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Towing with the dinghy

In harbour, it pays to tow alongside so you can stop the yacht. Secure the dinghy tightly under the quarter (four ropes, complete with springs) with the outboard motor propeller abaft the yacht's rudder. That way the dinghy can steer the yacht by shoving her stern around until she has enough way on to gain control herself. If the prop is forward of the rudder, this won't happen. Towing ahead, use a bridle as usual, but bear in mind that the yacht has huge inertia compared with the dinghy. This creates some odd situations. Don't think about steering with the dinghy as such. Just point the outboard propeller in the way you want to turn and don't worry where the dinghy seems to be pointing. Once you have good way on, keep in line with the yacht's bows and let her helmsman do the steering.

SKIPPER'S TIP

Living with the neighbours

Make sure your crew always cross another boat forward of the mast, and tell them to be aware of noise. A twanged shroud or a clumsy boot on a stowed booming-out pole when you creep back aboard at closing time will not endear your team to anyone. Keep it quiet is the watchword!

Locks can seem hairy places – and some are! However, careful line tending generally keeps things in order.

ANCHORING 8

The onset of large-scale marina development has led to a decline in anchoring as an everyday occurrence. Serious cruising yachts still do it regularly, but a growing number of marina-hoppers from the Western world's great yachting centres hardly anchor at all. This is an unmitigated blessing because it keeps the wilder harbours, rivers and roadsteads clear of gleaming fleets.

During our time ocean cruising, my wife and I spent literally hundreds of nights and days lying to various types of ground tackle in different boats. I can count on one hand the occasions on which we dragged, and they were all predictable. The right tackle well deployed is always a better bet than a mooring of unknown quality.

Anchors do not work by virtue of their weight alone. They sink their teeth into the seabed, and won't let go until you are ready to wrest them clear. Their mass is built up largely to assist them in doing this. All anchors dig in by being pulled along the bottom in as horizontal a direction as can conveniently be achieved. Heaving the hook over the bow and tying off the rode when the ironmongery hits the ground serves no purpose at all. The minimum effective length of chain cable for all practical anchoring is three times the depth of the water (Fig 8.1). This is known as a 3:1 scope; ideally it should be increased to at least 5:1 if you are

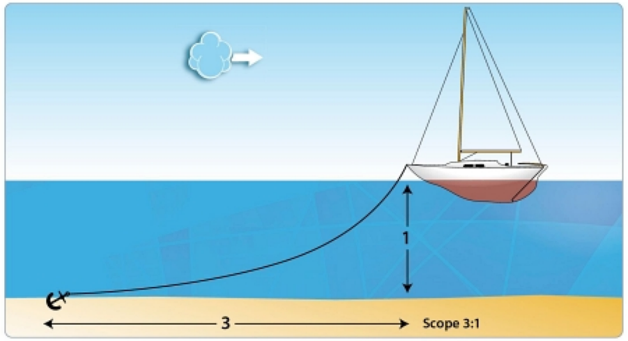


Fig 8.1 Classical anchoring.

depending upon whether the tide in question is a spring or a neap. Differences for such ports are given in relation to MHWS (Mean High Water Springs), MHWN (Neaps), etc.

In the greater tides of northern Europe, the tidal difference is given in relation not only to springs and neaps, but also in terms of the actual *zone* time of High and Low Water. This sounds complicated, but if you study the illustration for differences on London Bridge (Fig 14.2), you'll see that it is really quite straightforward.

In practice, one rarely ends up with a time that is given in the secondary-port information. Normally you want one somewhere in between. In these cases you must *interpolate*. Thus, if you want the time difference at Tilbury and the time of High Water is 0600 (Fig 14.2), you are three hours into the six (0300 to 0900) given at the top of the column. The difference for Tilbury at 0300 is –55 minutes. At 0900 it is –40 minutes. The difference therefore diminishes by 15 minutes in 6 hours, which is 2½ minutes per hour. By 0600 it will have dropped by 2½ minutes multiplied by 3, or 7½ minutes, so the difference at 0600 is going to be –47½ minutes. The negative sign shows that this is subtracted from the London Bridge time to find the time at Tilbury.

