8
26	85		12.7	13.5	14.2
28	92		13.1	13.9	14.6
30	98		13.5	14.3	15.0
32	105		13.9	14.7	15.4
34	112		14.2	15.0	15.7
36	118		14.6	15.4	16.1
38	125		14.9	15.7	16.4

Fig 4.3 Dipping Distance Table.

5 | Tidal Heights

5.1

Which of the letters in the illustration (Fig 5.1) refer to the following?

- | | | |
|-----------------------|---------------------|--------------------|
| i) Chart datum | v) MLWN | ix) H.A.T. |
| ii) MHWS | vi) Charted depth | x) Charted height |
| iii) Clearance height | vii) Height of tide | xi) MHWN |
| iv) Depth of water | viii) MLWS | xii) Drying height |

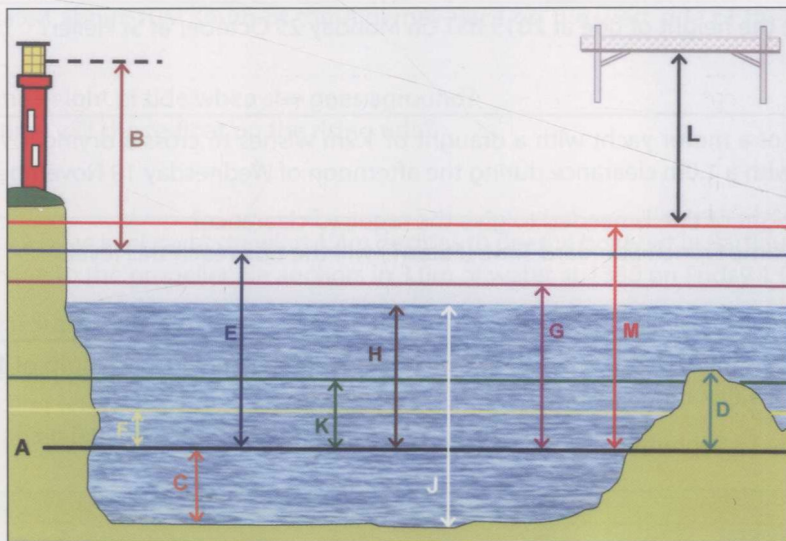


Fig 5.1 Tide levels.

5.2

The height of tide in Jersey (centre of chart) is calculated as 7.1m.

- What is the depth of water 0.5M south of the inner leading light at Gorey?
- What is the depth of water in position $49^{\circ} 09'.1N$ $02^{\circ} 12'.0W$?

5.3

Use the tidal information given for St Helier (Fig 5.2) to answer the following:

- What is the height of Point Corbière light above the water at MLWN?
- What depth of water will there be at MHWS over the shallowest part of the Violet Bank (southeast of Jersey)?
- If a boat drawing 2.0m is anchored in the shallowest part of St Aubin Bay (south Jersey) at MHWN, what clearance will there be under the keel?

Standard Port ST HELIER					
Height (metres)					
HAT	MHWS	MHWN	MLWN	MLWS	
12.2	11.0	8.1	4.0	1.4	

Fig 5.2 St Helier levels.

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- d) What will be the clearance under a power cable with a clearance height of 14.0m at MLWS at St Helier?

5.4

A bridge across a channel is shown as having a clearance height of 13m. The charted depth under the bridge is 0.8m and HAT is 5.7m.

What minimum height of tide will be needed for a boat drawing 1.5m and having an air draught of 15.0m to pass under the bridge with a minimum 1.0m clearance both under the boat and above the mast?

5.5

What will be the height of tide at 2015 BST on Monday 25 October at St Helier?

5.6

The skipper of a motor yacht with a draught of 1.2m wishes to cross a drying 1.5m patch off Cherbourg with a 1.0m clearance during the afternoon of Wednesday 10 November.

- a) What height of tide is needed to give the required clearance?
b) At what time French Standard Time (FStanT) will the tide reach this level?

5.7

What is the minimum depth of water in which to anchor a boat with a draught of 1.8m to give a clearance of 1.0m at the next LW?

Date: Monday 13 September. Place: St Helier. Time of anchoring: 1000 BST.



Waiting for the tide at Emsworth.