TIDES +0252 Dover; ML 3·6; Duration 0555; Zone 0 (UTC)
Standard Port LONDON BRIDGE (→)

Times				**Height (metres)**			
High Water		Low Water		MHWS	MHWN	MLWN	MLWS
0300	0900	0400	1100	7·1	5·9	1·3	0·5
1500	2100	1600	2300				
Differences TILBURY							
–0055	–0040	–0050	–0115	–0·7	–0·5	+0·1	0·0

Notes

- +0252 Dover – the Mean HW time difference is 2h 52 mins after Dover.
- ML – Mean sea level.
- Duration – the average time between Low and High Water at Tilbury.
- Standard Port tells you which to use. The arrow shows which way to move in the book to find it.
- Time differences – when a time difference is given as 0115, it means '1 hour and 15 minutes', NOT '115 minutes'.

Fig 14.2 Secondary port tidal differences from *Reeds Nautical Almanac*.

Height differences require similar interpolation in these cases. They are given at springs and neaps, but often you are halfway in between. European tables give mean spring and neap ranges on the tidal curves. If you can't find these, or there aren't any, it is easy enough to run your fingers down a month's tidal heights and see how yours compares with the highest and the lowest. Once you have this information, commonsense can be applied to the problem and a surprisingly accurate answer produced in your head.

I work my secondary port tides by using a simple box diagram that in the days of my freedom I sketched on the back of a cigarette packet. Now that I've kicked the habit, I use a handy ring-

bound pad that lives under my chart table. The diagram for the calculation above looks like this: let's say HW London Bridge is 0600 and 6.5m, with LW London Bridge at 1500 and 0.9m.

HW London Bridge (from standard port tide table)	0600 UT	6.5m (half spring/neap)
Difference Tilbury (from almanac via interpolation data)	–00 47.5 mins (Say 48 mins)	–0.6m (from almanac)
HW Tilbury	0512 UT	5.9m

LW London Bridge	1500 UT	0.9m
Difference Tilbury*	–00.55	0**
LW Tilbury	1405 UT	0.9m

The issue of interpolating secondary ports causes more grief than any other item in the Yachtmaster syllabus. It is possible to deal with the matter graphically, and a good method is described in *Reeds Nautical Almanac*. In all honesty, it really is easier in practice to do it as described here, but there is no substitute for repetition. The answer is to set yourself problems to solve. This is not hard to arrange – I just produced one about Tilbury. It can provide a diverting way of passing a winter's evening when a power cut snuffs out the TV, when conversation drags, and you are down to your last candle.

SKIPPER'S TIP

Different authorities, different methods

In the USA, but not in Canada, height differences are stated as a ratio. The figure (expressed as a decimal, e.g. 0.91) is multiplied into the tidal height given for the standard port and that is your secondary-port figure for the day. The system is simple to operate and works well for the moderate tides generally experienced.

The French operate on a system of 'coefficients', whereby the number 20 represents a tiny neap, 45 a mean neap, 70 a mean tide, 95 a mean spring and 120, the highest number you're likely to see, an exceptional spring.

*Note that unlike the more typical six-hourly rate of change between the varying differences, in this case the difference in time between the LW figures given in the secondary port for Tilbury indicates only five hours – between 1100 and 1600. This pair is chosen here because our time of Low Water at London Bridge is 1500, which falls between them. The total difference figure of 25 minutes (between 50 minutes and 1 hour 15 minutes) is therefore divided by 5, not 6. Had the time of LW fallen between 1600 and 2300, the total time for the change to take effect would have been 7 hours, so the 25 minutes would have been divided by 7 to find the hourly rate of change.

**A decision must be made whether to go for 0m or 0.1m. You could say, 'Because we're halfway between springs and neaps it's going to be 0.05' and nobody would quarrel with you, but one must work within reasonably practical parameters. I have chosen to apply no LW height difference because that will err on the safe side of less water. Any decisions regarding how to use the information will, if need be, reflect this marginal inaccuracy. On most occasions it will be entirely irrelevant.

hours. The falling tide behaves in a similar manner. The duration of High Water and Low Water is in theory momentary, though in reality little detectable change occurs for 15 minutes on either side of the time in the tables. This is known as the *stand*.

In many places the tide conforms to this ideal, and here the Rule of Twelfths can be confidently employed for tide calculations. All you must do to use this is to work out the range of the tide (HW–LW), divide it into 12 equal parts, then decide how many twelfths you actually need. A useful mnemonic is '1–2–3–3–2–1', which describes the number of twelfths rising or falling in their 6-hour sequences. Here is an example of the Rule of Twelfths:

LW 1500 1.0m
HW 2100 5.8m
What height of tide is there at 1700?
Range = 4.8m (5.8–1.0)
$\frac{1}{12}$ = 0.4m (4.8/12)

At 1700, $\frac{3}{12}$ of the range will have risen ($\frac{1}{12}$ in the first hour, $\frac{2}{12}$ in the second).
$\frac{3}{12}$ = 1.2m

Therefore, at 1700 there will be 1.2m *above* the figure given in the tide tables for Low Water (1.0m). Rise is added to the Low Water figure to find height, so at 1700 the height of tide will be 2.2m above chart datum.

Tidal curves

In the absence of any more accurate method being offered, the Rule of Twelfths can usually be used with moderate success. However, in certain areas (notably the UK, Ireland and northern Europe generally) the tides do not conform perfectly to the sine wave principle. Sometimes the rising and falling of the waters appear eccentric in the extreme. These places are best served by a graph showing accurately what is going on. The graphs and associated tidal data (the best available) are found in *Reeds Nautical Almanac* or the Admiralty Tide Tables (ATT).

Spring and neap curves

Notice the 'mean range' box at the top right-hand corner of Fig 14.4 (p. 137) giving spring and neap ranges, with a firm and a pecked line depicted alongside it. The tide curve with the solid line is the curve for spring tides and that with a pecked line is for neaps. You can ascertain rapidly by inspection whether today's tide is a spring or a neap, or somewhere near. If it falls between the two, you will use an imaginary curve between the solid and the pecked ones. This can easily be done by estimation to a degree of accuracy more than adequate for safe navigation. No interpolation sums are required in practice.

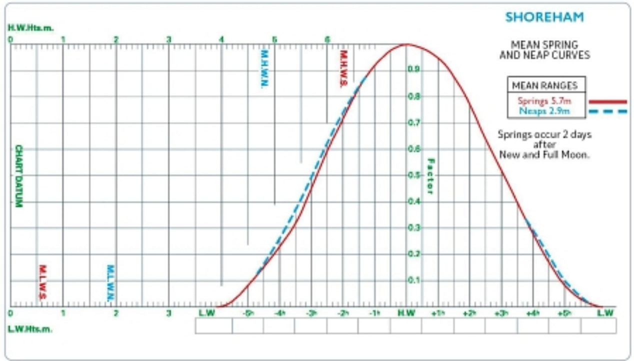


Fig 14.4 Tidal height curve for Shoreham (extract taken from *Reeds Nautical Almanac*).

The 'set up'

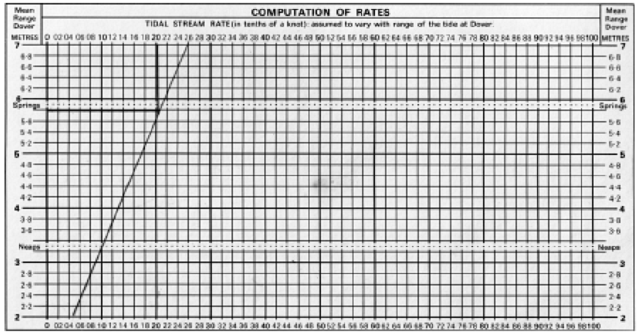
Whatever question you want to answer ('question', you notice – there are no more 'problems'), you start out by preparing the diagram for use on a given tide. Suppose we are setting it up for a day when the figures for the morning tide were as follows:

HW	5.6m	0700	
LW	1.6m	1310	range 4.0m

Notice straightaway that today's range, 4.0m, falls between the spring range of 5.7m and the neap range of 2.9m given in the mean range box. Now in order to 'set up' the diagram, draw a line (the 'line of the day') joining the height of Low Water at the bottom of the left-hand part of the picture with High Water at the top, and fill in the boxes beneath the curves for High Water and any other times of interest as in Fig 14.5. Once you have done this, you are ready to ask your question, which will probably be one of the following:

- At what time will there be a given height of tide?
- What will be the height of tide at a given time?

Let us take the first of these and be more specific: at what time on that particular morning will the tide at Shoreham have fallen to a height of 2.8m above chart datum? To find the answer you draw three straight lines, as illustrated in Fig 14.5 (overleaf).



Computation of rates table from an *Admiralty Tidal Stream Atlas*.

Computation of intermediate rates

This can, of course, be done by mental interpolation and in practice it generally is. For examination purposes, or when it really matters to be as nearly right as you can be, use the 'Computation of Rates' diagram in the tidal stream atlas (see above). To get into this, you must first find the range of tide at Dover for the tide in question. Let's say that today's is 5.8m. With this information to hand, check the atlas page for the spring and neap stream rates you want. In this case, the tabulated streams are 'Neap 1.0, Spring 2.1'. Make a pencil mark for the spring rate on the spring dotted line and vice versa for the neap. Join the two dots with a pencil line.

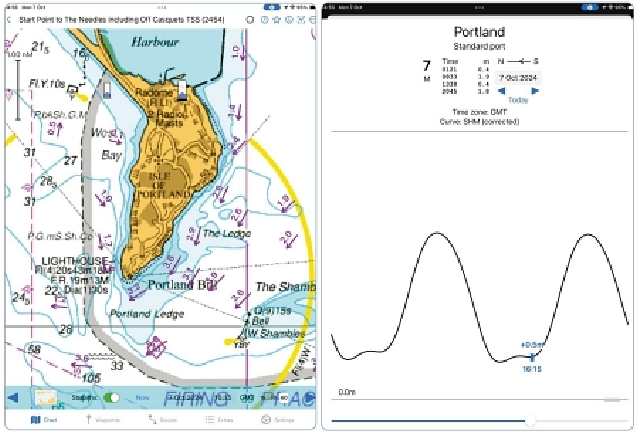
Now enter the table on the left- or right-hand side with the range of tide for Dover you just worked out. Go across from this value until you reach your pencil line, then move up or down vertically and read off the interpolated stream rate at the top or bottom. In this case, mine was 2.0 knots. Hardly worth the trouble? Maybe, but then again, maybe not!

Don't be confused because this atlas is asking for a Dover range when you might be working out a rate off Cornwall. It's just a convenient way of coming up with a 'factor' for the table to work from.

Tidal diamonds

More accurate tidal predictions are to be found on many charts. British Admiralty and USA government charts deliver this in the form of 'diamonds'. Letters of the alphabet are depicted in a diamond-shaped frame (e.g. ◇A) at various locations. The tidal streams they identify are tabulated in a convenient location on the chart, by reference to 'hours before or after High Water' at a standard port. Some charts have a dozen or more of these diamonds, others few, or none at all. Spring and neap rates are generally given in the table.

Diamonds can be very convenient for plotting vector diagrams (Chapter 20), but bear in mind that the information they give you is good only for the point at which they are sited.



Tidal information on a small-scale chart of the English Channel for Portland Bill. This is an AngelNav raster chart. Note the tidal stream arrows and, at the top of the left-hand illustration, the icon indicating where the tidal heights will be found. A tap on this icon produces the page seen here on the right giving the full Admiralty tidal curve for Portland. Not to be used for navigation

Two cables away, things may be different. Where two or more diamonds are available, study the streams at each and make an intelligent assessment of the overall position from that. A certain amount of interpolation and interpretation may well prove necessary.

Current tables

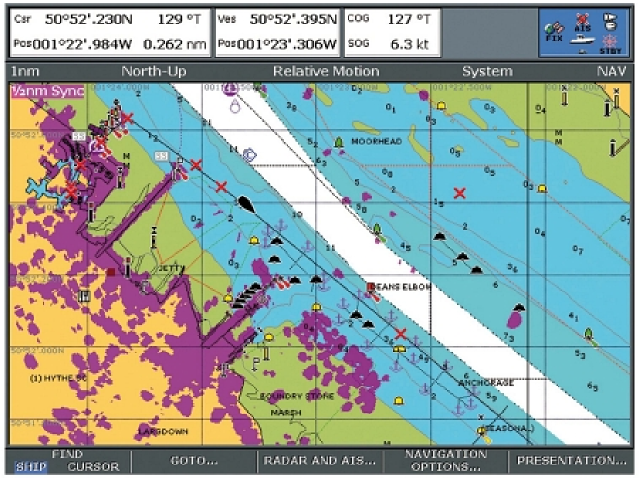
In the USA, current tables are issued and published in the almanacs. They look for all the world like tide tables, except that they give the time of slack water and the times of the maximum flood and ebb current as well as their rates. Ebb information is given in italic typeface. The similarity with tide tables even extends to the 'differences' pages, where time differences for flood, ebb and slack are given for numerous associated locations. My own favourite is the table for Hell Gate at the northern entrance to East River, New York City. The current differences are offered for such colourful locations as 'Bronx River', 'Manhattan', 'Off 31st Street', and 'Brooklyn Bridge'.

Electronic plotters

Back in 2005, when I first added a section on electronic tidal stream prediction to what was then the latest edition of this book, I noted that much work remained to be done by the

Digital radar

The first radar I used was the size of a fruit machine. It was on the bridge of a coaster way back in the 1970s. To see the cathode-ray screen, your head had to be inside a huge sight guard. Other than changing the range and various other controls, including gain, tune and clutter, there was no choice about what you could see. The glimmering green display was 'Head-up or nothing'. Today's digital, daylight sets are far more sophisticated, but a potential nest of confusion lurks under the 'display options' button, where 'Head-up', 'Course-up' or 'North-up' are generally on offer.

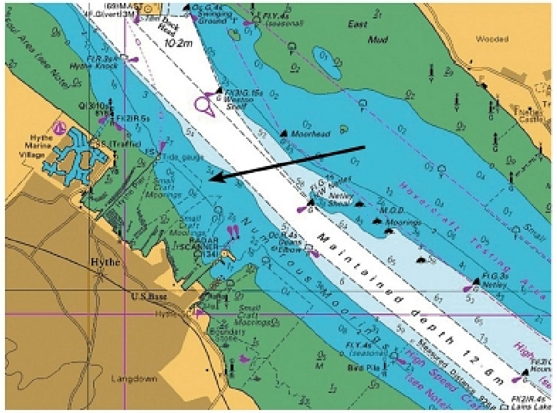


A radar overlay on a Navionics chart image delivered by a Raymarine E-series plotter. The following illustrations showing Head-up, Course-up, etc, were taken with the boat in this area.
Not to be used for navigation

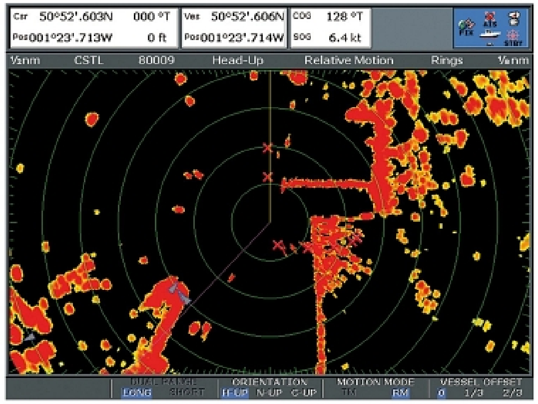
Display options

Head-up

The line representing the ship's head (the heading line) runs from the centre (your position) to the top of the screen. Nothing is fed into the computer other than radar input, so it works on its own, assuming itself to be stationary with all other objects moving around it. Its reference point for bearings is the bow of the boat. These are therefore always relative. Distances or ranges are all taken from your present position.



The same chart as on p. 254, shown in raster form for clarity. Note that the dock head which appears on some subsequent radar images is just off the screen at the top. The position of the boat in the image on p. 254 is marked with an arrow. Not to be used for navigation



A Head-up radar image. The boat is travelling south-eastwards but straight up the radar screen. Note the clearly defined square corner of Hythe Marina over her starboard quarter, and the long jetty on her starboard bow. As in all radar images, the boat's position is at the centre of the rings.